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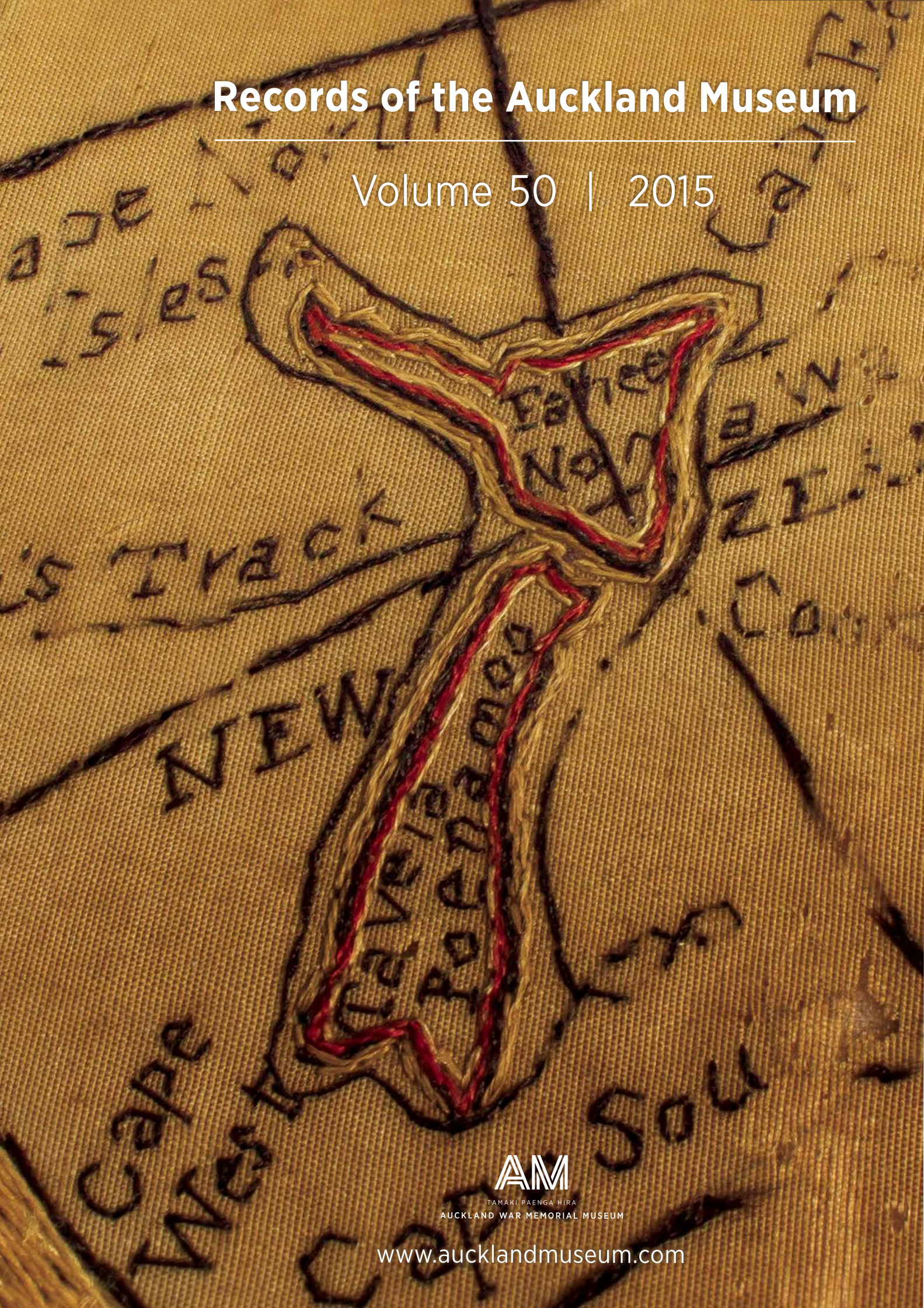

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Cover image: Detail from sampler sewn by Martha Gibbons showing New Zealand and the use of Te Reo placenames. 1784. Image courtesy of the Auckland War Memorial Museum, Tamaki Paenga Hira. 2014.1.1.

Clay – a lesser known medium for Maori artefacts

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Abstract
Examples of shaped and fire-hardened clay objects held in Auckland Museum archaeology collections are described and illustrated. Found in Maori occupation sites from the fourteenth to the eighteenth century, they are mainly from the Auckland area but not exclusively. Several are similar in shape, and have no known purpose or parallels in Maori material culture. They are an interesting use of a pliable natural material, modified deliberately in some instances by heating.

Keywords
Clay; Maori; material culture.

INTRODUCTION

The short paper by Michael Trotter (2012) on clay balls in *Archaeology in New Zealand* prompted a review of research undertaken after excavation of several artefacts made of clay at the archaeological site of Westfield (R11/898), Auckland. These previously unknown artefacts, although not common, expand the range of Maori material culture and material use. All items described are in the collections of Auckland War Memorial Museum.

Trotter described small clay balls from South Island archaeological sites of Awamoa, Tai Rua and Shag Point in North Otago; Redcliffs and Hohopounamu in Canterbury; and Fyffe's site in Kaikoura. All of these sites date to between the fourteenth and sixteenth centuries, that is, at the early to middle period of the Maori sequence. The balls were shaped wet clay made hard by placing in or near a fire, and had no decoration. Trotter did not have a functional interpretation for these balls, and context within the sites offered few clues as in all cases they were found in the discarded midden. Walter Mantell in 1852 found a clay ball in the Awamoa site, south of Oamaru, and imaginatively speculated on its origin: "The only human manufacture we found was a small ball of baked clay, the work most likely of some ingenious young savage stopped on the thresh-hold of the invention of pottery by a vindictive tibia thrown at his head by his enraged parent with a concise order to go egg hunting, and not waste his time that way" (Mantell 1853 reported in Trotter 2012: 167). Mantell's flippant conjecture that Maori were on the cusp of a technological development was premature; there is no linear progression from forming a ball of wet clay to creating pots then successfully firing them at the correct temperature.

The only direct account of Maori using clay is related by Trotter (2012). The South Island reference is to the carcass of a rat being enclosed in clay before placing it in the fire: the fur and skin of the cooked rat adhered to the clay covering upon opening. This method of cooking does not appear to have been common practice and may have been use of an older European tradition of cooking wildlife such as hedgehogs and other animals. In an earlier paper Trotter (1965: 177) suggested that a clay covering may have been to collect melting fat during cooking and bird preservation. The balls would however not have been suitable for this task.

The archaeological literature revealed two instances of clay being used in settlements. At the swamp pa of Mangakaware in the Waikato, two circular to oval features lined with sandy clay were reported from the central part of the site, and the cooking area, and interpreted as fire pits (Bellwood 1978: 22). No further details were provided and a calculation off the plan scale indicates they were more than 50 cm diameter. A very similar feature was reported in more detail from a pa, Raupa, near Paeroa (Prickett 1992: 44, 46–48). It was a clay lined bowl, oval in shape measuring 550 x 480 mm and set 280–320 mm into the ground. Situated within a house, on the centreline, the feature contained no ash or charcoal and was filled with water-deposited sand. In the absence of any other evidence it was interpreted, from its location, as a hearth.

The clay objects described below are more varied than those reported by Trotter. While they are referred to throughout as having been fired, which changed the state of the clay from soft and pliable to hard, the objects cannot be interpreted as the start of a pottery tradition, or of evoking a memory of pre-Polynesian ancestors making pottery over one thousand years prior to Maori arriving in New Zealand.

Rice (1987: 4) distinguishes between pottery, a term used in archaeology to describe low fired objects such as vessels and other objects, and ceramics, which were fired at a high temperature and often glazed.

Pottery vessels were fired in specially created fires intended for the purpose with temperature being a key factor in success. The objects described here are unlikely to have been fired according to a rigorously tested and repeatedly applied methodology, and were instead accidentally or deliberately placed in or near a domestic fire. The items are therefore not pottery. The preferred term of 'fired clay' refers to the object having been subjected to a high temperature, and the clay's physical characteristics altered through water evaporation and chemical transformation, but without preparation such as the addition of a temper which usually occurs in pottery manufacture. The act of firing ensured object durability and survival although this was almost certainly not the intention. There may have been use of similar, unfired, objects but shaped dried or wet clay forms without heating have not been reported (with the exception of examples from Houhora described below). It is likely that unfired pieces would lose their shape unless particular conditions were present to ensure their survival.

The undefended occupation site of Westfield (R11/898) located on the western side of the Southern Motorway opposite the landmark Tip Top factory at Mt Wellington, Auckland, produced four shaped clay pieces (Furey 1986). Two had incised decoration and two additional pieces of different form were also recovered. Examination of archaeological collections at Auckland War Memorial Museum revealed a number of pieces (Table 1) which can be grouped according to type. The majority of these objects were recovered through controlled archaeological excavation, but there are two non-excavated examples donated to the museum. Unfortunately one has no recorded find locality.

The objects group as recognisably formal objects, incised or plain pieces of similar shapes, and balls like those reported from South Island sites. There are also fragments of irregularly shaped clay pieces of no particular form with some working such as a flattened surface or edge. Other pieces have one smooth surface consistent in appearance with a cut mark on wet clay but are otherwise unaltered. The geographic attribution of all pieces extends from Mt Camel Houhora, in the Far North to Oruarangi on the Waihou River south of Thames. However, the majority of the pieces come from Auckland contexts within a close geographic area (Fig. 1). Chronologically the sites cover almost the entire Maori occupation sequence.

DESCRIPTION OF OBJECTS

The formally-shaped objects include two nguru (flute) from Oruarangi on the Waihou River, south of Thames. Auckland Museum ethnologist Vic. Fisher (1937) drew attention to clay nguru and kōauau (flute) from Oruarangi in his article on musical instruments. The examples referred to as clay are in fact made from a very fine-grained sedimentary stone which in one example has an incised decorative design around the circumference of the wide end (Furey 1996). However there are two Oruarangi nguru fashioned from wet clay: the snout and upper area of a broken nguru is in Auckland Museum (Fig. 2), and an apparently unfired complete nguru is in a private collection. Fisher referred to the nguru being fashioned from 'baked clay' (as opposed to wet clay which had been heated or fired), implying that the material was naturally occurring and shaped. The partial nguru made of clay is burnished on the smooth outer

Figure 1. Places mentioned in the text, Auckland area.

Table 1. Summary of all clay pieces referred to in the text.

Cat. No.	Type	Location	Site no.	Dimensions	Comment
21980.1	Nguru	Oruarangi	T12/192	42 mm length	Fragment of snout
	Nguru	Oruarangi	T12/192	74 mm	Complete nguru
AR7468.22	Clay object	Westfield	R11/898	22 x 14 x 6 mm	Incised lines
AR8298	Clay object	St Heliers		16 x 16 x 6 mm	Incised lines
FS133	Clay object	Motutapu I	R10/494	9 mm	Incised lines
AR7468.25	Clay object	Westfield	R11/898	45 x 47 x 27 mm	Coiled clay with grooves
54489	Clay object	Oruarangi	T12/193	32 mm length	Net weight
6320	Clay ball	Ōhuiarangi Pigeon Mountain	R11/38	27 mm diameter	Incised lines
AR6190 #74	Clay ball	Mutukaroa Hamlins Hill	R11/142	25 mm diameter	Incised lines
AR6190 #73	Clay ball	Mutukaroa Hamlins Hill	R11/142	31 mm diameter	Incised lines
AR7468.23	Clay ball	Westfield	R11/898	14 x 16 x 17 mm	Incised lines
54451.3	Clay ball	Oruarangi	T12/192	35 mm diameter	Plain, shell inclusions
54451.5	Clay ball	Oruarangi	T12/192	38 mm diameter	Plain, shell, unbaked
54451.8	Clay ball	Oruarangi	T12/192	34 mm diameter	Plain, flattened base
54451.9	Clay ball	Oruarangi	T12/192	38 mm diameter	Plain, shell inclusions
54451.10	Clay ball	Oruarangi	T12/192	36 mm diameter	Plain, burnt, shell
AR7491.373	Clay ball	Houhora	N3/59	44 x 38 mm	Plain, shell, not fired
AR7491.212	Clay ball	Houhora	N3/59	29 x 26 x 15 mm	Plain
AR6190 #75	Clay ball	Mutukaroa Hamlins Hill	R11/142	31 x 23 x 25 mm	Plain
AR6190 #71	Clay ball	Mutukaroa Hamlins Hill	R11/142	25 x 22 x 21 mm	Plain
49938.2	Clay ball	Unlocalised		55 x 52 x 47 mm	Decoration
AU760.2	Object	Puketapapa Mt Roskill	R11/19	25 mm diameter	Central perforation
AU760.3	Object	Puketapapa Mt Roskill	R11/19	26 mm diameter	Central perforation
AR7616	Object	Taurere Taylors Hill	R11/96	41 mm diameter	Central perforation
AR7468.34	Object	Westfield	R11/898	40 mm length	Central perforation
AU760.1	Object	Puketapapa Mt Roskill	R11/19	24 mm length	Shaped
AR6190 #70	Object	Mutukaroa Hamlins Hill	R11/142	31 x 24 x 25 mm	One flat surface, irregular shape
AR6190 #72	Object	Mutukaroa Hamlins Hill	R11/142	22 x 19 x 13 mm	Curved, two small holes
AR6190 #69	Object	Mutukaroa Hamlins Hill	R11/142		Flat, with rounded edge. Fragment.
AR6190 #77	Object	Mutukaroa Hamlins Hill	R11/142		Flat, fragment
ICI/R/9	Object	ICI site, Tamaki River	R11/1506	32 x 18 x 7 mm	Flat with broken perforation
FS331	Clay object	Motutapu I	R10/494	13 x 13 x 12 mm	Clay piece flattened on broad surfaces, with edges rounded and smoothed. Reddish clay
AR856	Clay	Motutapu I	R10/31	31 mm	One smooth surface, 3 pieces
AR872	Clay	Motutapu I	R10/31		One smooth surface, 2 pieces
FS266.4, FS265.4	Clay object	Motutapu I	R10/494	28 x 29 x 4 mm	Two pieces of curved clay which join and have a smooth edge.
FS266.2, FS266.1, FS266.3, FS94, FS86	Clay	Motutapu I	R10/494		Five pieces of clay with curved surface, thin, with fractured edges
	Clay	Oue	S11/53	69 x 62 x 16 mm	Curved piece of clay

surface and is a reddish colour compared to the greyish white of Fisher's (1937) illustrated examples. Although generally the expected survivability of unfired clay is low, the environment within Oruarangi provided suitably moist conditions to ensure an unfired piece survived.

There are two shaped clay pieces from Westfield R11/898. One is a half crescent shape and is a fragment of a larger object of undetermined shape and size (Fig. 3). The long edges are finished and smooth and the broad flat surfaces have incised decoration of curved lines which join at each end to make oval shapes. The clay is of a fine texture and greyish white in colour, similar to the fragment of incised clay ball from the same site. According to a geologist at the now defunct Western Potteries in New Lynn, who viewed the objects in 1983, this type of clay is not found in the Auckland area and is possibly from the vicinity of Port Waikato (Furey 1986: 16). Another piece is roughly circular with grooves on the top, formed from a curved coil of wet clay and the ends pressed together forming a slightly raised upper surface (Fig. 4). A partial finger print and two crescent shaped fingernail impressions are on the underside. Grooves present on the upper conical surface radiate out from the centre of the object but are too irregular to form part of a decorative pattern. The width of the grooves is however consistent and it is suggested they were

Figure 3. Incised object. AR7468.22, Westfield

Figure 2. Nguru. 21980.1, Oruarangi.

Figure 4. Grooved object. AR7468.25, Westfield

possibly for shaping or sharpening small bone objects such as needles (Furey 1986: 16).

The piece from Waimarie Street, St Heliers (Fig. 5) has parallel incised lines on one broad surface and on the finished edge. The reverse side is plain and smooth, as is another finished edge and the piece is a fragment of a larger, possibly semi-circular object. The clay is distinctive with darker red streaks evident. A number of artefacts were found in the 1940s at this location in Waimarie St, adjacent to site R11/356, recorded as shell midden, terraces and storage pits on the volcanic crater rim of Glover Park or St Heliers (Whakamuhu). According to the site record description, several properties in Waimarie Street have, or had, shell midden in the back yard suggesting an extensive occupation site.

A small conical shaped piece only nine millimetres in length is from R10/494, Motutapu Island (Ladefoged and Wallace 2009). It is incised with grooves around the circumference but the flattened base and top are plain (Fig. 6).

The majority of the clay objects are balls, mostly plain, but there are incised examples from three sites: Westfield, Mutukaroa Hamlins Hill (Fig. 7) and Ōhuiarangi Pigeon Mountain. The fragment from Westfield is similar greyish-white clay to the two pieces described above, and has deeply incised curved lines forming part of a circular or spiral pattern. The design is similar to two partial balls from Mutukaroa Hamlins Hill, one of which (AR6190#74) has a smooth, possibly burnished, outer surface with two opposing patterns formed by the incised curved lines. The other ball (AR6190#73) has two well-defined curved incised lines but a less regular surface. A fragment of an incised ball from Ōhuiarangi Pigeon Mountain, a volcanic cone in East Tamaki, also has two opposing curved patterns (Fig. 8). This piece was not excavated but found in disturbed ground where scoria was being removed in 1920. Another circular object with no location or acquisition information is larger than other known examples. It is a slightly flattened ball, uneven on the outer surface, with incised curved lines in no particular pattern over more than half of the curved area (Fig. 9) and is blackened around the circumference. There are also inclusions of small pieces of stone. The piece is notably different to the other incised balls.

Undecorated clay balls, totalling ten, are from widely spaced localities (Mutukaroa Hamlins Hill, Oruarangi, Houhora) in the upper North Island. The geographic area reflects the main collecting focus of Auckland Museum and the predominance of northern site excavations, but their presence also in South Island sites as reported in Trotter (2012) suggest the balls have a wider geographic distribution. Fragments of two plain examples (AR6190#71, 75) from Mutukaroa Hamlins Hill are of similar size to the incised examples from the same site. Five complete balls from Oruarangi are slightly larger at 34–38 mm (Fig. 10). Four are flattened on part of the curve while the other is quite round. Shell and charcoal is embedded into three of the balls, and kokowai adheres to another. One ball is blackened and burnt, and the other four are grey in colour. There is also a partial fired ball with a curved

Figure 5. Incised object. AR8299, St Heliers.

Figure 6. Incised object. Motutapu Island.
Photo: Tim Mackrell, Auckland.

Figure 7. Incised clay balls. From top: AR7468.23, Westfield; AR 190#73, Mutukaroa Hamlins Hill.

Figure 8. Incised clay ball. 6320, Ōhuiarangi Pigeon Mountain.

Figure 9. Decorated clay ball. 49938.2, unlocalised.

Figure 10. Clay balls. Oruarangi.

Figure 11. Clay objects. From top: AU760.2, AU760.3, Puketapapa.

Figure 12. Clay disc. From top: AR7616, Taurere; AR7468.34, Westfield

Figure 13. Clay net weight? 54489, Oruarangi.

Figure 14. Clay object. R10/494, Motutapu Island.
Photo: Tim Mackrell, Auckland.

plain surface from Mt Camel, Houhora, and fragments of two larger balls which are crumbly and have not been fire hardened.

Another consistent group of objects are circular in shape, with flattened surfaces top and bottom, or slightly conical on the top surface. The common feature is a central perforation. The two examples from Puketapapa Mt Roskill were recovered during salvage excavations on the rim of the volcanic cone in 1961 (Fig. 11). AU760.2 is complete but neither the perforation nor the outside edges are completely round. Polish is visible under magnification on the upper and lower surfaces. There is also a heavy burnish or polish around the edges of the perforation. The outer edges of the object have some polish but it is not as pronounced or widespread as that on the broad surfaces. The hole is not completely round and has one flat edge which is smooth with some polish apparent but there are no striations evident on the sides of the hole. The second example (AU760.3) is not complete. One surface, with polish, is slightly concave within which there is an elongated central hole with worn edges, but unlike AU760.2 the hole is on an angle. While well formed at entry, the exit is very narrow and irregular, and there is no evidence of attempted enlargement of the hole from this side.

A similarly perforated object (AR7616) was recovered from the 1954 excavation on Taurere Taylors Hill (Leahy 1991: 37–8). The object has fractured through the central perforation (Fig. 12). The 4.5 mm diameter hole has vertical striations on the walls and the edges are rounded and worn. One side of the object is flat, the other is convex so that the thickness at the hole is ten millimetres and at the outer edge is five millimetres. The convex surface has no polish but the opposing flat surface has polish from use, as do the flattened edges but to a lesser degree. The complete object would have a diameter of approximately 42 mm. A similar object, not previously reported from the 1981 Westfield excavation, was located in the miscellaneous non-artefact stone material during sorting for storage (AR7468.34). Like the Taurere Taylors Hill item it has a central perforation 4.5 mm in diameter (Fig. 12). The outer curved edge has been smoothed as has one of the broad surfaces which is also blackened. The other side is irregular but is concave in profile and there is polish evident on the smooth surface. The hole has vertical striations. The complete diameter would be 50 mm, slightly larger than the Taurere Taylors Hill item. A fragment of another item, again with the remnant of a central perforation, was recovered from the ICI site (R11/1506) adjacent to

Figure 15. Clay fragments. AR856, R10/31, Motutapu Island.

Figure 16. Clay piece. Oue Pa.

the Tamaki River (Foster and Sewell 1997). This piece differs from the other examples in that the outside edge is straight, not curved, but has been smoothed.

From Oruarangi there is also a flattened slab of clay which has a groove around the circumference and a groove at right angles on one side and both edges (Fig. 13). The surfaces are smooth and faceted, perhaps reflecting cutting or smoothing of the clay in a leather hard state rather than when wet and pliable. The surfaces have a polish from wear. Apart from the nguru from the same site, this is the only object to have an identifiable function. Although not very heavy it was probably used as a net sinker: there are similarly sized stones in the Auckland Museum collection which still have fibre tied around them for attachment to a small light fishing net.

Another group of objects do not form recognizable shapes, nor have they been altered by decoration. A piece from Puketapapa Mt Roskill is a segment of a coil cut at both ends and has a roughly circular cross section. The clay is the same colour as the other pieces from the site. From Hamlins Hill there is a piece (AR6190#72) which has a curved surface, too irregular to be from a ball, and has two small holes, not natural, which penetrate only a few millimetres into the clay; another irregularly shaped piece from the same site (AR6190 #70) has a flattened surface. The 1990 Westfield excavation, approximately 50 m from the 1981 excavation, also produced a piece described as being "flattened to a rough diamond shape then rolled to a point" (Sewell 1992). It is similar in colour to the red clay pieces from Hamlins Hill. A small square piece with rounded smooth edges reminiscent of a cube is from Motutapu Island site R10/494 (Fig. 14).

There are also pieces with no obviously deliberate shaping yet have one smooth surface resulting from a cut through wet clay. Pieces of this type are not common in excavated collections and it is likely that similar items have been discarded during excavations as, on cursory examination, they can resemble fragments of shattered oven stone or burnt local debris. There are five pieces from Motutapu Island open settlement site (Leahy 1970) (Fig. 15) and two from Mutukaroa Hamlins Hill. This class of object is probably the result of peeling wet sticky clay off a digging stick or similar object and the impression preserved through accidental firing. Flattened curved pieces of fired clay with ragged unworked edges were also recovered from R10/494 on Motutapu Island.

Finally a piece of clay from Oue Pa has a curved moulded surface. It is pinkish grey on the inside and orange pink on the outside. The texture is not smooth or evenly worked, has no foreign material adhering to it, and has possibly been formed by moulding wet clay over a small cobble (Fig. 16). Despite its colour which indicates heating, the object is crumbly and fragile.

Reference to baked clay artefacts at the Hauraki sites of Paterangi, near Oruarangi (Shawcross and Terrell 1966), and Kopuarahi (Murdock 1963) are material misidentifications. These objects, nguru in the case of Paterangi, and a stopper from Kopuarahi, are similar material to the 'baked clay' nguru from Oruarangi (Fisher 1937). The material is stone, not clay.

SITE CONTEXT

The majority of the clay pieces are localised to the Auckland area, or the wider Hauraki area. The exception is Mt Camel Houhora in the Far North on the Aupouri Peninsula.

Little is known of the internal site context in which the majority of these items were found as the information has not been reported in publications. However the majority are from undefended sites, with pieces from five pa (Puketapapa Mt Roskill, Ōhuiarangi Pigeon Mountain, Taurere Taylors Hill, R11/1506 (name unknown) in Auckland, and Oruarangi in Hauraki).

The Westfield pieces are from Area 6, and adjacent Area 1, where numerous postholes and the outline of a small structure were in Occupation II below the turf and topsoil layer (Furey 1986: 7). Obsidian and greywacke flakes were also present in this area. The pieces are from an undated context, but later than Occupation I dated to 300–400 years BP. There may not however have been a significant time interval between the two occupations.

The Mutukaroa Hamlins Hill pieces were all found in Square O31, at the interface of the topsoil and the clay layer. There is little information on what was present in this square, on a terrace to the east of the main excavation area, but all of the obsidian flakes from the 1976 excavation were found in this square (Walton 1979: 112). Only two postholes are evident on the site plan (Walton 1979: Fig. 3). The single radiocarbon date (NZ6156) (Pearce and Walton 1983) suggests occupation at around the same time as the settlement at Westfield.

The clay pieces from Mt Roskill Puketapapa are from Square A108, Area 1, on the inner edge of the crater rim on the northern side. A108 was a test square to the north of the main excavation, and from the presence of pits seems to have functioned primarily as a storage area. No further details have been published about this square. Although only two pieces are referred to in Fox (1980: 57), three pieces are catalogued in the museum collection from the same square. There is no direct dating of the context in which these pieces were found but the radiocarbon dates from the site suggest occupation in the broad range of 300–500 years BP.

Oruarangi is a flatland pa site adjacent to the Waihou River south of Thames. The museum collection was acquired from several individuals who dug over the site in the 1930s (Furey 1996). The nguru fragment was purchased from Sonny Hovell. The balls and net weight were catalogued in the 1980s as previously uncatalogued material; the source of the objects may have been Vic. Fisher, Sonny Hovell or Jim Liggins, all of whom dug on the site. Oruarangi was occupied on more than one occasion and dates range from the fifteenth–eighteenth centuries, with documented occupation up until the early nineteenth century (Furey 1996: 31–32). It is not known where in the site the clay pieces came from, or from what level.

R11/1506 on the west bank of the Tamaki River in Auckland was a large settlement with storage pits, houses, shell midden and cooking areas enclosed by

a single and double row of fencing which has been interpreted as a pa. The location of the clay piece within the site is unknown. Radiocarbon dates indicate occupation in the sixteenth–seventeenth centuries, very similar to Hamlins Hill and Westfield.

Leahy (1991: 37–8) reported that few artefacts were recovered from the lower terrace (Square K100) on the slope of the volcanic cone Taurere Taylors Hill. The square had a shell layer, and the terrace had been extended and artificially built up. There is no age estimate for the occupation. Oue Pa is also undated but the similarity in material culture (adzes, fish hooks) between Oruarangi and Oue suggests they were both occupied at broadly the same time (Harsant 1981). Ōhuiarangi Pigeon Mountain and St Heliers sites were not excavated, and nothing is known of the range of occupation evidence.

Site R10/494 in the northern part of Motutapu Island is an undefended pit and terrace site. A house containing internal and external drains, stone alignments, and postholes was defined on the terrace. Associated artefacts include an andesite slab with red kokowai, an autoru (cobble for grinding kokowai), grind stones, hammer stones, and a large quantity of obsidian. The incised piece of fired clay was found in the south east corner of the house and the remaining pieces were in the southwest corner (Ladefoged and Wallace 2009). The site is also undated.

The clay fragments from another pit and terrace site T10/31 on Motutapu Island were found in Square 2, Layer 4. Leahy (1970: 74) noted that the flattish mark on one of the pieces matched the blade impression of an adze and that small adzes may have been used in digging out structures such as the storage pits present on the site.

The fired clay ball from Houhora was in Square A13 Layer 2c, while the unfired fragments with the curved outer surface are from Square E4 Layer 2c, and an unknown location (the attributed Square D5 was not excavated). The lowest layer of the site (Layer 3) is dated to the early to mid-1300s (Anderson and Wallace 1993; Furey 2002), and Layer 2c was part of the same occupation.

DISCUSSION

Writers have generally offered little speculation on the function of the objects, or they were not described in detail in the excavation reports. Fox (1980: 57) referred to the perforated items from Puketapapa Mt Roskill as "roundels… baked hard probably by volcanic action", and suggested they were intended as beads. Likewise the Taurere Taylors Hill object was interpreted as an ornamental bead, "…probably carved from very hard clay rather than hand moulded and baked" (Leahy 1991: 39). An alternative interpretation put forward by Leahy that the object was possibly a spindle whorl, can be dismissed. The object looks remarkably like a spindle whorl, used in Neolithic European sites for spinning of wool fibres for textiles, but this is not a technology associated with Maori culture, and several thousand years removed. Use as a weight for a pump drill is not feasible for several reasons: Maori did not use drill weights, and the pieces are not large enough or heavy enough to have been used this way. Although Fox and Leahy interpreted these objects as either natural or naturally obtained and modified material, examples from other sites suggest all of the described objects were made from wet and fire hardened clay.

The nguru of clay in the Oruarangi site can be compared to Otago Museum's modified ceramic smoking pipe bowl of European import made into a kōauau, from the same site. These pieces collectively suggest a European influence on the idea of using clay as a medium. Oruarangi was occupied in the 1790s–1830s when there were a number of European ships spending lengthy periods of time adjacent to the site, or traders resident within Maori villages on or near the river (Furey 1996).

The perforated discs consistently have use wear around the perforations. Threading onto a fibre cord is a likely option. Inserting a thin stick or peg through the hole is also a possibility but there are no parallels in shape except the paua shell eye inserts for carvings, in which case the clay items with one convex side may have provided an opportunity for greater relief for the eyes, but if this was the intended use, the practice did not catch on.

Presence of small pebbles within sites have sometimes been interpreted by archaeologists as jack-stones, similar to knuckle bones, but it is unlikely the balls would have been used that way as the curved surface would not rest on an outstretched hand. No other game described in Best (1925) or Buck (1950) appears to be a suitable fit.

Whether any of the clay pieces were used in games or for other activities cannot be deduced from either the objects themselves or their contexts. The predominance in the Auckland area, particularly the perforated disks in three or four sites, suggests the objects were made around the same time and that the Tamaki sites, particularly Taurere Taylors Hill to the north, and Westfield had some communication of ideas among people living on these sites. Use of non-Auckland clay in the Westfield sites suggests the occurrence of some of the incised pieces may be more widespread in the region. The clay balls are more problematic and the incised balls may have had a different purpose to the plain balls which are more geographically widespread.

Were these objects the result of accidental or deliberate manufacture? The small informal pieces of irregular shape may well have been the equivalent of doodling on paper, but the balls with their widespread distribution suggest they were made with a purpose over a long period of time. The almost identical perforated pieces from Taylors Hill and Westfield do suggest deliberate action of placing the clay in a fire to harden it but whatever use these pieces were intended for was not adopted widely.

None of the objects have added temper, the purpose of which is to alter the physical properties of the clay. The charcoal and shell fragments in the Oruarangi pieces are likely to have been incorporated into the clay matrix as general occupation debris. Blackening on some objects suggests they were placed directly into a fire.

Burnishing was evident on only two objects (nguru and incised ball from Mutukaroa Hamlins Hill), reflecting a secondary stage of work. The soft wet clay objects would have been left to air dry then rubbed in a hardened state to produce sheen. The incised design on two of the Westfield pieces also infers a second stage of handling to form the design, and therefore a pre-determined use for the objects. The majority of the pieces were however the product of a single event before placing in the fire.

Use of fire-hardened clay was not common but there appears to have been a concentration of the activity in the Auckland area 300–400 years ago. Identifying and describing the pieces and the manufacture of them allows them to be grouped in several ways. It is almost inevitable that further archaeological investigations in the Auckland area will uncover more pieces to add to current understanding.

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