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The archaeology of resilience: a case study from Peel town, Western
Australia, 1829-1830

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Abstract

This paper describes the archaeology of one family's tolerance to the stressors associated with the settlement of a new place. Artifacts associated with the maintenance of clothing suggest that a British family nearly arrived at the Swan River colony in the south west of Australia had the ability to maintain composure during a period of reduced resources and psychological strain. The family's ability to resist stress was probably the result of the social knowledge gained during previous experiences with internal migration in the British Isles during a time of high social dislocation.

Keywords: Vulnerability, resilience, settlement of new places, British, Peel town, Western Australia

Much is written about stress and its effects on human behavior. Stress is the body's reaction to any change that requires an adjustment or response – it is a normal part of life, and it is unsurprising, therefore, that many disciplines of the humanities have the study of stress and its consequences in their repertoire. Many studies discuss the behavioral and mental consequences for those affected (Quarantelli and Dynes 1977; Adams and Adams 1984; Gonzalez and Bell 2013), with archaeology contributing from a material perspective to the research when examining events from the near and distant past (Torrence and Grattan 2002a, 2002b).

Previously, archaeologists investigated stress when coupled to natural disasters such as volcanic eruptions and linked phenomena (Sadler and Grattan 1999; Driessen 2002), tectonic

earthquakes (Gilpin and Carver 1993), tsunamis, (Welsch 1998) and floods (Kornbacher 2002). Much of this research orbits how traumatic events influence cultural change (Driessen and Macdonald 1997), such as the long-term impacts on settlement patterns (Aldrete 2004), social systems and resource availability, and trade (Zeilinga de Boer 2002, Torrence 2002). However, there is a growing list of publications covering individual and small group behavior during rapidly occurring crisis-situations like shipwrecks, natural disasters and terrorist attacks (Frederick 1987; Torrence 2002; Gibbs 2002, 2003; Gould 2007; Frey, Savage, and Torgler 2011). Patterns have emerged showing that an individual's reaction to crisis can alter if they are with one's children, spouse or other close relatives and friends. Furthermore, group behavior varies depending on the group's male/female/adult/child ratio and experience in crisis-situations (Frederick 1987:68). The evidence indicates that during a crisis, not all behavior is unpredictable, unstructured, and panic driven, but that instead a group's behavior will actually respond in predictable patterns – some calm, others stressed. However, most archaeological publications on stress pay little attention to the vulnerability of a group to account for behavior and its archaeological signature (Torrence and Gratten 2002:7; Sheets et al. 1991; Torrence et al. 2000). Vulnerability – an individual or group's capacity to anticipate, cope with, resist and recover from the impact of a natural or human made hazard (Grayson 1990; Blaikie et al. 1994:9; Dixon et al. 2011) – is a key contributor to physical or psychological stresses. The more vulnerable the group the greater the stress and, by implication, the clearer the material evidence of stress-related behavior should be in the archaeological record.

Between December 1829 and November 1830 a group of men, women and children linked to the British settlement of the south west coast of Australia experienced stress while grappling with colonizing a new land (Burke 2016, 2017). The results of excavations of the camp the group formed in sand dunes near the Indian Ocean coast provide clues for the colonists' tensions, with evidence suggesting bushfire destroying some of the well-made prefabricated structures brought from Britain, and a reduction in resources such as good quality wood for fuel (Burke 2016, 2017). In addition, the deaths of about 29 of the group of about 500

(Collie 1830; Registry Office 1830-1831) and the camp's abandonment after 11 months are reasons why Peel town – the camp named after the group's leader Thomas Peel – is usually considered the symbol of the disorganized first days of the Swan River colony (Statham 1981:184). However, while some of the archaeological assemblage at Peel town strongly suggests both short-term and diffuse stressful events, material collected from excavations of a dwelling probably occupied by a single family and their servant point to some doing specific high skilled tasks. This implies that some at the camp were less vulnerable to the rigors and shock associated with colonizing new places.

Rockman (2003) emphasized the growing need to appreciate the culture and life experiences of those entering a new landscape in order to understand group and individual behavior in stressful situations. This paper examines one site's archaeology in the context of how culture and life experiences possibly shaped coping to and resisting the stresses of colonization.

The people, their culture, and stress at Peel town

The people comprising the 1829 – 1830 colonization of the Swan River that included the camp at Peel town were part of the global spread of British people and their culture that occurred mostly between 1760 and 1860 (Belich 2011). The people of the British Isles at this time were a highly variable and culturally complex amalgam from southern and northern England, Scotland, Ireland, Wales, Cornwall, Jersey, and Guernsey. In the 80 years before the Swan River's settlement, people from these regions had formed an ethnic identity that included elements of shared politics and geography, citizenship and race, legal and administrative structures, moral values and cultural habits, language, and tradition – in sum, they were the British (Johnson 2003:18; Lawrence 2003a; Lawrence 2003b, Tarlow 2007:124-127; Brooks 2015:4-5; Burke 2016). They were the most liberal of other contemporary European nations of the period and young on average in age, with 48 per cent of the population in England and

Wales in 1821 less than 15 years old (Evans 1993:4). Between 1815 and 1832 Britain's population increased by 29 per cent from an estimated 12.9 million to 16.6 million people, a rate of population growth unequalled before or since (Wrigley and Schofield 1981:208-209).

Social upheaval often accompanies rapid population increase, for more people usually means less food to share (Evans 1993:4), while a young population is typically more fractious. However, the British never instigated large-scale civil revolt such as other mainland European populations during this period. The British maintained an efficient agricultural industry and overseas trade, and the technological advances of the Industrial Revolution – the results seen the clearest in their homeland more than anywhere in the world – made the British of the late eighteenth and early nineteenth centuries markedly different to previous English speaking groups colonizing the New World in the seventeenth and early eighteenth centuries. As Lawrence (2003:22) and Belich (2011:120-121) state, the nineteenth century British had access to mass-produced objects and information that made them more modern in their global interaction.

The Industrial Revolution and the first modern cities that developed influenced the British Isle's demography, with people of the rural population in Britain searching for better opportunities in industry (Whyte 2000). The pull by developing industrial cities such as Manchester made Britain's laboring population extremely mobile during this period (Hobsbawm and Rudé 1970:99).

One should not think that being British melded all the cultural traits from the regions of the British Isles into a single entity to the exclusion of others – typically, people defined themselves by both their regional and British identities. However, advances in technology, overseas trade, and liberalism failed to protect the British from social dislocations in the 20 years before the founding of the Swan River colony. The average wheat price, on which the British people's staple food of bread was based, was never higher in the whole of the nineteenth century than between 1810 and 1819 (Evans 1993:4). This put massive pressure on wage earners to provide for their young (Evans 1993:5), and resulted in emigration from Britain to

North America, southern Africa and Australia during this period as British people looked for better opportunities (Belich 2011).

The camp's demography

The people at Peel town came directly from Britain to settle the south west coast of Australia. Verifying the precise number of people at Peel town during the camp's occupation is impossible due to contradictory information in primary historical sources. After the arrival of Peel's third ship the *Rockingham* in mid-May 1830 (the first ship, the *Gilmore* arrived 15 December 1829 and the second, *Hooghly*, mid-February 1830), the population for a short time was between 501 and 522 people (Scott 1829; Scott 1830a, 1830b). About 75 per cent of the group were in western style family units of wife, husband and children, with some of this percentile comprising solely father and children, mother and children and married couples without children (numbering five, one and nine respectively for a total of 79 families). The number of children at the camp under their parents' supervision – 242 or roughly 46 per cent of the camp's population – is striking as it reflects Britain's young on average population, while single men brought to the colony to serve Peel in laboring roles comprised about 20 per cent (n = 99) of the group.

The camp's population contributed about one-third of the Swan River colony's British population at the time, but none at the camp left a diary of daily events and few contributed to the reasonably large collection of primary sources linked to the Swan River colony's first two years. What can be gleaned from the meager historical record is that some at Peel town interacted with each other in business, such as George Dunnage acquiring the services of camp surgeon John Lyttleton for various ailments, and Dunnage also hiring John Crisp to work on his dwelling (Dunnage 1831). Three others left documents with varying spatial and temporal proximity to the events of 1829-1830: two from visitors to the camp (Collie 1830; Bayly 1831), and the other describing a relative's experiences (Shaw c.1938). All indicate that for some stress

occurred within hours of arriving at Peel town. To qualify for an initial 250,000 acres of the 1 million acres (404,000 hectares) promised to Peel, the Colonial Office in London stipulated that he and at least 400 of his people arrive at the Swan River by 1 November 1829 (Twiss 1923a:611, 1923b:612–613). The ocean journey of about 22,000 km would have physically stressed most, but compounding strain after the first ship reached the Swan River in mid-December 1829 was news that land set aside for Thomas Peel's people had been allocated to others due to their arrival after the 1 November deadline. The dejected group then had to erect shelters and unload and move stores, with many thrust into a new physical and cultural environment (Bayly 1831). Bayly – the second officer of the *Hooghly* – described lethargy and general despondence among some members of the Peel town group (Bayly 1831). He discussed how some with little experience “roughing it” or who had lived in cities in Britain before coming to Western Australia struggled; one man while erecting his family's dwelling cut his hand with an axe because it was, according to the man's wife, “his first attempt at anything of the kind” (Bayly 1831). Bayly also described the death of animals due to poor feed and a bushfire accidentally lit by a colonist razing structures – the British were ignorant of the Australian woodland's high fire potential in summer. He did state, however, that the camp of the *Hooghly's* steerage passengers – who were mostly men with manual trades and their families – had better quality dwellings compared with the rest of the camp (Bayly 1831). Bayly also mentioned how poor quality food and the large variation in day and night temperatures – sometimes as much as 28° C (50°F) – affected the health of people at the camp and the children particularly. Many were ill (Bayly 1831).

The memoirs of Edward Shaw (Shaw c.1938) written sometime after 1870 contain some factual errors, but cross-referencing with primary sources improved the validity for some of the events and the people Shaw describes. Arriving on the *Rockingham* in May 1830, Shaw described the ship's wrecking on a beach about 1000m south of Peel town during a storm (Anonymous *Perth Gazette* 19 Sept. 1835:567; Heal 1988:32-34; Shaw c.1938). Understandably traumatized, the 152 aboard made their way to Peel town, where Shaw described the descent

into madness of the *Rockingham's* doctor Nicholas Langley due to the conditions (The Magistrates of Fremantle 1830; Pratt 1831). The *Rockingham's* passengers arrived in late autumn, and soon after, winter storms combined with the exposed nature of the camp in the coastal sand dunes resulted in much damage to dwellings and subsequent angst among occupants (Shaw c.1938).

Collie, the assistant surgeon from HMS *Sulphur* that had arrived in June 1829 with the vanguard of the Swan River colony's settlement group, noted that 28 people had died when he recorded the camp's health in July 1830 (Dance 1830; Collie 1830). The number of fatalities in Collie's report corresponds closely to the number of deaths annotated in the embryonic colony's official records for the period that show 27 deaths by the time of Collie's survey and 30 by the time the camp disbanded in November 1830 (Registry Office 1830-1831). Combined, both primary sources suggest that by July 1830 children and adult males had suffered a similar number of deaths (11 and 10 respectively) along with eight adult females (Collie 1830; Registry Office 1830-1831). Dysentery and scurvy were the cause of most deaths, but Collie speaks of two women dying of complications in giving birth (but the government records noted three women – Elizabeth Eacott, Jane Thomas and Ann Bailey – succumbing). Collie also described one child dying of inanition due to the lack of a wet nurse (probably Thomas' new born son Clarence three weeks' after his mother's death), and a child who died convulsing after consuming a large quantity of alcohol (Collie 1830; Registry Office 1830-1831).

The deaths divided by familial association show that all the adult women were married and part of family groups but only one man was married and in a family (James Woodward) – the rest of the adult males perishing all single men. Collie (1830) stated that of the ten single men, two were drunkards and two more had "irregular habits." While the meaning of the latter category is unclear, the description suggests that the consumption of alcohol and poor personal hygiene contributed to individuals' deaths, causes also insinuated by Bayly's (1831) description of some people at the camp inebriated or affected by the hot sun.

Evidence of stress in the archaeological record

The archaeology supports the historical record of stress at the camp. Excavations (to the end of 2020) over a combined surface area of 457.5 meters square have uncovered dwellings, wells, rubbish pits, and separate cooking areas dating to the camp's occupation. Disposition of the group's material culture suggest both short-term and diffuse stressful events. Burke (2017) detailed the changes in the types of wood gathered for fuel from five dwelling sites at Peel town. In summary, charcoal collected from hearths, fireplaces and rubbish pits suggested that the people at Peel town used first high quality local wood for fuel but shifted to poorer quality woods as local resources ran low. Finally, colonists resorted to using their own furniture and other introduced timber objects for fuel, with charcoal from European, Caribbean, Asian and eastern Australian trees appearing in the youngest contexts. Associated with these contexts were furniture fixtures such as draw handles, hinges and upholstery tacks, and many iron nails, spikes, and fragments of ship sheathing of copper-alloy – the later most likely the result of colonists' collecting flotsam and jetsam from the nearby Indian Ocean shore (Burke 2017:499).

The archaeology from three closely placed dwellings occupied by the Bailey, Elmslie and Lyttleton families contain clear evidence of hasty abandonment and destruction of the dwellings by fire. The structures – two timber prefabricated structures with a limestone floor in one and timber floorboards in the other (Sites 1 and 16 occupied by the Bailey and Elmslie families respectively) – and a timber and canvas tent or pavilion probably with a carpet floor on sand (Site 3, the Lyttleton family), contained many artifacts affected by high temperatures. A large deposit of shattered and partly melted window glass from the center of the south-facing wall of the Bailey's dwelling and the north east corner of the Elmslie's structure – the former even had a carbonized but semi-complete window frame with window glass shards still held in place with caulking – attest to the conflagration. Charcoal, partly carbonized wood, and ash were also present, with the floorboards of the Bailey dwelling carbonized but in situ and easily identifiable, while carbonized bases of timber posts at the Lyttleton family's structure picked

out the pavilion's rectangular 3 by 6.1 meter footprint. Heat affected but complete ceramic and glass items, thick (4.5mm) polished glass in the interior of the Bailey dwelling interpreted as a heat shattered mirror, and coins, fragments of jewelry, and furniture fixtures were also gathered from the three structures suggesting insufficient time to collect valuable items before fire destroyed the dwellings.

The Crisp family and their dwelling

Martha (aged 37) and John Crisp (47), nursemaid Mary Thomson (age unknown), and children Martha (8), John (5), Frances and Robert (both 4) and Elizabeth (3), were one of the families at Peel town (Erickson 1988) that would have witnessed the stress associated with illness and depleted resources. Excavations on the family's cooking hearth contributed to the charcoal assemblage showing shifts in fuel types, with the youngest contexts containing charcoal from wood often used in the construction of boats and ships suggesting that flotsam and jetsam was the source of much of the family's firewood late in the camp's existence (Burke 2017:499). However, compared to other Peel town sites, the archaeological assemblage of the Crisp dwelling understates anxiety. Arriving on the *Gilmore*, the historical record suggests that John Crisp was a carpenter, but Martha Crisp's profession is unknown (Dunnage 1831). Nothing is known of their life in Britain before their arrival at the Swan River.

The Crisp family's dwelling (Site 2 in the overall Peel town site nomenclature) was discovered in *Banksia* low woodland south east of a sand covered limestone hill 420 meters from the beach where the group from the *Gilmore* disembarked. Peel town is located on the Spearwood Dune system that is prone to aeolian and colluvial processes. However, the Crisps' alleviated some of the processes caused by strong west and south west winds in the mid- to late-afternoon in summer and when cold fronts brought heavy rain in winter by placing their dwelling in the lee of the limestone ridge and on ground slowly rising to the south east (Riggert, 1979:184, 188; Southern 1979:203-205).

Most of the Crisp dwelling's archaeological assemblage was unearthed between 65 and 75mm below the ground's surface in a thin but clearly defined context of light brown to reddish yellow sand (Munsell 7.5YR 6/4 – 7.5YR 6/6). Excavation exposed a structure with a fireplace in the southwest corner of locally sourced limestone and imported low-fired yellow brick. A vertically laid perforated sheet of copper-alloy ship's hull sheathing, nails, and cobble-sized limestone laid in rough lines formed the structure's remnant foundations with walls probably of canvas (Figure 1). It was most likely open to the northeast.

{Fig. 1 here}

The structural artifacts comprising the remnant foundations of the dwelling separated the light brown to reddish yellow sand (contexts 62, 65, 69, 72, 76, 109, 124 and 125) from natural yellow sands (Munsell 2.5Y 7/6 to 6/6, contexts 66, 70, 71, 77 110, 126, and 123) and fine aeolian deposited sediments (Munsell 10YR 6/2, contexts 64, 67, 72, and 78). The former contexts are interpreted as an internal living/working area used by the Crisp family. This internal area of about 10.6 meters square contained 138 artifacts with clothing and profession (in this case, tailor/seamstress) functions. As Table 1 shows, the assemblage comprised pins, a pair of scissors, needles, thimbles, buttons, hooks and eyes, garter clips and hooks, and beads. The artifacts were of various materials including copper- and iron-alloys and glass, and are described below beginning with the profession functional category with the clothing function following.

{Table 1 here}

Artifacts associated with profession

Pins

The ubiquitous straight pin of copper-alloy comprised much of the collection. Typically used as sewing aids, the form of a pin is ideal for other functions such as clothes fasteners (Beaudry 2006:15), attaching multiple sheets of paper (Allen 2002) and even as an ingredient in witches bottles to ward away evil (Merrifield 1955:195). The pins were all two-part with coiled-wire heads (Dutton and Jones 1983:176; Beaudry 2006:20-21). Many of the 53 complete pins were the multi-functional short white (length varied, but all were within the 24 to 30mm length range for this pin type) all-purpose pin used to temporarily affix ruffles, veils, and neckties to clothing and to hold cloth in place while sewing pleats and hems. There were also long whites (between 30 and 70mm) with a similar function as short whites and the much shorter lill (12mm) used for fine sewing or to secure woman's clothing items made of fine fabrics such as veils or scarves (Beaudry 2006:22-25).

Needles

A minimum number of four needles came from squares V18, W18, and W17 (Figure 1). Of steel with notoriously poor preservation qualities, needles rarely survive the rigors of chemical and physical breakdown or even the most careful of excavation techniques at open archaeological sites (Beaudry 2006:44, cf. Davies 2010). The maritime environment of Peel town and the sandy sediments are not conducive to good preservation, with the four needles fragmented but with points recognizable despite corrosion. According to Deagan (2002), the needle is the most diagnostic artifact suggesting sewing at a site and it is the least likely of sewing associated artifacts to be used for other purposes.

Thimbles

Excavations in the under floor cavities at the Hyde Park Barracks Destitute Asylum in Sydney (Davies 2010:18) found thousands of pins and other sewing related artifacts. The butt-jointed floorboards at the site (Davies 2020) acted as a filter allowing small artifacts like pins (n=4273), needles (n=20) and larger objects like cotton reels (n=89) and leather off-cuts (n=502) to pass through into the under floor cavities. However, in an assemblage totaling 5034 artifacts deposited between 1862 and 1886 thimbles contributed just 12 items (Davies 2010:13, 18). It was therefore surprising discovering 24 copper-alloy thimbles and one copper- and iron-alloy thimble in the 10.6 meter square work area occupied for just 11-months. With the exception of the one copper-alloy thimble with iron-alloy crown, all had honeycombed knurlings on the body, a hatched crown, and rolled rims (Hill 1995:88-89; Beaudry 2006:107). None of the thimbles had size marks, inscribed initials, or monograms, but comprised girls', maids' and women's sizes (Beaudry 2006:105, 106).

Microscopic analysis of the thimbles' surface using a Tescan Vega3 SEM showed all had circular and ovaloid indentations and scratches. These marks were compared with a sample of new thimbles free of use wear that were then used by an adult sewing for about 20 hours using a steel needle through cotton cloth. The indentations and scratches produced on the comparative sample were almost identical in size – comprising ovaloid indentations between 60 and 25µm wide and 50µm deep – and location compared with the large and medium sized archaeological thimbles. However, the small archaeological thimbles had only shallow scratches and circular indentations between 10 and 15µm wide and 10µm deep. The two exceptions to this pattern were girls' thimble PT000103 that also had a V-shaped section removed (Figure 2) and women's sized thimble PT000108. Both had shallow and deep indentations (Figure 3).

{Fig. 2 here}

{Fig. 3 here}

Scissors

A complete pair of scissors measuring 170 mm long came from square V17. The artifact had side bent shanks and equal sized wire bows typical of sewing scissors (Beaudry 2006)

Artifacts associated with clothing

Beads

Small (dia. 2-4.5mm) red and black, and larger (dia. 5-5.5mm) dark blue and cream-colored glass beads were unearthed. Beads are artifacts often found at historical period sites including other Peel town sites (Deagan 1987; Casey 2004; Porter and Ferrier 2006; Davies 2015:559; Burke 2016), but few publications describe their primary function past the catchall term of “personal adornment” or “clothing.” Many have interpreted their presence as an indicator of sewing (Casey 2004; Davies 2015), but they are multifunctional with meaning often determined by the culture of the group (Fennell 2000; Barnes 2011; Apoh 2013; Davidson 2020:717-722).

Clothing fasteners

Clothing fasteners comprised most of the clothing function artifacts. Table 1 shows that there was a range of buttons, copper-alloy and iron-alloy clothing eyes and hooks, and copper-alloy garter hooks and clips.

Three copper rings in the assemblage were probably the metal frame of thread or Dorset buttons made usually by repeatedly binding yarn over a disc or ring former (Lindbergh 1999:51; McGowan and Prangnell 2011:14). There are few scholarly sources specifically on the objects (Lindbergh 1999:51; McGowan and Prangnell 2011:14; Peacock 2008; White 1977). However, their discovery at the Crisp dwelling tightly dated to between December 1829 and

November 1830 re-evaluates Willett Cunnington and Cunnington's (1992) statement that buttons of this type were out of fashion by 1830 but affirms Marcel's comment (1994) of their possible use until the 1850s.

The conventional buttons were a mix of one- and two-piece construction of slate and iron- and copper-alloy. The rare (Houart 1977:11) slate 4-way sew through button (PT000483) appears to be a trouser button, while PT00002 – stamped "Gold Plate" on the back – is an early example of a two-piece constructed gilded men's button (Marcel 1994).

Clothing hooks and eyes (seven and five respectively) made a small contribution to the fastener assemblage. Hooks and eyes have come from sites dating from the early to mid-seventeenth century (Noël Hume and Noël Hume 2001:177), and are usually associated with the closure of back and side seams of women and children's clothing (Lindbergh 1999:56; Casey 2004:37). However, Noël Hume and Noël Hume (2001:177) describe an iron-alloy hook and eye from the male dominated Martin's Hundred fort dated to the 1620s, and they were often used but rarely described as an alternative to buttons in men's shirts and tunics (Vuori and Hanson 2000:217; Noël Hume and Noël Hume 2001:177).

The collection contained two iron-alloy clothing eyes much larger (average length 13.9mm) than the smaller copper-based eyes (8.34mm, n=2), while a copper-based clothing hook (PT002155) and eye (PT002156) were excavated as a linked pair. Haberdashers today still provide customers clothing hooks and eyes as linked pairs.

Three garter clips and a single eye were also found in the work area. Sewn to opposite ends of strips of cloth and wound around the calf of the leg to hold stockings (socks) in place, the copper alloy hooks decorated with pressed relief images of braided rope or twine and vines. They were probably tinned using the argol and leaves of tin process that deposited a bright layer of tin on the items (Beaudry 2006:20).

Five of the fasteners had cotton thread attached. While preservation of organic material is rare at an open site, it is significant that all five artifacts (two rings, one shanked button, one clothing hook and one garter hook) were of copper-alloy. When one considers that copper-

alloys of the time comprised the elements tin, zinc, lead, and arsenic along with copper, it is unsurprising that the artifacts' slow corrosion produced an anaerobic zone protecting the cotton from biological break down.

Interpretation

Before interpreting the assemblage, it is paramount to verify the context of the artifacts in the loose, sandy matrix on which the Peel town campsite exists. Most of the artifacts associated with clothing and tailor/seamstress activities came from two areas: the northeast corner of UV/19-20 and the southwest corner of V18, and a cluster in V17, W17, and W18 (see Figure 1). The sandy matrix is conducive to the downward movement of small artifacts (Stockton 1973; Stevenson 1991:272), but tailor/seamstress related items in association and the preservation of visible vertical context breaks (especially the distinct boundaries between contexts 109/110, 67/69/70, and 71/72/75) strongly suggests that the sediments are undisturbed and the artifacts they contain are in primary context. In addition, fewer artifacts in areas outside of the clearly visible limits of the dwelling or in the southeast and southwest corners of the work area suggests little sideways scuffage occurred – a pattern typically observed at sites with small artifacts and sandy matrices where artifacts are instead trampled downward (Stevenson 1991:270-272). There is, however, evidence of natural and cultural disturbance of the site such as fireplace collapse in UV/21 and context 73 in TU/18 that is most likely a looter's pit – but overall, the accumulative evidence suggests that the deposit formed mostly by cultural processes during the camp's occupation in 1829 and 1830.

The high number of artifacts – including 25 thimbles – with profession and clothing functions in an area occupied for no longer than 11-months is surprising. However, there was no evidence of floor covering such as mats or carpets in the structure, and the sandy matrix – combined with trampling – would have quickly accepted small artifacts into the archaeological record. In addition, artifacts near west facing surfaces were likely covered by sand deposited by

the strong west and southwest winds.

Some of the artifacts – pins and beads in particular – have functions not connected with sewing allocated to them at other sites (Lucchetti and Straube 1998:20; Allen 2002), but the collection of artifacts as a whole at the Crisp dwelling strongly suggests that activities associated with clothing maintenance occurred at the site. These activities involved the attaching of clothing accessories such as buttons, hooks and eyes, garter clips and possibly beads, while pins and scissors suggest the manufacture, mending or altering of clothing. With the exception of the possible deliberate discard of three broken beads, accidental loss probably accounts for most artifacts.

The thimbles suggest that all members of the Crisp family were involved in work on the repair and production of clothing. All thimbles had evidence of use including the smallest examples with base diameters of between 10.2 and 10.9mm that comfortably fitted fingers of 21st century children aged three and four years – close to the ages of Frances, Robert and Elizabeth Crisp. In addition, all the thimbles had a similar amount of wear. Beaudry (2006:105) states that small thimbles have less wear than those used by adults because little fingers grow out of the smallest thimbles. However, also mentioned was that small thimbles supplied to inmates at charity schools were used by a succession of students resulting in consistent wear, and the results suggest that the same pattern occurs for a large, young family such as the Crisp's where the smallest thimbles were handed down to the youngest children. Evidence of the Crisp children involved in the sewing activities influences the cultural site formation process, for while bringing curiosity, children are also absent-minded and have an imperfect hand-eye coordination that probably increased the number of artifacts in the deposit.

The difference in depth of indentation between the girls', maids', and women's thimbles probably exists due to the difference in force used by an adult compared to a child when pushing a needle through fabric, but the authors acknowledge that the thickness of cloth, needle size and user experience would also influence the depth of indentation. The combination of shallow and deep indentations on large thimble PT000108 probably occurred due to an adult

using less force and a smaller, finer needle when sewing fine fabric, while the removal of a 3.41 by 8.26mm wedge from girls' sized thimble PT000103 opening its base diameter from about 10 to 13mm allowed its use by an adolescent adult who made the deeper indentions.

The British brought many items with them to the Swan River from Britain, some newly acquired specifically for the colonizing of a new land such as prefabricated structures, percussion cap firearms, and barrels of preserved food (Bayly 1831). However, there would have been much brought that was old with signs of wear, such as tradesmen's and professions' tools. Identifying the manufacture date was impossible for the artifacts associated with sewing, and it is therefore possible that the artifacts had much use before coming to the Swan River and that signs of use-wear might not represent use of the objects at the Swan River. This scenario is, however, unlikely. The provenience of the artifacts as a group, with two indistinct clusters fronting the fireplace and in the dwelling's north east corner, are patterns supporting use of the objects within the structure rather than spillage from a container that would have produced a deposit of material in a much smaller area.

It is unlikely that very young children would do work of this kind unsupervised. One can easily imagine members of the Crisp family – the very young John, Frances, Robert and Elizabeth, supervised by the older Martha or their parents or nursemaid – sitting around the fireplace busily working away on a range of garments while the Australian bush stirred.

Behavior in the context of stress at Peel town camp – previous life experiences

The historical (Collie 1830; Bayly 1831; Shaw c.1938) and archaeological records (Burke 2016, 2017) suggest that the Peel town camp's occupants experienced short-term and diffuse stressful events. Even the living area of the Crisp family contained evidence for a reduction of good quality fuel and a widening of the area for the gathering of fuel and food (Burke 2017). However, while behavior associated with heightened stress occurred, there is also archaeological evidence in the form of a collection of sewing related artifacts suggesting that

family members were involved in activities requiring concentration. The activity was probably little different to that done by the family before they left Britain on the *Gilmore* in July 1829. It underscores normality.

It is difficult quantifying vulnerability to stressors. However, examining previous life experiences of a group or individual is a method of gaging vulnerability, for as Gill (2000), Rockman (2003) and Iannone (2013) state, social knowledge determines the response, not the severity of the stressor. The historical record, however, contains little about the lives of most of the British before they came to the Swan River in 1829 and 1830, and little is known about the Crisp family. However, for many in Britain influenced during the Industrial Revolution by a quickly changing economic and cultural landscape, moving from one place to another for work opportunities was an experience probably familiar with the family. Whyte's comment (2000:105), that emigration from the British Isles in this period as simply an extension of already present internal mobility is pivotal (cf. Belich 2011:130). Families who had moved once in Britain were more likely to move again and consider emigration, and it suggests an already present social knowledge of adaptation to new environments for some at Peel town.

Those surviving stressful events like shipwrecks or conflict in war (Gibbs 2002:74; Plümper, Flores and Neumayer 2017) behave differently and are less vulnerable to stress when experiencing the stress again. It appears that the Crisp family – and probably others at Peel town – who were more-worldly and experienced in the stress of emigration then previously considered, were better equipped socially to withstand the traumas of colonization. Leach (1994) stated that 10 to 15 per cent of people in a group remained calm and focused while about 85 per cent experienced panic associated physiological responses such as nausea, vomiting, excessive sweating and significantly impaired thought processing, but that the percentage of those remaining calm increases when again experiencing the crisis situation (Leach 1994; Gibbs 2002:74). The social knowledge gain by internal migration is the possible ingredient making the Crisp family cope with, resist, and recover from the stressors of

colonizing, and possibly placed the family in the percentile of people that remain relatively calm in a crisis situation (Leach 1994).

Analysis of deaths at Peel town suggests that individual association with familial networks was also important to counter physical and psychological stress. Most deaths occurred in the very young (< 5 years of age, n=11) and older age groups (> 40 years of age, n=10), a pattern observed in other studies on groups where individuals succumbed to nutritional, infectious and psychological disorders (Stein, Susser, Saenger and Marolla 1975; McCurdy 1994). When deaths at Peel town are categorized into those from families (n=20 from 408) compared to single men (n=10 from 99), it was found that there was a real statistical difference ($\chi^2=3.868$, df 1, $p>0.05$) rejecting the null hypothesis that there was no difference in the number of deaths in the single men category compared to deaths among those from families. Furthermore, the single men's category was the only adult group at Peel town to have individuals dying in the 18 to 25- age range.

Others have observed the vulnerability of single men in stressful scenarios (McCurdy 1994; Frey, Savage and Torgler 2011:212-215), and while it is unclear why individuals traveling alone are more vulnerable than those accompanying or part of families (McCurdy 1994), it suggests that psychological support is just as crucial to survival as food, water, shelter, and experience. In the case of the Crisp family at Peel town, the reaper never visited the family, despite five of the family in age ranges in which deaths occurred the most. Furthermore, the family's living and work areas had no evidence of destruction by bushfire. Ergo, the Crisp family had comparatively low vulnerability to the stressors experienced in the first days of colonizing a new land due to probable life experiences and existing in a family unit with psychological advantages, but one cannot overlook the part chance – or luck – plays in stressful scenarios. It was probably providence that the family did not personally experience the more drastic environmental events of their new home – such as bushfire – in which they had little experience countering.

In October 1830, news was received that those camped at Peel town were permitted to leave (*Anonymous Perth Gazette*, 11 May 1833:75-76) – within a month, most had left for other parts of the Swan River colony. The Crisp family moved again, this time to the slowly developing port town of Fremantle 14.5 km north. There, part of the family lived – John working as a carpenter until his death in 1837 (Erickson 1988:713), and Martha until at least 1840 when she then moved to the colony’s capital of Perth where she died in June 1870 aged 78 (*Anonymous Inquirer and Commercial News*, 12 June 1870:2). With the exception of John junior who drowned in October 1832 (Wittenoom 1833), all of Martha and John’s children lived to relatively old age.

Conclusion

The vulnerability and resilience of people is a significant factor contributing to the success or failure of a group’s colonizing efforts, with cultural resilience and vulnerability applicable in any discussion about how people respond to the process of colonization and the resulting stressors in a given environment. This paper assessed a collection of clothing and profession function artifacts deposited by a British family soon after arriving in the new colony of Swan River in the south west of Australia. The artifacts suggest the family – including five children aged between three and eight – mended and possibly altered clothing. Isolated the activity sounds prosaic, but in the context of people colonizing a new land the behavior’s normality inherits a different meaning – one showing a reduced vulnerability to the stressors of the early colonizing phase. The activity – a traditional method of passing skills from adult to child – strongly suggests an already present social knowledge of adaptation to new environments for the family. This experience was most likely gained by many British families during this period as people moved to developing industrial cities. In the case of the Crisp family, it was essential knowledge that allowing the family to “bounce back” – show resilience (Morrone, Scrivens, Smith and Balestra 2011) – after the long voyage, the disappointment of discovering that land

promised them was unavailable, and the stress of adapting and surviving in a foreign environment.

Rockman (2003) discussed the need to appreciate the past-experiences of those entering a new landscape in order to understand group and individual behavior in stressful situations. This research reaffirms Rockman's recommendation by providing a non-natural disaster case study using Industrial Revolution Period British. Previous internal migration experiences of the British provided the evidence to account for signs of familiarity with adaptation to new environments.

The Crisp family's work area is the only site at Peel town clearly showing an activity outside of fuel gathering, and food procurement, preparation and consumption. Further research is needed to observe the archaeological record about how others at the camp experienced the same stressors as the Crisps. In particular, the material remains from sites occupied by those most vulnerable – single men – would possibly provide clues for this group's lower resistance to stressful scenarios. However, for one family at Peel town in 1829-1830, previous experiences lessened the stress of colonizing a new landscape with novel cultural and physical environments.

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Table 1. Sewing and clothing related artifacts at the Crisp family site

Artifact			
Pins	Short whites	34	
	Long whites	12	
	Lills	1	
	Unclear length	6	Total 53
Thimbles	Large (Base dia. 17-20mm)	7	
	Medium (Dia. 14-16mm)	12	
	Small (Dia. 10-13mm)	6	Total 25
Buttons	Shank	9	
	4-way sew through	3	
	Dorset style	3	
	Unclear attachment	1	Total 16
Glass beads	Red (Dia. 3.1-4.4mm)	12	
	Reddish brown (3.53-3.8mm)	2	
	Dark blue (5.4mm)	1	
	Black (2.05-2.33mm)	5	
	Cream (5.02-5.28mm)	3	Total 23
Clothing hooks	Iron alloy	0	
	Copper alloy	7	Total 7
Clothing eyes	Iron alloy	2	
	Copper alloy	3	Total 5
Garter clips	3		
Garter eyes	1		
Scissors	1		
Needles	MNI	4	
Total 138			

Figure captions

Figure 1. Diagram showing the Crisp family's workplace, area of excavation, and location of contexts and artifacts recorded in situ (the authors)

Figure 2. Thimble PT000103, showing the v-shaped notch allowing its use by a person with larger fingers. Trampling most likely caused the deformation seen in the cross-section (the authors)

Figure 3. A backscatter election image (BSE) on the uncoated surface of thimble PT000103 showing deep and shallow indentations (CMCA, 2021).