

A foodways research recipe

ALEXY SIMMONS

Food is an ephemeral staple of daily life that must be constantly renewed, as a biological necessity. Since the founding of the discipline archaeologists have used foodways information as a key for understanding the everyday lives of people, in the past and present. The specific focus of this paper is the study of soldiers' food culture during the Waikato campaign of the New Zealand Wars. The paper presents a research framework and methodology that has increased knowledge about how soldiers got and enjoyed their daily bread. The research model and method may also have broader applications for food studies in archaeology.

INTRODUCTION

The study of comestibles has been a focus of archaeological research since the founding of the discipline and encompasses a myriad of research topics. Mintz and Du Bois (2002:8) in their commentary on agents of dietary change noted that war has been relatively neglected in food studies and is an area ripe for research. In response to this gap in the food culture discourse I began investigating soldiers' food and drink during the Waikato campaign of the New Zealand Wars 1863–1880 (Simmons 2010). The result was the development of a foodways research framework and methodology that provides new information about soldiers' food culture (Simmons 2011).

BACKGROUND INFORMATION

The New Zealand Wars were staged as a series of regional campaigns against various North Island Māori and involved British and colonial troops (Belich 1986; Cowan 1956). The Waikato campaign of the wars began with a build-up phase in 1862 followed by a series of battles in 1863–1864 as the

troops moved south from Queen's Redoubt, and an occupation phase that extended to 1880 (Ritchie 2001). My research focus was the first ten years of the Waikato campaign. Figure 1 shows many of the military posts that were manned during the conflict.

The British Army and Royal Navy and Marines transferred soldiers from various locations, including England and India, to fight in the New Zealand Wars (Barber 2011; Harrop 1937; Ryan and Parham 2002). Military forces were also raised locally and in Australia. In March 1864 there were 14,000 troops composed of 4000 colonial and 9000 Imperial, and a few hundred pro-British Māori (Belich 1986:125) under Lieutenant General Duncan Cameron. He and many of his officers were veterans of the Crimean War and considered food security and communication systems priorities.

The Waikato campaign took place during a period of change in military supply systems (Rough 2004). The previously civilian Commissariat Department and Transportation Corps became military departments, creating changes in the supply system and enabling greater control by the army. The headquarters of the Commissariat Corps was in Auckland,

the location of the main overseas port during the war. At the start of the conflict Commissariat Corps staff was transferred from Australia (Hopkins-Weise 2006). The experienced Commissariat Corps proved to be essential to the success of the campaign, because New Zealand had few local resources to supply the needs of the force. The Deputy Assistant Commissary General observed:

In times of peace considerable quantities of grain were grown by the Maoris (sic) themselves and brought into the Auckland market. They also brought to market, onions, potatoes, and pigs. This source of supply was of course completely cut off as soon as the war broke out. (Robertson 1865:18).

Overseas supply sources fuelled the troops, particularly comestibles obtained from Australia.

DATA SOURCES AND RESEARCH APPROACH

Over the last 30 years archaeological excavations have been carried out at many of the Waikato camps and redoubts occupied by British and colonial soldiers. The majority of the field work has been sparked by development. The site mitigation work, albeit constrained by

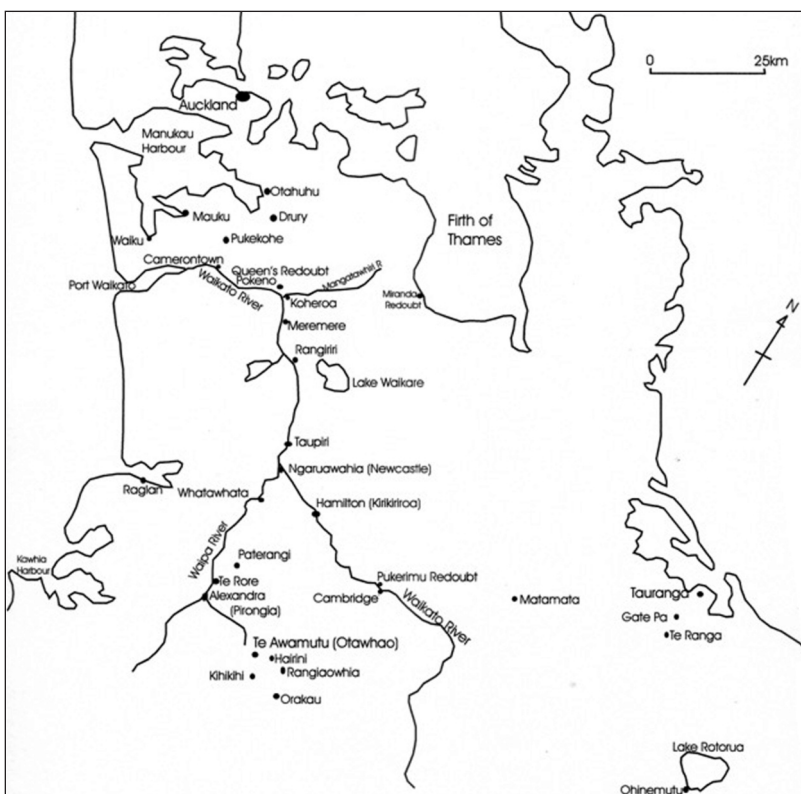


Figure 1: Regional map of the central North Island and places associated with the Waikato campaign.

contractual briefs, provides a body of information that would not otherwise be available. The historical sources that document the campaign include reports to the War Office, soldiers' diaries and letters, newspaper reports, and images. The documents provide both the official military perspective on the campaign and the more personal accounts from the camps. Comparison of the comestibles identified in historical and archaeological records suggested the potential to expand on the information known about soldiers' food culture by exploring each data set independently (Simmons 2010:177-180).

Compilation of research data as independent and equal data sources is a process that has been used successfully by Binford (1987), Leone and Potter (1988) and Smith (1996). Smith (1996:686) in his research on seal hunting in New Zealand in the eighteenth century noted that he:

treated historical and archaeological material as independent data sets, to derive some models from these and devise some clearly stated criteria by which it was possible to test one data set against the other. It was only in this way that deficiencies in either could be identified and a picture reconstructed that was much larger and more accurate than could have been derived from either source alone.

DEVELOPMENT OF THE FOODWAYS RESEARCH FRAMEWORK AND METHODOLOGY

The archaeological and historical information on the soldiers' comestibles was drawn from three data sets that provide distinct perspectives on eating and drinking – official reports to the War Office and Commissariat Corps' newspaper tenders; eyewitness accounts of soldiers' experiences; and archaeological data from campaign sites. Compiling the foodways information contained in each of the data sets required the identification of criteria that could be used to test one data set against the other, as Smith (1996) illustrated in his research on seal hunting. This involved constructing a research framework with a systematic classification system that could capture food culture characteristics and traits. The criteria and structure used in the research framework were based on the food culture studies of Chang (1967 and 1977), Douglas (n.d., 1972 and 1982), Goody (1982), Samuels (1996), Miracle (2002), and Leach (2008 and 2010).

Goody (1982), Samuel (1996) and Miracle (2002) created models for understanding food in culture. The models emphasised activities and links to underlying cultural concepts – for example, collecting as an indication of cultural economics. The research focus of Chang (1977) and Leach (2008 and 2010) was the identification of the underlying principles of food traditions. Chang and Leach worked from the top down, in contrast to Goody, Samuel, and Miracle.

Leach (2008:2) observed:

food cultures incorporate rules and principles that we learn, often unconsciously, as we grow up. They are passed down from one generation to the next. They guide our decisions and mark our identity.

Leach divided her rules into two sets. The first rule set – what is/isn't food – included what is safe, the principles used for processing foods, and beliefs about food (Leach 2008:2). The second rule set included the composition of meals, what dishes should be served, with what drinks, in what order and other cultural rules associated with table manners (Leach 2008:2, 2010:14). I reviewed Leach's rule sets and added a third rule set, disposal. Disposal is a major source of data for

archaeologists and part of the food culture chain of operation (chaîne opératoire). I also modified her second rule set and included processing as part of my second rule set, although it could be argued that processing is necessary to make many raw materials into edible comestibles. The food cultural rules sets used in the research framework are illustrated on Table 1.

Table 1: Foodways rule sets and practices (after Leach 2008 and 2010).

Cultural rule sets	Foodway practices
I) What is/isn't food	A) Procuring food B1) Primary raw materials B2) Secondary raw materials
II) Processing and combining foods	C1) Food preparation and processing C2) Food preparation equipment and facilities D1) Serving a meal D2) Consuming a meal E) Non-meals
III) Discard/disposal	F1) Planned/sanitary disposal F2) Casual disposal

The observations of Chang (1967, 1977), Samuel (1996), Adams and Adams (1997), Miracle (2002) and Leach (2008 and 2010) informed the list of foodway practices that constitute the rule sets (Table 1). What is/isn't food, for example, includes both primary raw materials and secondary raw materials. Chang (1977) has identified primary raw materials as the fan, the starchy staples in traditional Chinese cuisine and secondary raw materials as the ts'ai, the meat, vegetable and other ingredients that add flavour. I defined soldiers' primary raw materials as military rations which were provided under general orders (Figure 2). Other foods were identified as soldiers' secondary raw materials. If a different population was being researched primary raw material would be defined by other comestibles. For example, if the study group was a population of Malaysian Chinese, rice and noodles might be identified as the primary raw materials.

The other practices were also defined. For example, Rule Set II, processing and combining foods, includes the practice of serving a meal. Serving a meal involves the combination of foods that constitute a meal, when it is served and the service. The raw data associated with this practice include: menus, tableware, utensils and furnishings, the timing of the meal (7 am) and the type of meal (breakfast), etc.

My intention was to use the research framework (Table 1) to collect data on soldiers' comestibles from each of my three data sets and segregate the data excerpts by rule sets and practices and also track information sources within the data sets. The tool that suited the foodways data extraction and compilation task was a data grid. Data grids were used by Douglas (n.d., 1972, and 1982), Binford (1987), Leone and Potter (1988) and Smith (1996) to compile and segregate various categories of data. Use of the data grid facilitated the addition of sub-practice categories for compiling more detailed information about soldiers' food culture. A data grid was created for each data set. For example, an official records data grid. Table 2 illustrates the data grid structure and some of the sub-practices identified in the rule sets and also contains a few examples of the information identified in the data sets. To assist with computer sorting, data code letters and numbers preface the entries.

Each of the data sets included discrete sources such as military sub-groups, types of information or archaeological features. The eyewitness accounts included officers' diaries, private soldiers' diaries, newspaper correspondents' reports, photographs and drawings. These were compiled as sample groups on the data grid. For example, archaeological deposits

SCALE OF ALLOWANCES FOR FIELD SERVICE.

Ordinary field ration: 1 lb. of fresh or salt meat, 1½ lb. of bread or 1 lb. of biscuit, and 1 gill of rum.—(General Order, No. 541, 11th July, 1863.)

Grocery rations: 1-6th oz. of tea, 1-3rd oz. of coffee, 2 ozs. of sugar, 1-36th oz. of pepper, and ½ oz. of salt.—(General Order, No. 197, 4th February, 1862.)

Vegetable ration: 1 lb. of potatoes, and ½ oz. of onions.—(General Order, No. 624, 6th October, 1863.)

When this ration cannot be procured, the commissariat may substitute 4 ozs. of rice, or 1 oz. of compressed vegetables, or 1-3rd pint of peas, for potatoes; 1-12th oz. of mustard, or ½ oz. of pickles, for onions.

The stoppages are: for officers, ordinary ration 1½d., grocery ration 2d., vegetable ration 1½d., total 5d.—(General Order, No. 660, 12th November, 1863.)

For soldiers, ordinary ration 3½d., vegetable ration 1½d., total 5d.—(General Order, No. 624, 6th October, 1863.)

Lime juice 1 oz. and sugar for lime juice 1 oz. to each officer and man when salt meat is issued, and on fresh-meat days when no vegetables are issued.—(General Orders, No. 660, 12th November, 1863; 701, 30th December, 1863; 741, 13th February 1864.)

Figure 2: Military rations allowances for field service in New Zealand (Jones 1864:75-76).

Table 2: Example of the foodways data grid.

Cultural Rule Sets	Foodways Practices	Sub-practices	Example of Information
What is/isn't food Rule I	A1) Procuring Food	A1.1 observing/scouting	A1.1 cultivations A1.1 a peach grove in an image A1.1.1 privately owned stores
		A1.2 transportation	A1.2.1 administration clerk A1.2.2 flat bottomed row boats A1.2.2 packhorses A1.2.2 pack horse saddles
		A1.3 acquiring	A1.3.1 military tendering advertisements A1.3.1 purchasing from suppliers A1.3.2 other methods (through friend) A1.3.3 cost of purchase A1.3.4 trading with Māori A1.3.5 foraging for potatoes (from abandoned gardens) A1.3.6 hunting for pigs A1.3.7 gathering wild/natural resources (honey)
		A1.4 storage/store house	A1.4.1 commissariat stockyard at Rangiriri A1.4.1 commissariat depot at Waikato Heads A1.4.2 stockpile of two months supplies at Meremere A1.4.3 regulation for care of stores A1.4.4 abandoned depots
What is/isn't food Rule I	B1) Primary Raw Materials (rations)	B1.1 rations	B1.1 rations (no detail)
		B1.2 meat	B1.2.2 beef (faunal remains) B1.2.3 sheep B1.2.5 pork B1.2.6 salt beef B1.2.7 government salt pork
		B1.3 bread	B1.3.1 bread B1.3.2 biscuits B1.3.3 ingredients for bread
		B1.4 vegetable ration	B1.4.2.1 potatoes B1.4.2.3 preserved potatoes B1.4.3 onions B1.4.4 rice B1.4.8 compressed vegetables
		B1.5 other allowed rations (groceries)	B1.5.2 tea (tea pot) B1.5.3 coffee B1.5.4 sugar B1.5.5 salt B1.5.7 rum (ration doubled)

from redoubt ditches were grouped as one sample, officers' diaries as another. Grouping the data samples on the grid allowed comparison of information within the data set. Table 3 provides an example of a comparison of officers' and enlisted men's diaries. The source of each data excerpt was coded on the data grid to assist with editing and facilitate future research opportunities.

A data grid prototype was constructed and tested against historical information found in soldiers' diaries and letters. The outcome of the test was the addition of more sub-practices and use of the information details (or secondary sub-practices) column to compile clusters of similar data. Table 3 illustrates some of the clusters of information, such as hunting pigs and gathering honey.

Table 3: Eyewitness accounts data grid example.

Cultural Rule	Foodways Practice	Sub-practices (primary)	Information details (secondary sub practices)	Diary/journal officers'	Diary/journal soldier (private)	Newspaper accounts from our correspondent	Accounts of soldiering	Sub-totals
What is/ isn't food	A1 Procuring Food	A1.3.6 hunt/ fish	A1.3.6.1 hunt pigs	A1.3.6.1 hunt pigs (ADC1)			A1.3.6.1 hunting pigs (Cm1)	2
			A1.3.6.2 hunt game birds		A1.3.6.2 hunt pigeons and 4-5 unmentionables (quail or pheasant?) (NM38)		A1.3.6.2 hunt ducks [2] (EAW26) pheasants hunt (EAW29)	3
			A1.3.6.3 hunt rabbits		A1.3.6.3 hunt rabbits (NM55)			1
			A1.3.6.5 hunt mixed species		A1.3.6.5 shot 50 rabbits, 1 cat, 3 pukekos, 1 unmentionable (quail or pheasant?) (NM66)			1
			A1.3.6.10 fishing	A1.3.6.10 fishing [2] (ADC11,13)				2
				3	3	0	3	9
		A1.3.7 gather (wild/natural resource)	A1.3.7.1 gather honey		A1.3.7.1 honey (two buckets) (JS8)	A1.3.7.1 honey (VT5)	2	
			A1.3.7.2 gather indigenous fruits and berries				A1.3.7.2 tupake berries (for wine) (VT5)	1

Key: Parentheses () contain information that identifies the source, e.g. (JS) is John Stichbury. (JS8) indicates the information was part of the eighth John Stichbury diary excerpt used as a source. If the source provided other entries about the same information, an additional excerpt notation is included in the parentheses, e.g. (ADC11,13). Square brackets [] indicate the number of entries if there is more than one, e.g. [2] there were two entries relating to fishing A1.3.6.10. Note: The data source material is archived in the Soldiers' Foodways Study files at Simmons & Associates Ltd, Hamilton New Zealand.

Table 4: Compilation of eyewitness accounts Information – Rule Set II: Consuming a meal.

Rule Set	Practice	Sub-practice	Total	Sub-practice based on sample type	Sub-total
Rule II	D2 Consuming a meal	D2.1 location	1		
		D2.1.1 mess/ barracks	4		
		D2.1.2 men's mess	3		
		D2.1.3 officers mess	32		
		D2.1.4 club	2		
		D2.1.5 hotel/ pub	11	D2.1.5 officer	2
				D2.1.5 men	9
		D2.1.6 residence	2		
		D2.1.7 other	1		
		D2.2 status indicator/ affiliation	28	D2.2 officer	19
		D2.1 men	9		

DATA EXTRACTION AND COMPILATION

Context, logical inference and historical analogy were used to identify and interpret the data during extraction from the source document and compilation of the data grid (Asher 1961, Wylie 2002). Archaeological data was interpreted literally. A tea pot was tableware and directly associated with serving a meal and the presence and use of tea. Frequently more than one practice and rule set was represented by the data extracts. For example, foraging for peaches would be entered on the data grid under procuring as a primary sub-practice (scavenge/forage). The peach would also be noted as a secondary raw materials (practice), fruits (sub-practice), and peaches (information detail). The information details increased knowledge about comestibles and other activities. For example, the types of fruit provided an indication of what was available in the Waikato during the campaign, as well as information about diet, foraging and leisure activities. The data grid information for each data set was tabulated on a summary table and a narrative prepared based on the information. Table 4 provides an example of a summary table.

OFFICIAL RECORDS

The official record sources were drawn from reports of the Commissariat Corps and other officers' reports prepared for

the War Office, as well as a roster of camp duty and corps newspaper advertisements for supplies and supply disposal. The official record documents the institutional management of the food supply from source to soldier and included 165 entries that provided 654 data grid entries. The records documented the Commissariat Corps' role as military store keepers. The corps obtained and distributed military rations required under general orders (Figure 2) and camp equipment. Officers' reports mention scavenging for potatoes. The camp diary of duty recorded duty assignments such as cook or camp clean-up. For example, at Kihikihi camp the same man was assigned cooking duty for many months and camp-clean up was assigned to one or more of the soldiers for periods of a few hours to a full day.

The Commissariat Corps' reports provided the majority of the official information. The corps tendered for supplies and operated bakeries to ensure the bread ration was provided as required under general orders (Figure 2). They stockpiled food and disposed of condemned and surplus supplies. The corps also recorded the amount of stoppage taken from each soldier's pay to reimburse the army for military rations. The Commissariat Corps was given special approval to create a Commissariat Transportation Corps at the start of the campaign. The Commissariat Transportation Corps supplemented the role of the Military Train. The corps purchased carriages, carts, draught horse, bullocks and lighter packhorses, as well as vessels for water transport. Reports to the War Office document the transport of food to the front including the types of boats purchased and the best saddle for the packhorses (the Otago pattern saddle was preferred because the standard issue Cape pattern saddle was harder on the horses' backs). The Commissariat Transportation Corps used militia men, the Naval Brigade and some local Māori to load and convey supplies. The corps complained about theft and damage during transport by the seconded men (Robertson 1864a:24-25).

The comestibles provided to the troops by the British army were required under general orders, nothing extra was supplied. The corps or other officers provided little information about secondary raw materials and the social use of foods by soldiers.

EYEWITNESS ACCOUNTS

Eyewitness accounts are the personal accounts of the men and officers and include 271 excerpts that produced 773 entries relating to soldiers' food culture. The eyewitness accounts data was drawn from diaries and letters of enlisted men and officers in the field as well as images, manuscripts and newspaper articles about camp life. The diaries indicated that enlisted men ensured food security by scouting and foraging. They collected fruits, vegetables, poultry and tableware. These activities facilitated the acquisition of secondary raw materials on the move and where they camped. Officers also foraged. Assistant Surgeon Carbery (1864:26) of the 18th Royal Irish Regiment noted:

I expect the Colonial Government will have to pay a good penny compensation to the Settlers whose domicils (sic) lay on our track in those days. I shall never forget my beautiful set of ware desert patterns, my table chairs, china, &c that I made over to my successor (sic) when leaving the column.

Carbery described his orderly as a servant and noted how clever he was as a cook. The officers' diaries indicate they discussed the dishes they ate, the composition of their meals, where they dined and the rank of their companions (Table 4). Affiliation and status was affirmed by shared meals with

officers of similar rank. For example, non-commissioned officers shared meals with other non-commissioned officers. The places they dined were documented in diaries and sketches. For example, Lieutenant Colonel Edward Arthur Williams of the Royal Artillery prepared sketches with annotations that showed the interior of the tent used as a mess whare/headquarters shanty at Te Awamutu and the exterior of the Royal Artillery and Royal Engineers' mess whare at Pukerimu. The officers' diaries and letters indicate the mess was not only a dining venue, but a social hub. The mess purchased secondary foods from the officers' mess contribution, there was a mess chest that held tableware and other items, celebration dinners were held, orderlies might be assigned mess duty and a mess president might be elected.

Conditions were harsher for enlisted men, but shared meals were a time to socialise. Their diaries indicate that enlisted men messed with other enlisted men and pooled money to purchase secondary foods. They also drank together, although they were not to be drunk on duty or keep alcohol in camp.

ARCHAEOLOGICAL RECORD

The archaeological data was obtained from 11 Waikato campaign sites. The sources include preliminary reports, articles and several draft artefact catalogues. The archaeological data was grouped by context on the data grid, such as redoubt ditch, general garbage pits, privies, rifle pits and surface samples inside the redoubt. The data compilation process produced over 28,800 entries. The quantities represented numbers of items and artificially distorted the information represented. For example, 107 pickle bottles were identified in samples obtained from ten sites. This is not a large quantity of pickles to transport – four dozen pint size [20 imperial fluid ounces/0.568 l] bottles of Wynbrows' Pickles or 48 bottles were shipped in one case (*Otago Daily Times* 24 September 1864:3). If the 107 pickle jars were pint size [20 imperial fluid ounces/0.568 l] 100 soldiers would have been provided with their pickle ration for just short of 43 days, if measured judiciously.

The artefacts included food product containers, kitchenware and tableware that provide evidence of overseas product procurement and transport to the campaign sites. The only transportation evidence is draught and lighter-horse shoes. The smaller shoes could have been used on packhorses or officers' mounts. No wagon wheels or wagon parts (such as metal wheel rims) have been identified. Although coal has been found it cannot be directly associated with steam-powered boats.

The comestibles in the archaeological record suggest a diet dominated by meat with a bit of flavourful sauce or pickle. The amount of meat, like the pickle, is only representative. There was no evidence for bread, such as the raw materials for making bread, bread-baking equipment or ovens. Similarly potatoes or other vegetable rations are not represented, with the exception of peas at the Alexandra Armed Constabulary redoubt in Alexandra (Pirongia). Organic preservation has been poor at all of the sites investigated, which has limited the range of foods identified.

Secondary raw materials include peaches and cucurbits (possibly cucumber, melon or other members of the Cucurbitaceae family). The information about secondary foods is dominated by glass food product containers, such as bottles associated with proprietary sauces, salad oils and vinegars. No residue analysis has been used to confirm the bottle content matches the bottle type.

Not surprisingly, alcohol bottles have been recovered from

the sites and are identified as the dominate container type, although the quantities recovered are only representative. The 627 bottles of beer recovered from 11 sites would probably not have provided refreshment for 100 men for a week, even if they were restrained in their drinking. The alcohol bottles are usually found in garbage pits that also contained faunal remains, broken ceramic dinner plates, sauce bottles and tin can fragments. The context does not indicate whether authorised or unauthorised drinking took place; as was noted previously enlisted men were not allowed to keep alcohol in camp, unlike officers, who could. Alcohol bottles have also been recovered from a privy deposit, as well as holes under tent floors at Ngaruawahia (Vuleich 2010: pers. comm.). These contexts suggest circumspect disposal and unauthorised alcohol consumption.

Food processing and combining foods was indicated by a few articles of kitchenware, including cast iron pots and frying pans. The paucity is not surprising. The kitchenware used by the military was robust and scarce. The cast iron pots and pans would have been suitable for frying, roasting, boiling and baking. The faunal remains provide little or no information about cooking methods. No evidence has been found of fire pits, bread ovens or cooking trench features (Figure 3). The lack of information may be a sampling problem.

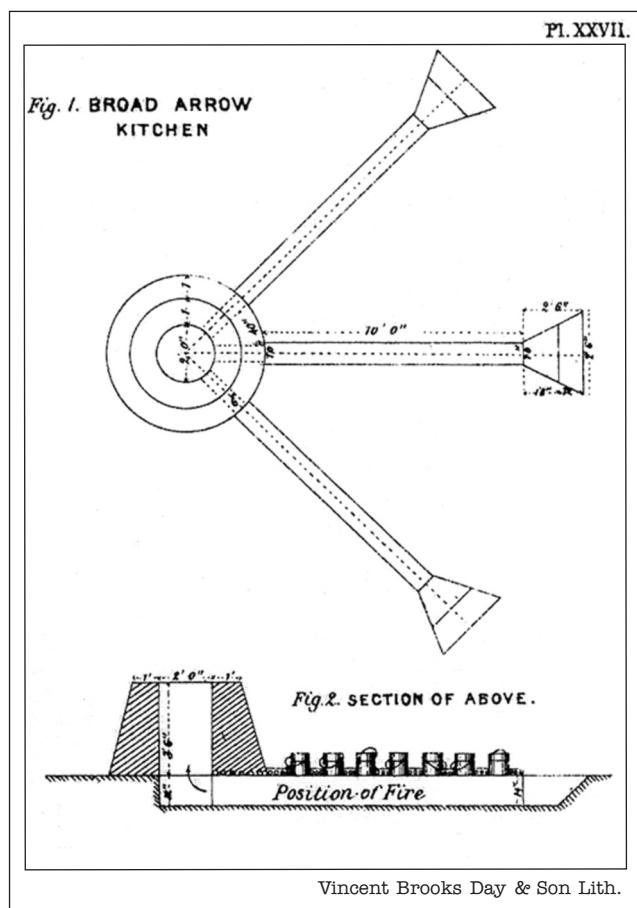


Figure 3: Broad arrow kitchen (Horse Guard 1871:Plate 22).

Serving meals is suggested by ceramic tableware vessel types that are used for serving a group of people, such as ashets. The interpretation of ceramics and similar artefacts must be approached with caution due to the potential for scavenging from abandoned households and other sources of tableware. What is known is the ceramic tableware included a range of vessel types and were dominated by transfer print patterns that were popular in the mid-1800s and produced in substantial quantities. Differences in trademarks and mould

decorations or shapes indicate many of the popular transfer print patterns were produced by more than one manufacture.

Comparative data from other military sites suggests that a proportion of the tableware probably came from regimental mess chests. Mess chest tableware would have been purchased in large quantities through the mess contribution. The purchase of common patterns ensured the quantity required was available, kept costs down and guaranteed that replacements could be obtained from wholesale warehouses (Sussman 1978). Sussman noted the most common transfer print ware found after 1820 at Fort Beauséjour was Blue Willow pattern (Sussman 1978:100). Blue Willow, Asiatic Pheasant, Rhine, Antique, Bouquet, Dulcamara, Foliage and Cable are among the transfer print patterns identified at the campaign sites in this study.

The dining style of officers would suggest that specialised tableware might be indicative of an officers' mess, such as stemmed glasses, drinking glasses and egg cups, which have been found in small quantities. After all, officers dined in a style that was reminiscent of middle and upper class dining in England (Harries-Jenkins 1977). Information that lends support to this hypothesis includes a newspaper advertisement for the sale of the 40th Regiment sergeant's mess kit that lists a large quantity of dinner, breakfast, and tea ware; knives, forks, and spoons; and decanters, tumblers, ale and wine glasses (*Daily Southern Cross* 15 May 1863:2).

DATA COMPARISON

The preceding discussion provides a brief overview of the development and application of the research framework and some of the food culture information extracted from official records, eyewitness accounts and the archaeological record. The next research stage involved comparison of the data grid findings to highlight the general attributes of the data sets (Table 5). More detailed analysis then focused on practice and sub-practice data. The comparative analysis of practices and sub-practices exposed differences and ambiguities that could not be explained. Binford (1987) posits that when ambiguity is identified it is indicative of unrecognised information about organisational phenomena. For example, Table 6 illustrates an ambiguity: salted meat is missing from the archaeological record, but evident in the written records.

Table 5: Comparative summary of the preliminary findings of the Soldiers' Foodway Research Project.

Rules by practice	Official record	Eyewitness accounts	Archaeological record
A1 Procuring	262	180	17372
B1 Raw Material Primary	265	96	6266
B2 Raw Material Secondary	1	139	2316
Rule I Subtotal	528	415	25954
C1 Food Prep and Processing	21	67	510
C2 Food Prep Equip and Facilities	78	64	54
D1 Serving a Meal	4	126	677
D2 Consuming a Meal	0	84	0
E1 Non-meals	0	38	1579
Rule II Subtotal	103	379	2822
F1 Discard/Disposal Planned	23	3	39
F2 Discard/Disposal Casual	0	0	13
Rule III Subtotal	23	3	52

TABLE 6: Comparison of documentation of meat – Rule Set I: Primary raw materials.

Rule set	Practice	Sub-practice	Official record	Eyewitness accounts	Archaeological record
Rule I	B1 Raw Materials Prime	B1.2 meat	41	14	6113
		B1.2.1 meat unspecified	13	1	0
		B1.2.2 beef (fresh)	2	4	4798
		B1.2.3 mutton	1	2	1190
		B1.2.4 beef or mutton	32	0	0
		B1.2.5 pork	0	1	125
		B1.2.6 salt beef	9	2	0
		B1.2.7 salt pork	12	5	0
		B1.2.8 salt provisions and preserved meat	3	0	0

THE MISSING SALTED MEAT

The remains of cattle and sheep were found in reasonable quantities at several of the sites occupied in the early and later stages of the war, but there was no evidence for salted meat (Table 6). In contrast, the Commissariat Corps purchased salted meat, discussed prices and had regulations for storage of salted meat. Lieutenant General Cameron ordered the Commissariat Corps to stockpile a month's worth of salted meat for each post in 1864. The preserved rations would have provided food security.

The soldiers' diaries document the consumption of salted meat. Corporal George Brier (1866) of the 68th Regiment observed in 1866:

Once a week we had eather (sic) 12 ounces of salted beef or salted pork. The day we got salted meat we got 1 ounce of lime juice and 2 ounces of brown sugar ... We had to drink the lime juice to prevent us from having scurvy.

The idea that salted meat was invisible because of the lack of bones has been proven spurious based on evidence from shipwreck sites (English 1990), water-logged terrestrial sites (Hattori and Kosta 1990) and documents that include 1853 British Naval Victualling Office instructions for butchering and salting oxen and hogs (Grant 1853). Research carried out in 2010 indicated butchering patterns and meat cuts were not reliable indicators of the presence of salted meat (Simmons 2011). The butchering patterns mimicked fresh meat divisions, although beef and pork elements were divided into pieces of equal weight suitable for packing, based on slaughter yard specification or legislation (English 1990). Grades of pork and beef contained unexpected cuts, for example the lowest grade of salt pork contained desirable shoulder cuts and roasting hams along with crania, mandibles, and foot bones (Hattori and Kosta 1990:86). These factors plus preservation issues render salted meat virtually invisible in the archaeological record. The research into the salted meat ambiguity could have stopped with that explanation, but I continued my research to determine if some sites were more or less likely to contain salted meat. I reviewed the Commissariat Corps reports to determine how much salted meat was issued and when. The records indicate salted meat was purchased as the battle front moved south in 1864, but the quantities purchased and issued were not recorded. The corps also entered into a new meat contract effective on 1 February 1864. The contract required the delivery of cattle and fresh meat to the front (Robertson 1864b). The fresh meat contractors must have been diligent, because six months later Robertson (1864b:65) noted:

Little be said on the subject of salt meat, large quantities of which must of a necessity be available, if not for very frequent consumption yet as a reserve, in case of failure in the supply of fresh meat, or to be used on unexpected movements of troops.

The conclusion drawn about salted meat during the campaign was that salted meat remains are more likely to be found at the campaign sites used prior to 1 February 1864, at remote pickets, or during initial encampment or food emergencies. I had not recognised the significance of the meat contract until I investigated the ambiguous information about the issuing of salted meat during the campaign. Use of the research methodology resulted in the identification of previously unrecognised information about the organisational structure of food provisioning – that is, the corps was the military purchase agent, but not always the delivery agent. This suggested that additional research on other Commissariat Corps contractors would be worthwhile and increase knowledge about provisioning at the campaign sites.

OTHER COMPARATIVE ANOMALIES

Comparisons of other practices and sub-practices indicates that there were additional data ambiguities to be investigated, including the lack of references in the eyewitness accounts to commercially produced sauce bottles (such as Lea and Perrins and Yorkshire Relish bottles), which are usually found at the campaign sites. Table 7 provides a summary of information for commercially produced sauces, which are also referred to as compound sauces.

Table 7: Comparison of sources – Secondary raw material: Commercially produced sauces.

Sub-practice	Official record	Eyewitness accounts	Archaeological record
B2.4.11 general sauce	0	0	31
B2.4.11.1 Worcestershire sauce Lea & Perrins	0	0	71
B2.4.11.2 tomato sauce	0	0	25
B2.4.11.3 Yorkshire sauce/ relish	0	0	11

The lack of information about sauces in official records is not surprising. The official record documents primary raw materials, as was discussed previously. What was unexpected was the lack of references about sauces in the eyewitness accounts. The soldiers mention that they purchased beer, milk, sardines and many other items. Even Lieutenant Surgeon Carbery, who wrote in detail about food, includes no references to commercial sauces. He does mention a sauce cooked by a companion: 'my co-frere (sic?) was a capital cook and was in his glory when suggesting the manufacture of some savoury mess – or tasting the properties of some newly invented sauce' (Carbery 1863:17).

The ambiguous information about sauces raises obvious questions of why and what the information might indicate. Possible explanations could include:

- manufactured sauces were commonly used, like salt and pepper, and therefore not considered notable;

- manufactured sauces were purchased by the mess through the mess contribution and placed on the mess table as part of the meal;
- manufactured sauces were purchased by officers' orderlies and part of the officers' mess or dinner table; or
- the sauce bottles were brought with the soldiers for a recycled purpose and not their original purpose.

A number of other interpretations might be proposed, but for the time being the procurement and use of compound sauces and/or sauce bottles remains an open question. Other ambiguities exposed by the data comparison process remain to be investigated, but have the potential to add substantially to what is known about eating and drinking during the campaign.

SUMMARY AND CONCLUSIONS

The soldiers' food culture research has exposed the similarities and differences found in the three data sets. The official records provided a perspective that was clearly institutional in form and content. The eyewitness accounts were personal, anecdotal and provide rank and file perspectives on camp life. In contrast the artefacts, remains and features recorded in the archaeological record document consumption and disposal.

The research process has been facilitated by the development of a foodways research framework and methodology for data compilation. A prototype framework was tested and modified at an early stage in the research process to create a robust tool. The testing phase also informed the research by exposing unanticipated information about soldiers' comestibles. Use of the framework and methodology expedited data management by creating a food culture typology for organising and later comparing the information contained in the three data sets. The deficiencies in each data set were identifiable on the data grid because the research tool created an opportunity for one-to-one comparison. Comparison of the three data sets illustrated the use of the framework as a tool for exposing ambiguities, identifying unrecognised information and developing more accurate interpretations. The information produced has already expanded knowledge about soldiers' food culture during the campaign and provided a more accurate picture of life in the Waikato military camps. The outcomes discussed in this paper suggest the potential for broader application of the research framework and method in archaeological research.

ACKNOWLEDGEMENTS

The research framework, methodology and case study of soldiers' food culture during the Waikato campaign of the New Zealand Wars presented in this paper is part of ongoing research undertaken in a doctoral programme at Otago University. I would like to thank Ian Smith and Helen Leach for their supervision of my PhD research and their encouragement. I also wish to acknowledge my three original Dunedin office mates, Anne Ford, Marsa Dodson and Chris Burke, and my partner Daniel Tanaka, who have done more than they know to help me reach my research goals.

REFERENCES

ADAMS, W.Y. and E.W. ADAMS 1991 *Archaeological Typology and Practical Reality: A Dialectical Approach to Artifact Classification and Sorting*, Cambridge University Press, Cambridge.

- ASHER, R. 1961 'Analogy in Archaeological Interpretation', *Southwestern Journal of Anthropology* 17(4):317-325.
- BARBER, R.A. 2011 British Troops in New Zealand, <http://www.teara.govt.nz/en/1966/british-troops-in-new-zealand/1>.
- BINFORD, L. 1987 'Researching Ambiguity', in Susan Kent (ed.) *Method and Theory for Activity Research Area: An Ethnoarchaeological Approach*, Columbia University Press, New York, pp. 449-512.
- BELICH, J. 1986 *The New Zealand Wars*. Penguin Books, Auckland.
- BRIER, G.E. 1866 *My Travels in New Zealand as a Soldier January 1865-March 1866*, (MS-0259), Alexander Turnbull Library, Wellington.
- CARBERY, A.T. 1958 *Journal of Andrew Dillion[sic Thomas] Carbery Assistant Surgeon 18th Royal Irish Regiment*, 1863, Hocken Library University of Otago, Dunedin and Hamilton City Library, Hamilton.
- CHANG, K.C. 1967 'Major Aspects of the Interrelationship of Archaeology and Ethnology', *Current Anthropology* 8(3):227-243.
- CHANG, K.C. 1977 *Food in Chinese Culture: Anthropological and Historical Perspectives*, Yale University Press, New Haven and London.
- COWAN, J. 1956 *The New Zealand Wars; Volume II: The Hauhau Wars, 1864-72* (2nd edition), R.E. Owen, Wellington.
- DAILY SOUTHERN CROSS 1863 'Sergeant's mess, 40th Regiment'. *Daily Southern Cross* 15 May 1863, p. 2.
- DOUGLAS, M. n.d. A History of Grid and Group Cultural Theory (paper), <www.chass.utoronto.ca/epc/srb/cyber/douglas1.pdf>
- DOUGLAS, M. 1972 'Deciphering a Meal', in Clifford Geertz (ed.) *Myth, Symbol, and Culture*, WW Norton & Company Inc, New York, pp. 61-81.
- DOUGLAS, M. 1982 *In the Active Voice*. Routledge and Kegan Paul, London.
- DOUGLAS, M. and B. ISHERWOOD 1979 *The World of Goods: Towards an Anthropology of Consumption*, Allan Lane Penguin Books, London.
- ENGLISH, A.J. 1990 'Salted Meats From the Wreck of the *William Salthouse*: Archaeological Analysis of Nineteenth Century Butchering Patterns', *Australian Historical Archaeology* 8:63-69.
- GOODY, J. 1982 *Cooking, Cuisine and Class: A Study in Comparative Sociology*, Cambridge University Press, Cambridge.
- GRANT, T. 1853 'Mode of Curing Oxen and Hogs Slaughtered in the Establishment at Deptford', *Transactions of the New York State Agriculture Society: Proceedings of the Annual Meeting*, 12:287-291.
- HARRIES-JENKINS, G. 1977 *The Army in Victorian Society*, Routledge & Kegan Paul, London.
- HARROP, A.J. 1937 *England and the Māori Wars*, Whitcombe and Tombs Limited, Australia.
- HATTORI, E.M. and J.L. KOSTA 1990 'The Hoff Store Site And Gold Rush Merchandise From San Francisco, California', in *Society for Historical Archaeology Special Publication Series 7*, Braun-Brumfield Inc., Ann Arbor, pp. 82-113.
- HOPKINS-WEISE, J. 2006 'Australia's Logistical and Commissariat Support in the New Zealand Wars, 1863-66', *Sabretache* 47 (4):5-24.
- HORSE GUARD 1853 'Regulations for Encampments',

- Quarter Master General's Office, Parker, Furnivall, and Parker, London.
- HORSE GUARD 1871 'Regulations and Instructions for Encampments', W Clowers & Sons, London.
- JONES, H.S. 1864 'Appendix 4: Instructions to Commissariat Officers and Others for Field Service in New Zealand, Military Rations Allowances for Field Service in New Zealand, 22 April 1864. War Office 33/17A, British Archives, Kew, pp. 75-76.
- LEACH, H. 2008 'Kai to Kiwi Kitchen: Tracing the Development of New Zealand's Culinary traditions. Macmillan Brown Lecture Series 2008 (manuscript).
- LEACH, H. 2010 'The Macmillan Brown Lectures 2008', in Helen Leach (ed.) *Kai to Kiwi Kitchen New Zealand Culinary Traditions and Cookbooks*, Otago University Press, Dunedin, pp. 7-68 .
- LEONE, M.P. and P.J. POTTER 1988 *The Recovery of Meaning*, Smithsonian Institute, Washington D.C.
- MINTZ, S. and C.M. DU BOIS 2002 'The Anthropology of Food and Eating', *Annual Review of Anthropology* 31:99-199.
- MIRACLE, P. 2002 'Mesolithic Meals From Mesolithic Middens', in Preston Miracle and Nicky Milner (eds) *Consuming Passions and Patterns of Consumption*, McDonald Institute Monographs, Cambridge McDonald Institute for Archaeological Research, Cambridge, pp. 65-88.
- OTAGO DAILY TIMES 1864 'Auctions'. *Otago Daily Times* 24 September 1864, p. 3.
- RATHJE, W.L. 1992 *Rubbish! The Archaeology of Garbage*, Harper Collins, New York.
- RATHJE, W.L. 2001 'Integrated Archaeology: A Garbage Paradigm', in Victor Buchli and Gavin Lucas (eds) *Archaeologies of the Contemporary Past*, Routledge, London and New York, pp. 63-76.
- RITCHIE, N. 2001 *The Waikato War of 1863-64: A Guide to the Main Events and Sites*, Te Awamutu and District Museum in association with the New Zealand Lotteries Commission and the Department of Conservation, Hamilton.
- ROUGH, H.E. JR. 2004 *The Victorians at War 1815-1914: An Encyclopedia of British Military History*, ABC-CLIO Inc, Santa Barbara.
- ROBERTSON, L. 1864a Inclosure 1 no. 13, 7 September 1864. War Office 33/17A, British Archives, Kew, pp. 15-26.
- ROBERTSON, L. 1864b Inclosure 1 no. 18, 23 August 1864 Continuation of Narrative of the Campaign in the Waikato Country, Auckland New Zealand 1863-1864, War Office 33/17A, British Archives, Kew, pp. 59-73.
- RYAN, T. and B. PARHAM 2002 *The Colonial New Zealand Wars* (reprint), Grantham House, Wellington.
- SAMUELS, D. 1996 'Approaches to the Archaeology of Food', *Petis Propos Culinaires* 54:12-21.
- SMITH, I. 1996 'Historical Documents, Archaeology and 18th Century Seal Hunting in New Zealand', in *Oceanic Cultural History: Essays in Honour of Roger Green*. New Zealand Journal of Archaeology Special Publication, pp. 675-688.
- SIMMONS, A. 2010 'Postcard from Te Awamutu: Eating and Drinking with the Troops on the New Zealand War Front', in James Symonds (ed.) *Table Settings: The Material Culture and Social Context of Dining AD 1700-1900*, Oxford Books, Oxford, pp. 163-181.
- SIMMONS, A. 2011 'Salty as Sailors Boots': Salt Cured Meat the Blessing and Bane of the Soldier and the Archaeologist', in Helen Saberi (ed.) *Oxford Symposium on Cured, Fermented and Smoked Foods: Proceedings of the Oxford Symposium on Food and Cookery 2010*, Prospect Books, Devon, pp. 288-301.
- SIMMONS, A. 2012 'Soldiers' Foodways during the Waikato Campaign of the New Zealand Wars', draft thesis manuscript, University of Otago.
- SUSSMAN, L. 1978 'British Military Tableware, 1760-1830', *Historical Archaeology* 12:93-104.
- VULETICH, LES 2010 Excavations at Ngaruawahia personal communication to Alexy Simmons.
- WAR OFFICE 1866 *Report of a Committee Appointed to Inquire into the Equalization of stoppages from the Soldiers for Rations at Home, Abroad, in Hospital, and on Board Ship, and the Improvements Required in the Composition of his Rations, New Zealand Daily Ration, 18 January 1866*, British Archives, Kew, pp. 104.
- WYLIE, A. 2002 *Thinking From Things: Essays in the Philosophy of Archaeology*, University of California Press, Berkeley.