

Artefacts, history and assemblage formation at Te Hoe whaling station, New Zealand

IAN SMITH and NAOMI WOODS¹

Manufacturing date ranges for ceramic vessels, glass bottles, clay pipes and selected metal artefacts at Te Hoe whaling station, Hawkes Bay, New Zealand are compared with each other and with two historically identified phases of occupation at the site (c.1842–1857, 1864–1896). This supports the frequently observed pattern of ceramic vessels having a longer use-life than either glass bottles or clay pipes. It also shows a markedly longer time-lag for ceramics from the second phase of occupation, which is interpreted here as indicating that the remnant whaling community had limited engagement with mainstream New Zealand society throughout the later nineteenth century.

INTRODUCTION

The 1860s were a time of significant change in New Zealand. The discovery of gold stimulated an influx of immigrants that raised their population numbers above those of the indigenous Maori, and also expanded the range of ethnic groups forming distinctive components of the New Zealand population. Simultaneously the political landscape was transformed by the onset of wars between some sections of the indigenous and immigrant populations. Smith (2008) proposed that the beginning of this decade marked a watershed between two periods of New Zealand's culture history: the Pakeha period, which began with the first on-shore settlements by non-Maori in 1792; and the Kiwi Period, which persists to the present. It was noted that several features of the artefactual record, such as embossing on the sides of bottles and ceramics with stand-alone banded rims, first appeared at about the same time, but that further research would be needed to characterise the material assemblages for each of these periods. Woods (2011, 2012) examined the occurrence of ceramics in Pakeha period sites and identified characteristics that had production ranges known to have ended before 1860, along with those that were most common or popular before that date. Using these 'known early' and 'probably early' criteria Woods applied this model to ceramic assemblages from Te Hoe whaling station, demonstrating that all the chronologically sensitive items were definitely or probably manufactured prior to 1860. This was a somewhat surprising result, as historical information indicated that although most whaling at the site was earlier than 1860, there was occupation of the site after that date. In this paper we reassess the manufacturing date ranges of ceramics from the site, along with dates for clay pipes, glass bottles and selected metal artefacts, placing these alongside historical evidence for occupation at the site, and consider implications of these observations for assemblage formation.

TE HOE AND HAWKES BAY WHALING

Te Hoe is located on the Mahia Peninsula at the northern end of Hawkes Bay on the east coast of North Island, New Zealand (Figure 1). Shore whaling in Hawkes Bay began relatively late compared to the South Island and Cook Strait areas (Prickett 2002). The first stations were probably established in 1837 at Waikokopu and Te Mahia (Anon. 1868), a few kilometres north of Te Hoe. The earliest whalers here were mostly from the Bay of Islands (Mackay 1966:147). In contrast to earlier phases of shore whaling which were managed predominantly

by Sydney-based merchants, Hawkes Bay whaling was operated by Wellington and Auckland merchants (Prickett n.d.). With newspapers and official records only just emerging from these centres at this time, the historical record for the initial years of Hawkes Bay whaling is sparse. Nonetheless it is clear that the main years for operation of the industry here were between 1840 and c.1853 (Anon. 1868; Dinwiddie 1916; Mackay 1966; Prickett 2002).



Figure 1: The location of Te Hoe and other whaling stations on Mahia Peninsula, northern Hawkes Bay.

Direct evidence for when whalers operated at Te Hoe is limited. The site is not referred to explicitly by name until 1853 when the Protestant missionary John Hamlin visited, holding a service in 'the master's house, who professes to be a papist' (Hamlin n.d.:25 July 1853). This was almost certainly Joseph Carroll, a Sydney-born Irishman (Ward 1993), who is known to have run a whaling operation at Te Hoe (Lambert 1925:369). An 1850 newspaper account refers to 'Joseph

1. Department of Archaeology and Anthropology, University of Otago, Dunedin 9054, New Zealand: ian.smith@otago.ac.nz; naomijanewoods@gmail.com

Carroll's party, Pleasure Bay' (*Wellington Independent* 26 June 1850:2) in a geographically-ordered listing of Hawkes Bay stations that places it in the correct location for Te Hoe. Just how much earlier Carroll operated there is unclear. It is thought that he arrived in Hawkes Bay from the Bay of Islands in 1842 (Harris n.d.) and other whalers reported to have whaled out of Te Hoe, including Captain Mansfield, Captain Perry, James Moodie, George Noyes, Samuel Harrington and Daniel O'Keefe, all appear to have been present in the Bay during the 1840s (Lambert 1925:369-372; Prickett 2008:361). Neither Te Hoe nor Pleasure Bay, however, are listed in summaries of Hawkes Bay whaling stations that were published for the years 1843–1847 (Prickett n.d.) although, as Prickett cautions, such listings are demonstrably incomplete in several other parts of the country. Thus while some uncertainty must remain, it seems likely that whaling began at Te Hoe at some time during the 1840s. Carroll's activities at Te Hoe ceased in the mid 1850s and he was whaling out of Wairoa, 40 km to the west, when his son James was born in 1857 (Ward 1993). In the same year Daniel O'Keefe was buried at Te Hoe (information from gravestone erected by his descendants in 1995), which may mark the end of its life as a whaling settlement.

In 1864 the paddle steamer *Ballarat* was driven ashore at Te Hoe during a storm. Captain White reported that 'with the assistance of our sails and some old whares [Note that *whare* is the Maori term for a building used for domestic or communal purposes, and was adopted into New Zealand English with the usual meanings of either 'a Maori house' or 'a rough or make shift hut or cottage' (Orsman 1997:904-5)], we managed to find shelter from the storm and drenching rain – myself and wife finding comfortable quarters in the house of Mr Smith, a settler living at this place' (*Hawkes Bay Herald* 28 June 1864:2). This was John Jackson Smith (Johann Hacken Schmidt or Hake Mete) born in Prussia who had come to Hawkes Bay in the late 1830s or early 1840s, served as a boat builder and whaler at several stations including Te Hoe, and married Tauari Paraparakurekure, a high born woman from Nuhaka (Lambert 1925; Molenaar 1973). His activities at Te Hoe appear to have turned increasingly towards farming. The *Hawkes Bay Crown Land Sales Act 1870* provides a schedule of persons entitled to complete the purchase of land over which they had entered into contract with the Maori owners prior to the Crown purchase of the Mahia Block in 1864, and lists John Smith as entitled to 'Agricultural Section 1, Mahia', which a later map shows at Te Hoe (Smith and Prickett 2008:Figure 4). Smith and his sons continued whaling on a part-time basis; John, Peter and Thomas are listed as 'whalers' in *Wise's Directory of New Zealand for the years 1875-76* (Feilding 1875), and the 1878 edition adds their location as 'Le Hoe' (Prickett n.d.). They continue to be listed in this directory until 1896, but by 1898 had relocated to Nuhaka, marking the end of known settlement at Te Hoe.

The foregoing suggests that there were two phases of nineteenth-century occupation at Te Hoe: a period focused more or less exclusively on whaling, beginning c.1842 and ending about 1857; and from at least 1864 through to 1896 when it was primarily a family farm with whaling conducted on a part-time basis. While it is possible that there was some occupation in the period between these phases, they nonetheless provide a useful framework for the organisation of evidence from archaeological excavations at the site.

Excavations at Te Hoe

Excavations were undertaken at the site (NZAA site number Y19/82) in January-February 2005 (Smith and Prickett 2008). These examined ten areas (Figure 2), eight of which disclosed evidence of nineteenth-century occupation. The only occupa-

tional evidence in Area 6 derived from pre-European occupation, radiocarbon-dated to the fifteenth century, while that in Area 9 comprised a mid-to-late twentieth-century rubbish pit; these two areas are excluded from further discussion here. Evidence of pre-European occupation found in lower layers of Areas 1, 2 and 3 will also be excluded from the present discussion. The areas yielding nineteenth-century remains are described briefly below; full descriptions of these are available elsewhere (Smith and Prickett 2008).

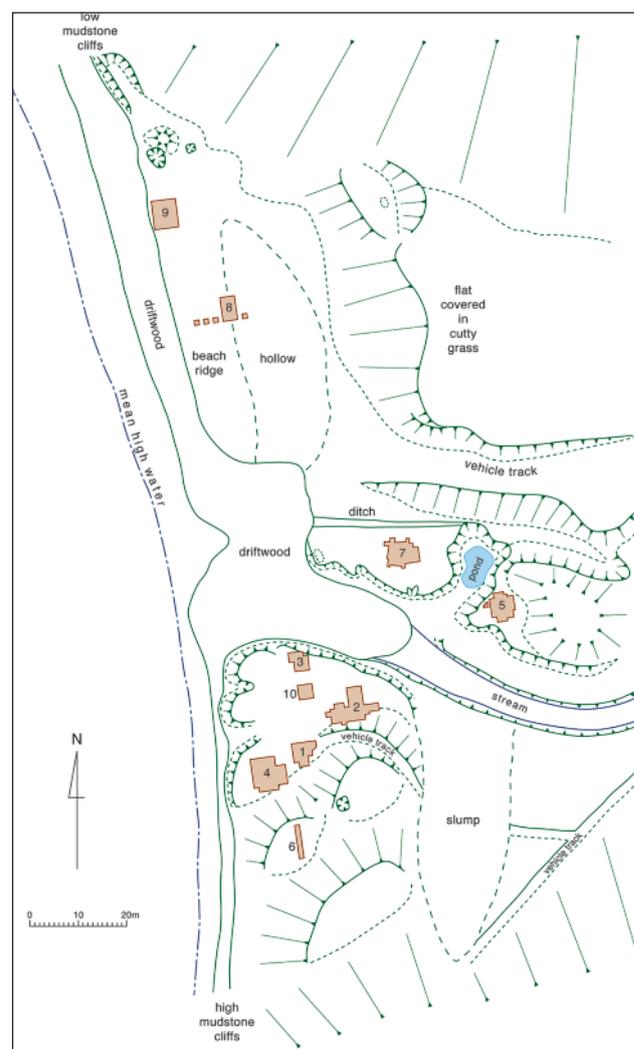


Figure 2: Te Hoe, showing the location of excavated areas.

Area 1 Layer 1

Excavations in this area revealed nineteenth-century occupation in Layer 1, overlying a fifteenth-century midden in Layer 2. The upper deposit was dominated by remnants of a tryworks structure comprising a stone-walled firebox, an iron cooling tank set into the ground, and a pile of whale bones stacked alongside the firebox. It is possible that there had been a wooden superstructure over the tryworks, as metal fasteners dominated the artefact assemblage (Table 1a). Also common were other metal items that included barrel bands and fragments of riveted plate. Ceramics, glass and other domestic and personal items occurred in lower densities than in most other areas of the site (Table 1b) and were presumably scattered from residential occupation nearby.

Area 2

Remnants of the largest residential structure on the site were uncovered in Layer 1 of Area 2, comprising the base of a large

Table 1: (a. above) NISP and (b. below) NISP per m² for general categories of artefacts at Te Hoe.

a.	A1/L1	A2/L1	A2/L2a	A3/L1	A4	A5	A7	A8/L2	A8/L4	A10	Total
glass vessel	237	1643	135	74	231	274	250	19		5	2868
glass – flat	12	407	32	4	80	8	20				563
ceramic vessel	24	82	11	24	17	63	146		1	2	370
smoking pipe	10	13	1	9	5	54	71	2	1	2	168
clothing hardware	5	20	3	8	5	11	8			1	61
munitions		58		6		1					65
hardware	4	18	1	2	6		1	1			33
metal tool		4			3	1					8
metal-fastener	585	2347	143	527	1110	187	270	60	4	85	5318
metal-other	347	735	248	130	811	299	115	48	2	38	2773
bone artefact	7	13	2	4	1						27
stone tool	4	16	13	4	7			1			45
wooden artefact					31						31
other artefact	3	9		1		3	1			1	18
Total	1238	5365	589	793	2307	901	882	131	8	134	12348
excavated area m ²	18	42	11	13	40	24	28	5	7	9	197

b.	A1/L1	A2/L1	A2/L2a	A3/L1	A4	A5	A7	A8/L2	A8/L4	A10	Total
glass vessel	13.17	39.12	12.27	5.69	5.78	11.42	8.93	3.80		0.56	14.56
glass – flat	0.67	9.69	2.91	0.31	2.00	0.33	0.71				2.86
ceramic vessel	1.33	1.95	1.00	1.85	0.43	2.63	5.21	0.20	0.29	0.22	1.88
smoking pipe	0.56	0.31	0.09	0.69	0.13	2.25	2.54	0.40	0.14	0.22	0.85
clothing hardware	0.28	0.48	0.27	0.62	0.13	0.46	0.29			0.11	0.31
munitions		1.38		0.46		0.04					0.33
hardware	0.22	0.43	0.09	0.15	0.15		0.04	0.20			0.17
metal tool		0.10			0.08	0.04					0.04
metal-fastener	32.50	55.88	13.00	40.54	27.75	7.79	9.64	12.00	0.57	9.44	26.99
metal-other	19.28	17.50	22.55	10.00	20.28	12.46	4.11	9.60	0.29	4.22	14.08
bone artefact	0.39	0.31	0.18	0.31	0.03						0.14
stone tool	0.22	0.38	1.18	0.31	0.18			0.20			0.23
wooden artefact					0.78						0.16
other artefact	0.17	0.21		0.08		0.13	0.04			0.11	0.09
Total	68.78	127.74	53.55	61.00	57.68	37.54	31.50	26.20	1.14	14.89	62.68

stone chimney and a series of postholes indicating a rectangular wooden-floored building about 7 m x 5.5 m. This yielded the largest artefact assemblage at the site, again dominated by metal fasteners, and with more flat glass than elsewhere indicating glass windows. Bottle glass, munitions and clothing hardware were concentrated more densely than elsewhere, and the ceramic vessel assemblage was the second largest recovered from the site.

Layer 2a represents a period of occupation predating construction of the house, during which artefacts and faunal remains were deposited on and mixed into the top of a deep midden with radiocarbon dates spanning the fifteenth century to the early eighteenth century. Compared to the overlying deposit, fasteners were relatively scarce, and the most common items were metal fragments that include barrel bands and fragments of flat sheet. Glass, ceramics and personal items were also present.

Area 3 Layer 1

The upper layer of Area 3 disclosed another stone chimney base, overlying midden dated to the fifteenth century. The chimney base was smaller than that in Area 2 and in front of it was a compacted earth floor with several post holes demarcating two of the perimeter walls; an eroding river bank prohibited definition of the full dimensions of this small house. With metal fasteners making up almost two thirds of the artefacts this is likely to have been a wooden framed structure, and the virtual absence of flat glass implied that it did not have glazed windows. There were modest assemblages of glass, ceramic and personal artefacts.

Area 4

Excavations in this area revealed two partially superimposed tryworks structures within a single occupation phase. The

uppermost of these was a substantially intact stone structure with two fireboxes side by side connected to a long horizontal chimney flue, with a substantial pile of whale bones to one side. Remnants of an earlier structure protruded from beneath the base of the chimney. Alongside this were partial remains of a whaleboat, which contributed to the large number of metal fasteners recovered from this area. Most of the other metal artefacts were pieces of iron bar and rod similar to those still *in situ* within the intact tryworks, along with barrel bands and sheet metal. As in Area 1, domestic and personal items were in relatively low concentrations and were presumably scattered from adjacent residences.

Area 5

This area yielded evidence of an earth-floored hut with a stone chimney base overlying an undated but presumably prehistoric earth oven. The earthen floor was c. 4.5 m x 3.3 m and both this and stone paving just outside the north wall of the building contained numerous artefacts, with clay smoking pipes and ceramic vessels in high concentration. Similar artefacts obtained from an eroding bank at the edge of the stone paving have been included in this analysis. Metal fasteners and flat glass were scarce, indicating that this dwelling is likely to have been built of woven reeds and flax, in the manner of a traditional Maori house.

Area 7

Remnants of a rectangular hut, 3.9 m x 3 m, were uncovered in this area, constructed of vertical timber slabs set into the ground with an earthen floor and a stone chimney base adjoining one of the long walls. Metal fasteners and window glass were scarce, indicating that, other than for its chimney, this structure was built primarily using traditional Maori materials and techniques. Nonetheless it yielded the highest

concentrations of ceramic vessels and smoking pipes on the site, and none of the stone or bone tools that predominate in pre-European Maori sites.

Area 8

This low-lying part of the site disclosed two layers of nineteenth-century cultural material. Most artefacts were recovered from the uppermost (Layer 2) which was dominated by metal fasteners, suggesting that at one time there may have been timber-framed structures in this vicinity. Beneath this was a layer of rubble that appeared to have been washed ashore by a storm surge or tsunami, burying an earlier occupation surface (Layer 4) which yielded a very small sample of metal fragments, a ceramic sherd and a clay pipe stem.

Area 10

The final excavation area revealed the stone chimney base of an earth-floored hut, although the size of the excavation was insufficient to determine its dimensions. Metal fasteners dominated the artefact assemblage although most of these were from the fireplace, indicating that they were likely to have been from items burnt as fuel, rather than necessarily from the building itself. Other artefacts were generally scarce.

Manufacturing date ranges

Artefacts from the excavations have been described elsewhere (Harris and Smith 2005), although without full consideration of their stratigraphic contexts. A thorough re-assessment of these will be published in due course. For the present analysis artefact classes expected to yield chronological information were re-examined. The objective of this was to ascertain probable date ranges for the manufacture of individual items, so that the numbers and proportions of datable items in each assemblage could be compared with the historically determined phases of occupation. Beginning and end dates for manufacturing specific artefact types or forms with distinctive characteristics were ascertained from relevant literature. Where historical information demonstrated that the earliest introduction of a specific artefact to New Zealand post-dated its initial manufacturing age, the later date was employed. In cases where no information was available for the end of production, an arbitrary end date of 1920 was adopted, as cessation of occupation at Te Hoe well before that date has already been established. Where sufficient information was available, periods of peak production were also identified. This approach was applied to ceramic vessels, clay tobacco pipes, glass bottles and two unique metal items. No attempt was made to use metal fasteners, as only a very small proportion could be assigned to manufacture types due to their condition. Also excluded were munitions, made up predominantly of shotgun cartridge cases that are very likely to have been discarded on the site after occupation.

Ceramic vessels

A minimum number of 130 ceramic vessels were identified from Te Hoe (Table 2), and none of these revealed any manufacturers' marks, date stamps or registration diamonds, precluding the use of several methods often utilised for dating ceramics. Instead attention was focused on chronologically sensitive wares and decorative styles (Table 3). Tin-glazed earthenware, unglazed coarse earthenware, pearlware and creamware have all been recognised as rare components in early Pakeha period assemblages (Woods 2012; Smith 2013; Smith *et al.* 2012). Of these only pearlware is represented at Te Hoe. This was produced over the period 1775 to 1830 (Miller 1989), within which there were peaks in the production of various decorative styles (Miller *et al.* 2002). The specimens at

Te Hoe, however, were insufficiently complete to determine which of the latter were represented there.

The vast majority (87 per cent) of the minimum number of 130 vessels identified in the assemblage were whiteware, which was first produced in 1805, although not common until c.1820 (des Fontaines 1990). Of these 80 per cent were decorated with underglaze transfer prints. Samford (1997) has documented the manufacturing date ranges and mean beginning and end dates of peak production for the main colours used in transfer printing on pearlware and whiteware, and for different styles of central decorative motifs and border designs. This provides at least two sets of dates that could be applied to any one vessel. To employ these for the Te Hoe assemblage, date ranges for print colour were combined with those for either the central motif or border design, depending upon the portion of vessel represented, using the following protocols. Firstly, all initial dates for early colours and design characteristics given by Samford were constrained to 1805, which is the earliest possible date for transfer printing on whiteware. For each combination of colour and design characteristics the beginning date for production was taken from the *later* of the beginning dates for the relevant colour and design elements, while the end of production was taken from the *earlier* of the two end dates given. The start date for peak production was taken as the mean of the start dates for peak production of the relevant colour and design elements, and likewise the end date was taken from the mean of the two end dates (Figure 3). This method generated the majority of date ranges listed in Table 3.

Chronological evidence was also found in two different forms of shell-edged ware, with date ranges derived from Stelle (2001:Table 1), and spongeware (Samford and Miller 2012). Finally one item of semi-vitrified whiteware was moulded with the 'Berlin Swirl' pattern. Godden (1999:238-239, 281) lists three companies that produced this pattern over the period 1842 to 1870, while Brooks (2005:59) notes that it is most common in Australia after 1861.



Figure 3: Base of whiteware bowl with 'Amoy' pattern. The light blue colour and romantic central design of this transfer print indicate a manufacturing range of 1818–1867 and peak production period of 1832–1850, which correspond with the reported production of the 'Amoy' pattern in the early 1840s (Coysh & Henrywood 1982:21).

Table 2: Minimum numbers of artefacts in classes used for dating study.

	A1/L1	A2/L1	A2/L2a	A3/L1	A4	A5	A7	A8/L2	A8/L4	A10	Total
ceramic vessels	7	29	6	15	6	24	40	-	1	2	130
clay pipes	3	3	2	1	2	10	12	2	1	1	37
glass bottles	11	53	8	7	10	14	14	5	-	1	123
metal buttons	2	4	-	3	2	5	3	-	-	1	20
coins	-	-	-	-	-	-	-	-	-	1	1
Total	23	89	16	26	20	53	69	7	2	6	311

Table 3: Manufacturing date ranges and peak production date ranges for ceramics.

Key No ¹	ware	decoration	characteristics	manufacturing range	peak production
1	pearlware	decoration indeterminate		1775-1830	1790-1820
2	whiteware	shell-edged	scalloped rim; impressed curved lines	1805-1845	1805-1832
3	whiteware	UGTP ²	medium blue; chinoiserie central design	1805-1859	1816-1835
4	whiteware	UGTP	medium blue; geometric rim design	1805-1859	1817-1832
5	whiteware	UGTP	medium blue; design indeterminate	1805-1859	1817-1834
6	whiteware	UGTP	dark blue; chinoiserie central design	1805-1846	1817-1836
7	whiteware	UGTP	dark blue; design indeterminate	1805-1846	1819-1835
8	whiteware	UGTP	medium blue; floral rim design	1805-1859	1820-1837
9	whiteware	UGTP	medium blue; non-continuous floral rim	1805-1859	1823-1839
10	whiteware	UGTP	medium blue; scenic vignette rim	1805-1859	1824-1841
11	whiteware	UGTP	medium blue; romantic central design	1805-1859	1824-1853
12	whiteware	UGTP	black; floral sheet design	1805-1864	1840-1864
13	whiteware	UGTP	purple; geometric rim design	1814-1864	1822-1834
14	whiteware	UGTP	purple; design indeterminate	1814-1867	1827-1838
15	whiteware	UGTP	brown; geometric rim design	1818-1859	1823-1836
16	whiteware	UGTP	green; geometric rim design	1818-1859	1824-1838
17	whiteware	UGTP	light blue; chinoiserie central design	1818-1867	1824-1842
18	whiteware	UGTP	green; floral rim design	1818-1859	1827-1843
19	whiteware	UGTP	brown; design indeterminate	1818-1869	1829-1843
20	whiteware	UGTP	light blue; floral sheet design	1818-1864	1845-1864
21	whiteware	UGTP	green; design indeterminate	1818-1859	1830-1846
22	whiteware	UGTP	green; romantic central design	1818-1859	1830-1849
23	whiteware	UGTP	grey; romantic central design	1818-1870	1831-1851
24	whiteware	UGTP	light blue; romantic central design	1818-1867	1832-1850
25	whiteware	UGTP	light blue; design indeterminate	1818-1867	1833-1848
26	whiteware	UGTP	light blue; floral central design	1818-1867	1833-1849
27	whiteware	UGTP	light blue; linear rim design	1818-1867	1853-1867
28	whiteware	sponged		1820-1860	1830-1850
29	whiteware	UGTP	purple; linear rim design	1820-1867	1834-1867
30	whiteware	UGTP	brown; linear rim design	1820-1869	1835-1851
31	whiteware	UGTP	grey; linear rim design	1820-1891	1842-1858
32	whiteware	shell-edged	plain rim; impressed curved lines	1825-1891	1849-1857
33	whiteware	UGTP	flown blue; design indeterminate	1828-1929	1839-1863 ³
34	whiteware	UGTP	flown blue; chinoiserie central design	1828-1867	1841-1854
35	whiteware	UGTP	brown; with polychrome paint	1840-1860	
36	SVW ⁴	moulded	Berlin Swirl	1842-1870	

1. Key numbers refer to figures 6-11. 2. UGTP – underglaze transfer print. 3. Flown blue exhibit a second peak 1890-1904.
4. SVW – semi-vitrified whiteware.

Clay pipes

A minimum number of 37 clay pipes were recovered at Te Hoe (Table 2). Identifiable manufacturers' marks (Figure 4) were evident on 21 pipes indicating five Scottish pipe manufacturers (Table 4). Their dates of operation were taken from Walker (1983:12, 20).

Table 4: Manufacturing date ranges for clay pipes.

Key No ¹	pipe manufacturer	manufacturing range
37	William White, Glasgow	1805-1955
38	Thomas White & Co., Edinburgh	1823-1876
39	Alexander Coghill, Glasgow	1826-1904
40	Duncan McDougall & Co., Glasgow	1846-1968
41	Thomas Davidson & Co., Glasgow	1861-1910

1. Key numbers refer to figures 6-11.

Glass bottles

A minimum number of 123 bottles were identified at Te Hoe (Table 2). Of these, 54 provided some evidence of when they are likely to have been manufactured (Table 5). Twenty-four

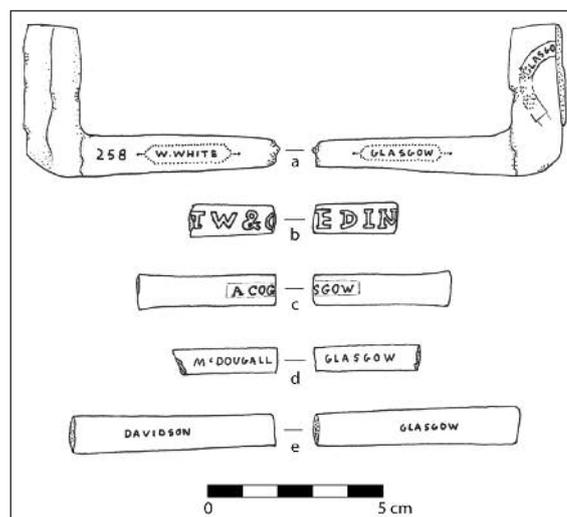


Figure 4: Clay pipe manufacturers represented at Te Hoe: a – William White; b – Thomas White; c – Alexander Coghill; d – Duncan McDougall; e – Thomas Davidson.

bottles, all but one in dark olive glass, had been formed in three-piece moulds, and 16 of these showed clear evidence of the use of a bare iron pontil (Figure 5a), while eight had no pontil marks indicating the use of a sabot or snap-case (Figure 5b). Production date ranges for these methods were taken from Stelle (2001:Table 3), and peak production periods from Lindsey (2012). The same sources were utilised for production in turn moulds (Figure 5c), which accounted for another 16 bottles, nearly all in green glass. Fourteen bottles had embossing that was chronologically distinctive. One aqua green bottle base was marked 'JK/W', a mark used by glass makers John Kilner and Sons of Wakefield, Yorkshire from 1847–1857 (Lockhart et al. 2013). Two bottle stoppers embossed "LEA & PERRINS" were clearly from the popular sauce that was first manufactured in 1838. This product, however, was first imported to New Zealand in 1851 (*The New Zealander* 26 July 1851:1), so that date is used here. The same rationale is used for the five bottles embossed 'DAVIS VEGETABLE PAIN KILLER', which was first imported in 1861 (*Daily Southern Cross* 26 February 1861:2) and the five 'UDOLOPHO WOLFE'S AROMATIC SCHNAPPS' first imported 1863 (*Daily Southern Cross* 10 October 1863:5; Low 2005:142). Finally, a bottle embossed 'JOHN S. WELSMAN/CHEMIST/NAPIER' must post-date 1877, the year in which Welsman transferred his business from Auckland to Napier (*New Zealand Herald* 26 June 1877:2).

Table 5: Manufacturing date ranges and peak production date ranges for glass bottles.

Key no ¹	Characteristics	Manufacturing range	Peak production
42	3-piece mould; bare iron pontil	1830-1875	1845-1865
43	3-piece mould; no pontil scar	1845-1905	1860-1890
44	JK/W maker's mark	1847-1857	
45	Lea & Perrins	1851 ² -1920	
46	turn mould	1855-1920	1880-1915
47	Davis Vegetable Pain Killer	1861 ² -1920	
48	Udolpho Wolfe's Aromatic Schnapps	1863 ² -1920	
49	John S Welsman, Chemist, Napier	1877-1920	

1. Key numbers refer to figures 6-11. 2. Date of first import to New Zealand (see text).

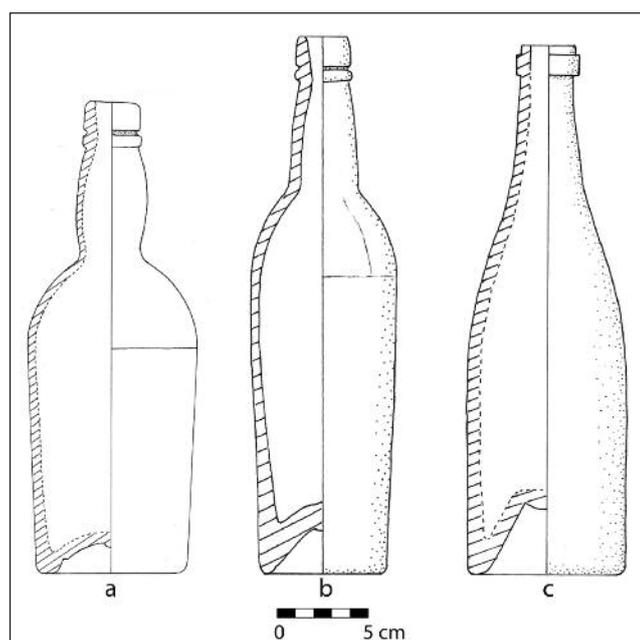


Figure 5: Glass bottles with manufacturing characteristics: a – 3-piece mould and bare iron pontil scar; b – 3-piece mould and no pontil scar; c – turn mould.

Metal items

Twenty metal buttons were recovered at Te Hoe (Table 2), one of which was stamped 'WM C^o L^{td}. KAIAPOI', which indicates that it is from the Kaiapoi Woollen Manufacturing Company which began operation in 1878, continuing into the 1960s (Waimakariri Libraries 2012). There was also one coin recovered, an 1891 British silver shilling (Table 6).

Table 6: Manufacturing date information for metal items.

Key no ¹	Item	Manufacturing range
50	Kaiapoi Wollen Milling Co. button	1878-1968
51	British silver shilling	1891

1. Key numbers refer to figures 6-11.

Mean production ranges

In addition to identifying when each individual artefact is likely to have been manufactured, it is useful to aggregate these data for each artefact class within an assemblage. The procedure for doing this follows Adams and Gaw (1977), who calculate the mean initial (i.e. beginning of production), median (i.e. middle of production range) and terminal (i.e. end of production) for the items in each class. Following Hill (1982), production ranges that extended beyond the historically recorded end of occupation at the site were truncated to 1896 for the calculation of both median and terminal dates. For comparative purposes a 'use range' was employed for the single coin, spanning the period from its year of production until abandonment of the site.

RESULTS

Just over half of all the artefacts in the classes under consideration were assigned a production age range (Table 7). Success was highest in the Area 7 (A7) assemblage, with 62 per cent assigned successfully and lowest in A4 where only 25 per cent were datable. There was also variation between artefact classes. Leaving aside the single coin, success was highest for ceramic vessels and clay pipes and lowest for the metal buttons. Variation between artefact classes will be considered further below.

A2/L2a, on stratigraphic grounds the assemblage most likely to represent initial European activity at Te Hoe, contained five dated ceramic vessels, all likely to have been manufactured before or during the Phase 1 occupation of the site (Figure 6). These dated items represent 83 per cent of all identified vessels in the assemblage indicating that they are likely to be a reliable indication of the age of the ceramics there. Although generally somewhat later than the ceramics, the production ranges for glass bottles also overlap the Phase 1 occupation period.

A different picture is apparent in the overlying A2/L1 assemblage (Figure 7). While the ceramic vessel production ranges all overlap with Phase 1 occupation, one of the clay pipes and seven of the glass bottles must have been manufactured subsequent to that period, indicating that at least 16 per cent of the dated items here must have been deposited during Phase 2. This is also the case for A5 (Figure 8) where 10 per cent of the dated items were not manufactured until after Phase 1, and to a lesser extent in A7 (Figure 9) with a single clay pipe (2 per cent of dated items) of post-Phase 1 age.

Among the smaller assemblages (Figure 10), production ranges for all dated artefacts in A3/L1, A4 and A8/L4 overlap the Phase 1 occupation period, although only just for one glass bottle from A4. The remaining assemblages all have artefacts that post-date Phase 1: in A1, one glass bottle and a metal button (22 per cent of dated items); A8/L2, one glass bottle (25 per cent); and A10, one coin (33 per cent).

Table 7: Proportion (%MNV) of artefacts dated.

	A1/L1	A2/L1	A2/L2a	A3/L1	A4	A5	A7	A8/L2	A8/L4	A10	Total
ceramic vessels	71	66	83	60	67	71	75	-	100	100	63
clay pipes	0	67	0	100	50	100	58	50	0	0	57
glass bottles	27	55	50	14	10	29	43	60	-	0	41
metal buttons	50	0	-	0	0	0	0	-	-	0	5
coins	-	-	-	-	-	-	-	-	-	100	100
Total	39	56	56	42	25	59	62	57	50	50	53

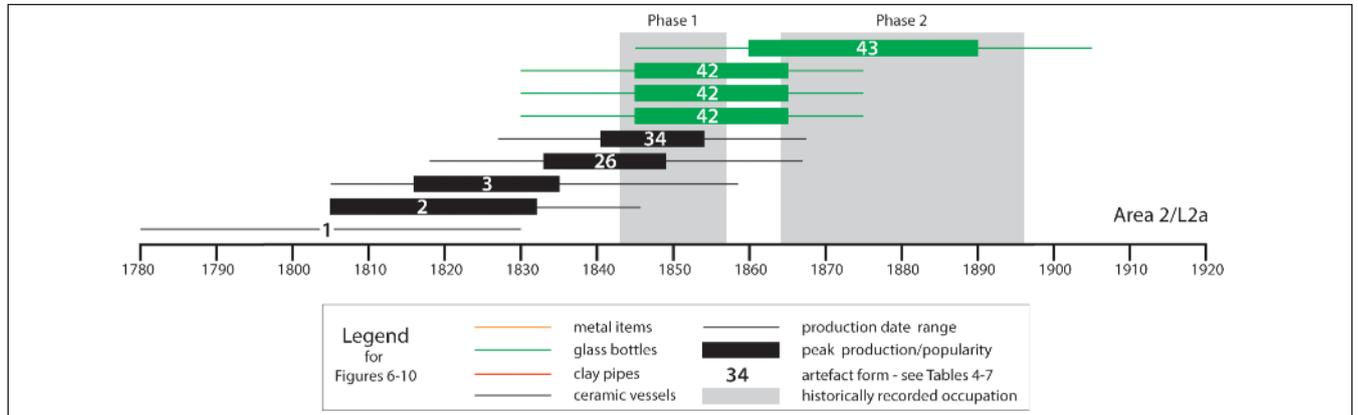


Figure 6: Manufacturing date ranges for artefacts in Area 2/Layer 2a.

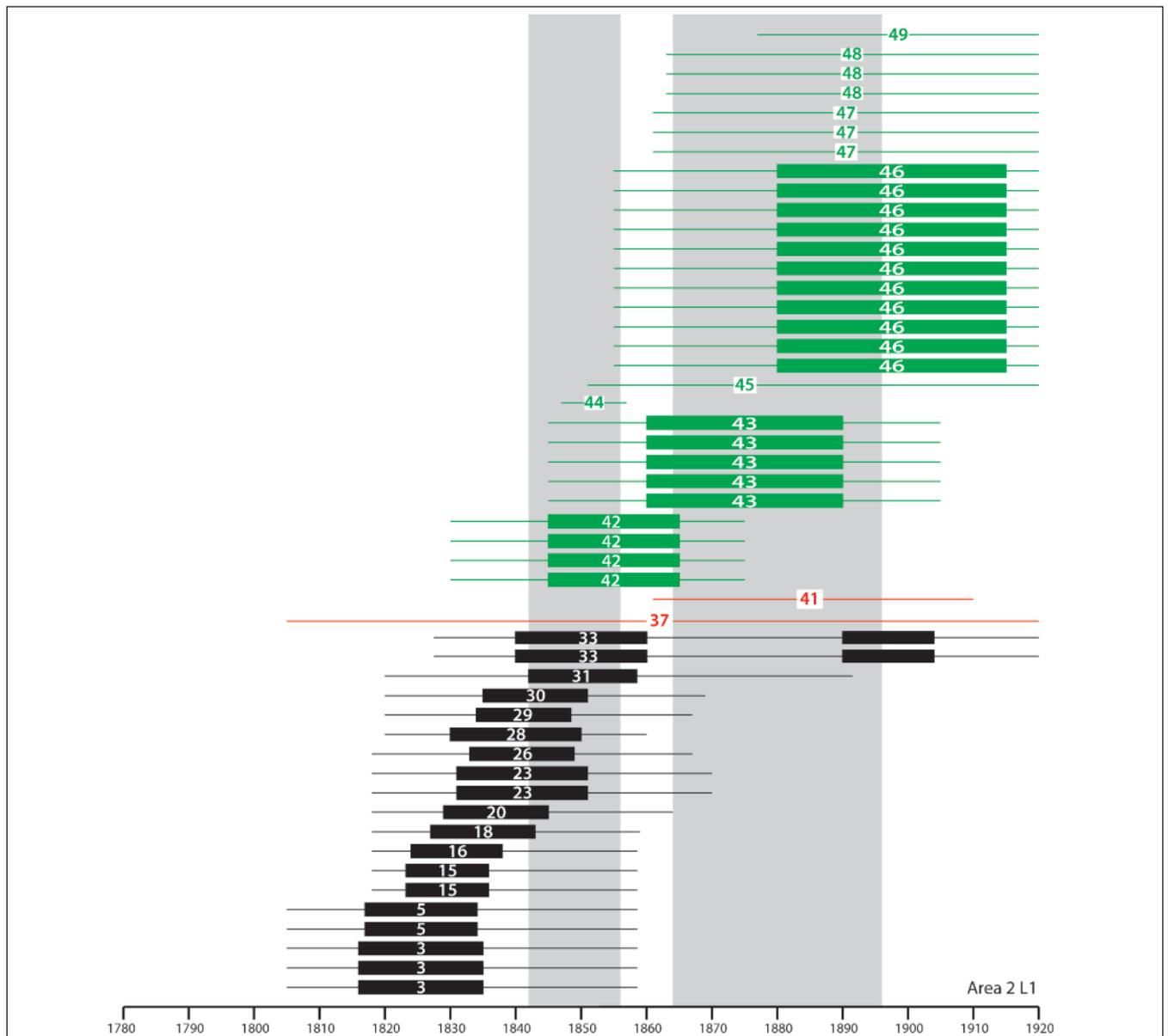


Figure 7: Manufacturing date ranges for artefacts in Area 2/Layer 1.

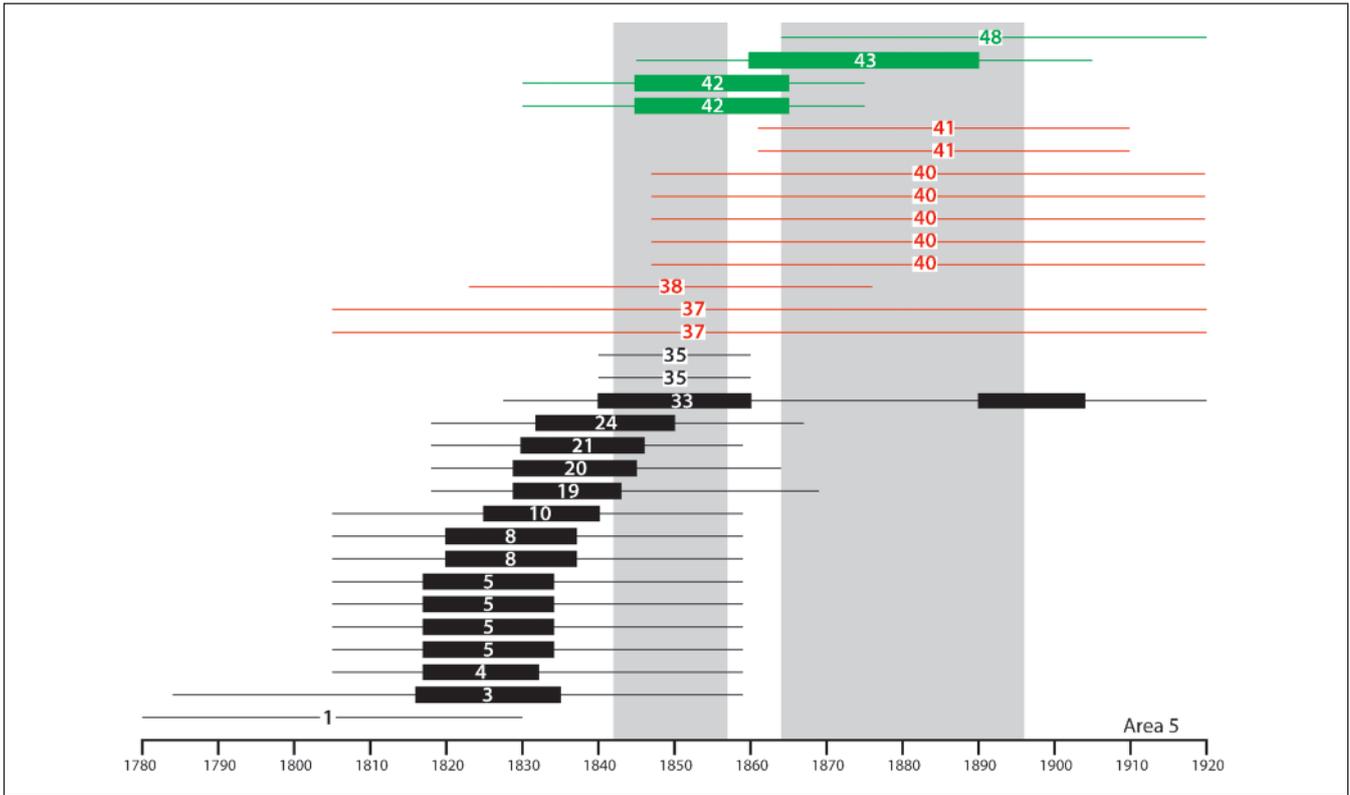


Figure 8: Manufacturing date ranges for artefacts in Area 5.

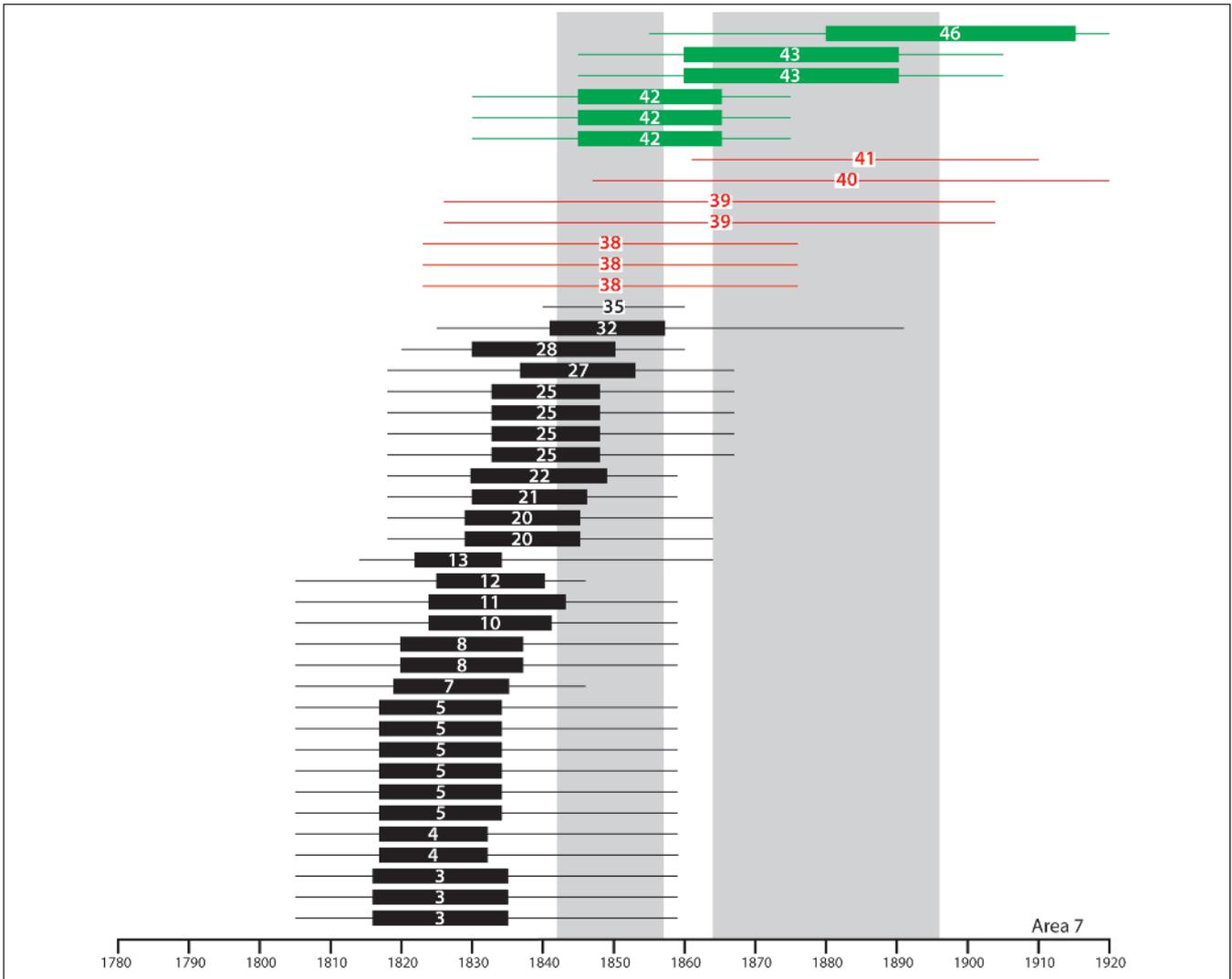


Figure 9: Manufacturing date ranges for artefacts in Area 7.

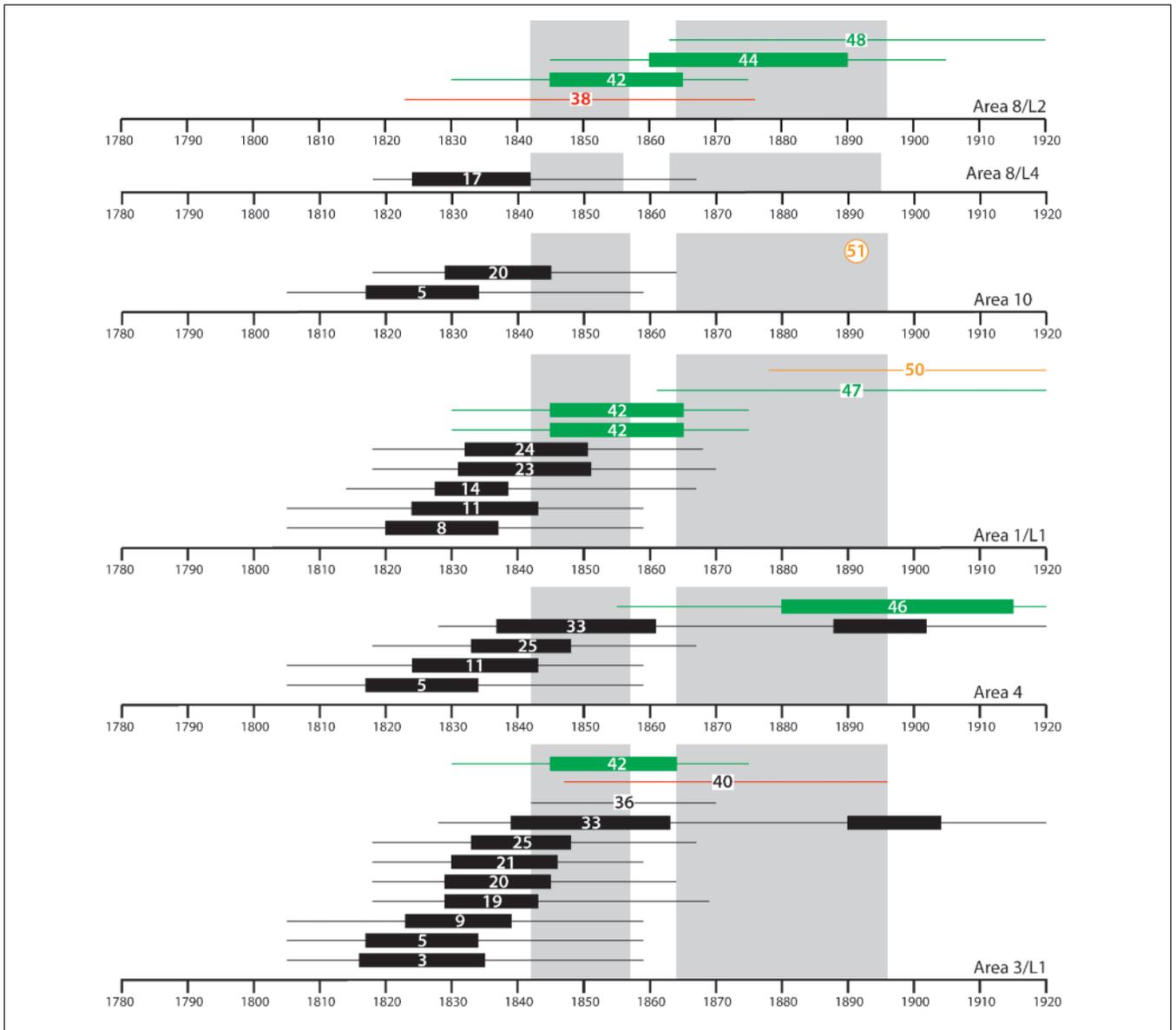


Figure 10: Manufacturing date ranges for artefacts in smaller assemblages.

DISCUSSION

Several observations can be made about the foregoing data. Firstly, they confirm Woods' (2011) conclusion that all of the ceramic vessels at Te Hoe are likely to have been manufactured prior to 1860. They also show, however, that 22 per cent of the non-ceramic dated items are clearly of later age. Comparison of mean production ranges (Figure 11) shows that in all assemblages the ceramics have production ranges significantly earlier than those for glass vessels, clay pipes and the selected metal items used in this analysis. Comparing ceramics and glass, weighted means combining all assemblages disclose differences of 33.4 years on initial dates, 28.4 years on median dates and 23 years on terminal dates, indicating that the glass bottles had been manufactured, on average, between 23 and 33 years after the ceramic vessels. Likewise the clay pipes were produced between 22 and 28 years after the ceramics, and the metal items 33 to 71 years later.

Differences of this kind have been reported previously, although their magnitude here is considerably greater than the ten to 16 years between bottle and ceramic manufacture that Adams calculated at Silcott, or the 15 to 25 years that he suggests as a typical use-life for ceramic vessels (Adams 2003:44, 59). As Adams notes, the time-lag between manu-

facture and deposition in a site is influenced by a range of factors including, among others, transportation, access to sources of supply, curation, and life-cycle events in households, and that variability in the impact of these is to be expected. While this places limits on the utility of ceramic vessels for closely dating archaeological assemblages, it also opens the way for more nuanced interpretations of the processes involved in assemblage formation.

At Te Hoe an important question regarding assemblage formation concerns which parts of the site were employed during each of the two phases of nineteenth-century occupation. Some answers to this can be found by combining the use of individual date ranges for artefacts with consideration of mean production ranges for artefact classes, and setting these within the functional contexts of the excavated areas and the known history of occupation at the site. Mean production ranges can provide a useful indication of the relative age of archaeological assemblages, and with larger numbers of dated items than the other classes the ceramics are most useful for this at Te Hoe. Their mean production ranges suggest that the vessels in A2/L2a were manufactured somewhat earlier than the rest; those in A5, A7 and A10 form a second group; while those in A2/L1, A3/L1, A4 and A8/L4 are the most recent (Figure 11). The mean production ranges

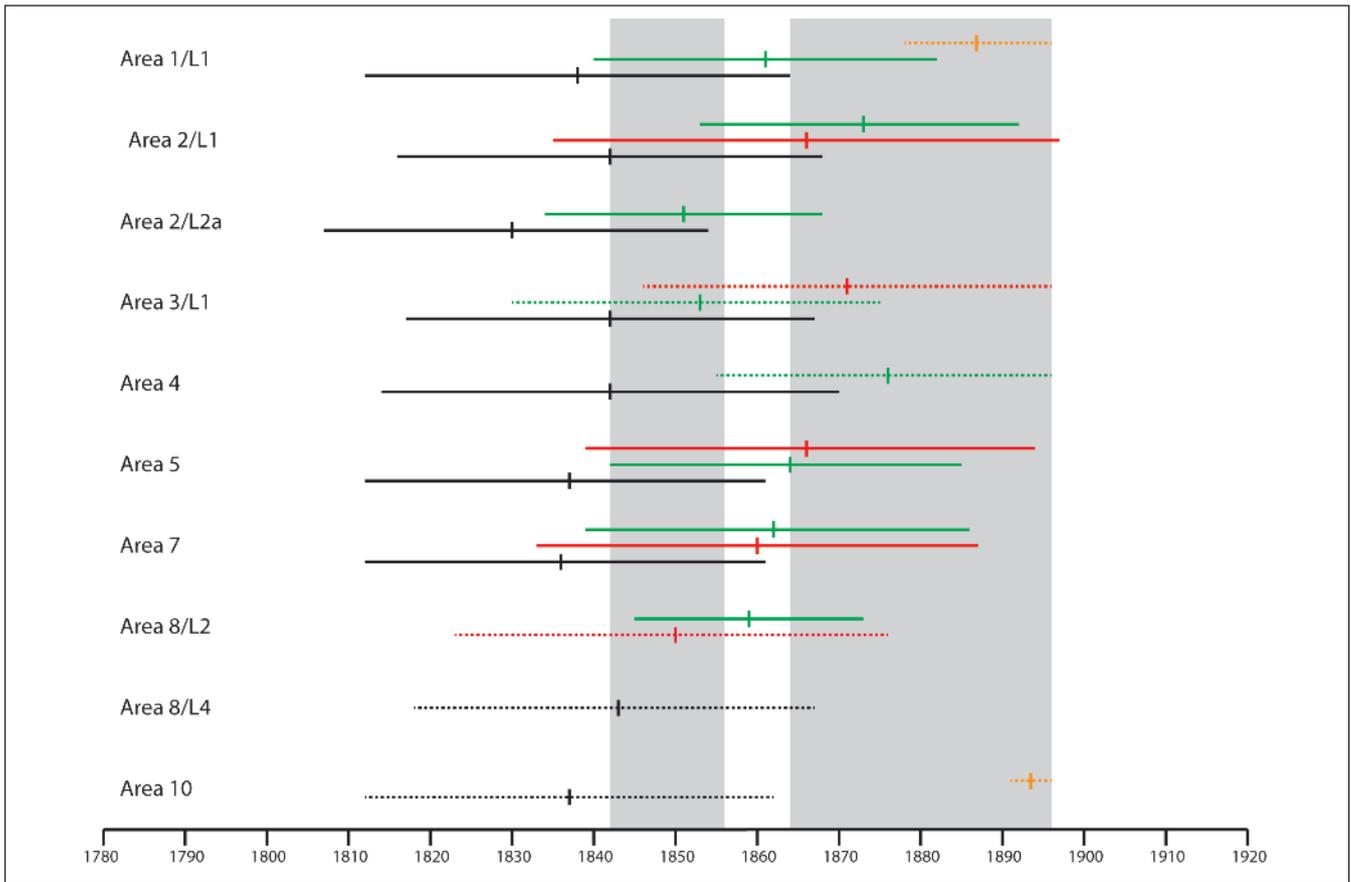


Figure 11: Mean production ranges for artefact classes (solid lines) and production ranges for single items (dotted lines). Colours as for previous figures.

for glass bottles are broadly consistent with this, although A3/L1 shifts from the most recent to the earliest group, and A8/L2 is in the middle group, contrasting with the placement of the stratigraphically lower A8/L4 ceramics in the recent group. Production ranges for the clay pipes are even less consistent, with A8/L2 apparently the earliest, the A2/L1 in the middle of the range and A3/L1 most recent. Some of these anomalies may be due to sample size, with two assemblages in each of these material classes comprised of single specimens. However, closer inspection (below) indicates that some of the bottle and pipe assemblages contain items from more than one phase of occupation, which will have limited the effectiveness of mean production ranges in placing them in relative chronological order.

The most significant information that derives from consideration of individual artefacts is the *terminus post quem* that is derived from their earliest possible production date. On this basis it is apparent that one or more artefacts in six out of the ten assemblages were not manufactured until after Phase 1, and therefore must have been deposited during Phase 2. Where these were found in greatest abundance, in A2/L1, there can be little doubt that this part of the site was occupied during the later phase. As already noted, the mean production ranges for both ceramics and bottles in this assemblage are among the youngest on the site (Figure 8). Furthermore, the substantial building foundations in the upper layers here are the only convincing candidate found during excavation for the house of John Smith and family who lived at Te Hoe from at least 1864 to 1896.

Area 5 contained the second highest number of definitively post-Phase 1 items, predominantly clay pipes, and inspection of Figure 5 shows that the majority of items in this class could equally derive from Phase 2. Indeed, while the mean production ranges of both ceramics and bottles in A5 are uniformly

6–10 years earlier than those for A2/L1, the ranges for clay pipes in the two areas are virtually identical. This may indicate that the main occupation in A5 was during Phase 1, with a secondary occupation during Phase 2 that contributed most of the clay pipes, and perhaps some of the bottles. The house in A5 may well have been one of the ‘old whares’ referred to by the master of the *Ballarat* in 1864, and may have seen use then, and perhaps later by members of the Smith family.

The houses in A3, A7 and A10 could also have been ‘old whares’ by 1864. The A7 house certainly appears most likely to have been occupied during Phase 1, as the production ranges of both ceramics and glass there are 6–12 years older than those for A2/L1. The single post-Phase 1 item, a clay pipe, may have been discarded there during casual later use. A similar explanation probably accounts for the 1891 coin in the floor of the A10 house, which post-dates by 60 years the mid-point of the production range for the one dated ceramic vessel there. With just two dated items, however, one from each end of the occupation sequence, it is uncertain which gives more reliable evidence of the age of the house. The A3 house is difficult to judge. While it yielded no definitively post-Phase 1 items, the production range of ceramics there is virtually identical to that in A2/L1, suggesting that it may well be a Phase 2 structure.

Areas 1 and 4 both contained remnants of tryworks, indicating that they were the focus of industrial activities. Both yielded only small numbers of domestic and personal items, with lower proportions of these datable than in the adjacent residential areas, limiting what can be inferred about when they were used from the methods employed in this study. The mean production ranges of both ceramics and bottles suggest that A1/L1 may be earlier than A4, although post-Phase 1 activity in A1/L1 is demonstrated by a metal button and one of the glass bottles. Archaeological observations also indicate

two phases of tryworks construction in Area 4. With historical evidence indicating that whaling was conducted throughout the nineteenth-century occupation of Te Hoe, it is likely that these areas were used during both Phases 1 and 2.

CONCLUSIONS

On the basis of the analysis presented here it is proposed that during Phase 1 (c.1842–1857) there was occupation in the vicinity of Area 2, represented by the L2a assemblage, and houses were constructed and used in Areas 5 and 7, and perhaps also Area 10. During Phase 2 (1864–1896) occupation was centred on the large house in the upper layer of Area 2 and probably also the house in Area 3, along with some reoccupation of Area 5 and casual reuse of Areas 7 and 10. Both small assemblages from Area 8 probably also belong to this phase. The industrial features in Areas 1 and 4 are likely to have been used during both phases.

If these interpretations are broadly correct it is pertinent to consider what they indicate about time lags in the formation of the archaeological assemblages at Te Hoe. As noted previously it is typical for ceramic vessels to have been manufactured some 15–25 years prior to entering the archaeological record. Those in the assemblages assigned most confidently to Phase 1 (A2/L2a, A5 and A7) have median production dates of 20–27 years prior to the termination of Phase 1, placing them around the end of the typical range. This is not dissimilar to the time lag estimated for ceramics at Port Essington, a near contemporary (1838–1849) remote outpost in northern Australia (Allen 2008:75), demonstrating that remoteness from production centres in Britain had minimal impact on the supply of ceramics.

The situation is markedly different in the Phase 2 assemblages. In both A2/L1 and A3 the median production date for ceramics is 54 years earlier than the terminal date for occupation. This indicates that the majority of the vessels discarded during the three decades of occupation by the Smith family were brought with them when they arrived at Te Hoe. While some new ceramics might have been purchased, then carefully curated and removed when the family shifted to Nuhaka in 1896, it seems unlikely that there could have been any substantial addition to the ceramic inventory without some of it entering the archaeological record. This suggests that these former whalers and their Maori relatives had limited engagement with mainstream New Zealand society. Although initially a remote whaling frontier, Hawkes Bay was soon drawn into the expanding realm of European settlement. The town of Napier was founded in 1851, and Crown purchases of Maori land for on-sale to settlers were completed by the mid 1860s. While a relatively small number of bottled products, clay pipes and metal items that post-date 1860 did find their way to Te Hoe, there is very little that suggests its inhabitants were regular participants in the European commercial economy. As Belich (1996:188) has observed, some remnants of the 'Old New Zealand' made up, in part, by whalers and their Maori families, persisted beyond the 1860s and 'did not finally fade away until the early twentieth century'. The evidence presented here shows that Te Hoe was one of these places.

There are also broader implications for the interpretation of material culture in nineteenth-century New Zealand. As the Phase 2 occupation at Te Hoe demonstrates, there are situations in which artefacts manufactured during the Pakeha period remained in use well into the succeeding Kiwi period. This highlights yet again the importance of considering the time lag between production and discard of artefacts, and ceramic vessels in particular, when attempting to date archaeological deposits from their material contents alone.

When a broader range of artefacts are used in conjunction with detailed historical research, however, analysis of time lag can provide insights into processes influencing assemblage formation and provide a more nuanced understanding of the ways in which specific communities negotiated their ways through the changing cultural landscape of mid-to-late nineteenth-century New Zealand.

REFERENCES

- ADAMS, W.H. 2003 'Dating Historical Sites: The Importance of Understanding Time Lag in the Acquisition, Curation, Use, and Disposal of Artifacts', *Historical Archaeology* 37:38-64.
- ADAMS, W.H. and L.P. GAW 1977 'A model for determining time lag of ceramic artefacts', *Northwest Anthropological Research Notes* 11:218-31.
- ALLEN, J. 2008 *Port Essington: the historical archaeology of a north Australian nineteenth-century military outpost*, Sydney University Press, Sydney.
- ANON. 1868 'Sketches of Hawkes Bay and the East Coast', *The Hawkes Bay Herald* 6 June 1868, 9 June 1868, 13 June 1868.
- BELICH, J. 1996 *Making Peoples: a History of the New Zealanders from Polynesian Settlement to the end of the Nineteenth Century*, Penguin, Auckland.
- BROOKS, A. 2005 *An Archaeological Guide to British Ceramics in Australia 1788–1901*, The Australasian Society for Historical Archaeology, Sydney, and La Trobe University Archaeology Program, Melbourne.
- COYSH, A.W. and R.K. HENRYWOOD 1982 *The Dictionary of Blue & White Printed Pottery 1780-1880*, volume 1, Antique Collectors' Club, Woodbridge, Suffolk.
- DAILY SOUTHERN CROSS 'Perry Davis Vegetable Pain Killer' 26 February 1861:2, 'On sale by the undersigned, ex Annie Wilson', 10 October 1863:5.
- DES FONTAINES, J. 1990 'Wedgewood whiteware', *Proceedings of the Wedgewood Society* 13:1-8.
- DINWIDDIE, W. 1916 *Old Hawkes Bay*, Dinwiddie, Walker and Co, Napier.
- FEILDING, T.H. (ed) 1875 *Wise's Directory of New Zealand for the years 1875-76*, H. Wise and Company, Dunedin.
- GODDEN, G.A. 1999 *Godden's Guide to Ironstone Stone and Granite Wares*, Antique Collectors Club, Woodbridge.
- HAMLIN, J. n.d. Journal of James Hamlin. MS-0069, Hocken Library, University of Otago, Dunedin.
- HARRIS, E.T. n.d. Notes (1897). MS-0918, Alexander Turnbull Library, Wellington.
- HARRIS, J. and I.W.G. SMITH 2005 *The Te Hoe Whaling Station Artefact Assemblage*, Otago Archaeological Laboratory Report, No. 2. Anthropology Department, University of Otago, Dunedin.
- HAWKES BAY CROWN LAND SALES ACT 1870 http://www.austlii.edu.au/nz/legis/hist_act/hbclsa187033a34v1870n58389.pdf, retrieved 1 November 2013.
- HAWKES BAY HERALD 1864 'Wreck of the Paddle Steamer Ballarat', 28 June 1864:2.
- HILL, S.H. 1982 'An examination of manufacture-deposition lag for glass bottles from late historic sites' in R.S. Dickens (ed) *Archaeology of Urban America: The Search for Pattern and Process*, Academic Press, New York, pp. 291-327.
- LAMBERT, T. 1925 *The Story of Old Wairoa*, Coulls, Somerville Wilkie, Dunedin.

- LINDSEY, B. 2012 Historic Glass Bottle Identification & Information Website, <http://www.sha.org/bottle/index.htm>, retrieved September 2013.
- LOCKHART, B., B. LINDSEY, C. SERR, P. SCHULZ, and B. SCHRIEVER 2013 'Makers Markings Logo Tables: J.' In *Historic Glass Bottle Identification & Information Website*, <http://www.sha.org/bottle/pdf/files/JLogoTable.pdf>, retrieved September 2013.
- LOW, J. 2005 Health in a Bottle? The Archaeology of Self Medication in Nineteenth Century New Zealand. MA thesis, University of Auckland.
- MACKAY, J.A. 1966 *Historic Poverty Bay and the East Coast, N.I., N.Z.*, J.G. Mackay, Gisborne.
- MILLER, G.L. 1989 'Origins of Josiah Wedgwood's Pearlware', *34th Annual Wedgwood International Seminar, Washington DC*, pp. 167-84.
- MILLER, G.L., P. SAMFORD, E. SHLASKO and A. MADSEN 2002 'Telling Time for Archaeologists', *Northeast Historical Archaeology* 29:1-22.
- MOLENAAR, A. 1973 'Smith Family Reunion', *Te Ao Hou: The Maori Magazine* 73:42-44.
- NEW ZEALAND HERALD 1877 'Presentation to Mr Welsman', 26 June 1877:2.
- ORSMAN, H.W. 1997 *The Dictionary of New Zealand English: A Dictionary of New Zealandisms on Historical Principles*, Oxford University Press, Auckland.
- PRICKETT, N.J. 2002 *The Archaeology of New Zealand Shore Whaling*, Department of Conservation, Wellington.
- PRICKETT, N.J. 2008 'Trans-Tasman stories: Australian Aborigines in New Zealand sealing and shore whaling' in G.R.Clark, B.F. Leach and S. O'Connor (eds) *Islands of Inquiry: Colonisation, Seafaring and the Archaeology of Maritime Landscapes*, ANU EPress, Canberra, pp. 351-366.
- PRICKETT, N.J. n.d. Mahia. Unpublished manuscript, Department of Anthropology and Archaeology, University of Otago, Dunedin.
- SAMFORD, P.M. 1997 'Response to a market: Dating English underglaze transfer-printed wares', *Historical Archaeology* 31:1-30.
- SAMFORD, P. and G.L. MILLER 2012 Post-colonial Ceramics: Sponged Wares. <http://www.jefpat.org/diagnostic/Post-Colonial%20Ceramics/Sponged Wares/indexsponged wares.htm>, retrieved September 2013.
- SMITH, I.W.G. 2008 'Maori, Pakeha and Kiwi: Peoples, cultures and sequence in New Zealand archaeology' in G.R. Clark, B.F. Leach and S. O'Connor (eds) *Islands of Inquiry: Colonisation, Seafaring and the Archaeology of Maritime Landscapes*, ANU EPress, Canberra, pp. 367-380.
- SMITH, I.W.G. 2013 'Ephemeral foundations: early European settlement of the Tasman frontier', in M. Campbell, S.J. Holdaway and S. Macready (eds) *Finding our Recent Past: Historical Archaeology in New Zealand*, New Zealand Archaeological Association Monograph No. 29, Auckland, pp. 9-32.
- SMITH, I.W.G., A. MIDDLETON, J. GARLAND and N. WOODS 2012 *Archaeology of the Hohi Mission Station. Volume 1: the 2012 excavations*, Department of Anthropology and Archaeology, University of Otago, Dunedin.
- SMITH, I.W.G. and N.J. PRICKETT, 2008 *Excavations at Te Hoe, Mahia Peninsula*, Otago Archaeological Laboratory Reports, No. 5. Anthropology Department, University of Otago, Dunedin.
- STELLE, L.J. 2001 An Archaeological Guide to Historic Artifacts of the Upper Sangamon Basin. <http://virtual.parkland.edu/lstelle1/len/archguide/documents/archguide.htm>, retrieved September 2013.
- THE NEW ZEALANDER 1851 'On sale ex Maukin', 26 July 1851:1
- WAIMAKARIRI LIBRARIES 2012 A History of the Kaiapoi Wollen Manufacturing Company and Mill. http://libraries.waimakariri.govt.nz/Libraries/Local_History_-_Places_-_KAI/History_of_Kaiapoi_Mill.sflb.ashx, retrieved September 2013.
- WALKER, I.C. 1983 'Nineteenth century clay tobacco pipes in Canada', in P. Davies (ed) *The Archaeology of the Clay Tobacco Pipe, VIII, America*, BAR International Series 175, Oxford, pp. 1-87.
- WARD, A. 1993 'Carroll, James', in W.H. Oliver (ed) *Dictionary of New Zealand Biography Volume Two (1870-1900)*, Department of Internal Affairs, Wellington.
- WELLINGTON INDEPENDENT 1850 'The Government Bank', 26 June 1850:2.
- WOODS, N. 2011 Pakeha ceramics as dating tools: Creating a chronology for the Te Hoe whaling station, BAHons Dissertation, University of Otago, Dunedin.
- WOODS, N. 2012 'Pakeha ceramics as dating tools', *Archaeology in New Zealand* 55:121-132.