NEW ZEALAND
ARCHAEOLOGICAL
ASSOCIATION

ARCHAEOLOGY IN NEW ZEALAND

NEW ZEALAND
ARCHAEOLOGICAL ASSOCIATION
ARCHAEOLOGY IN NEW ZEALAND

PREHISTORIC EXPLOITATION OF ANDESITE AT OROKAWA BAY, WESTERN BAY OF PLENTY

Phillip R. Moore
Peninsula Research
Waihi

During a visit to Orokawa Bay, near Waihi Beach, several years ago, I noticed some cobbles of fine-grained andesite at the mouth of Orokawa Stream bearing large percussion scars. Although it looked as if several of these had been purposely struck, many other cobbles and boulders in the stream had similar percussion scars. Such scars are often produced when hard, brittle rocks collide during major floods. As no other evidence of stone working could be found in the vicinity, the percussion scars on the andesite cobbles were simply attributed to natural processes.

In May 1999, however, I discovered several hammer stones, worked cobbles, and stone flakes in a midden on the northern side of Whiti Kareia pa (T13/16) (Figure 1). Many of the cobbles were water-worn and appeared similar to those at the mouth of Orokawa Stream. A number of well-formed cores were also found in a small gully further east (site U13/1242), and in September 1999 a few worked cobbles, flakes, and a hammer stone were collected from Maru Puwhenua pa T13/26.

Description of Andesite

Pebbles, cobbles, and small boulders of hard grey andesite are common in Orokawa Stream, and are particularly abundant in nearby Orokawaiti Stream (Figure 1). They are undoubtedly derived from the Matangia Andesite, which outcrops in the upper reaches of both streams and forms bluffs around Whiti Kareia pa (Brathwaite and Christie 1996). This formation is described by Brathwaite and Christie as consisting mainly of lava flows of fine-grained, two pyroxene andesite.

Archaeology in New Zealand 44(2):1102-108, 2001

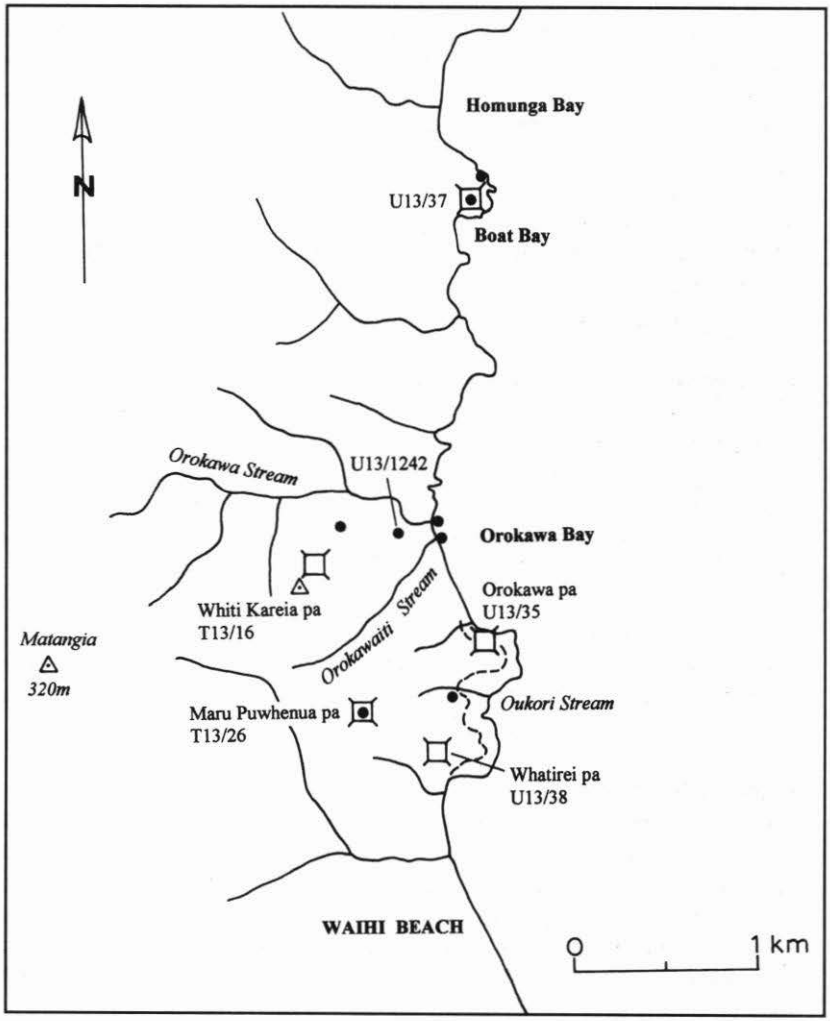

Figure 1. Map of the Orokawa Bay area, showing locations of recorded andesite artefacts (large dots).

Freshly broken, unweathered andesite is dark grey in colour (Rock Colour Chart), but water-worn pebbles and cobbles develop a medium dark grey to medium grey patina upon weathering. More weathered material has a thicker creamy, pale brown, or orange-brown cortex. The andesite is fairly homogeneous and shows only minor variation in texture, from very fine grained (almost glassy) with very few larger crystals (phenocrysts) to slightly coarser with more common phenocrysts. The phenocrysts generally range in size from about 0.5mm to 2mm, but some are up to 3mm diameter. The rock has a sub-conchoidal to slightly hackly fracture.

In thin section the rock consists of scattered phenocrysts of plagioclase and hypersthene in a fine-grained groundmass of plagioclase, hypersthene, augite, and volcanic glass (R. Brathwaite pers comm.). There is a pronounced sub-parallel alignment of interlocking plagioclase crystals in the groundmass, and this would impart considerable strength to the rock.

Comparison with Tahanga Basalt

Direct comparison of the Matangia andesite with pieces of Tahanga basalt showed they are very similar in general appearance. The Tahanga basalt is also dark grey when fresh, and develops a medium dark grey patina upon weathering. This has a distinctly bluish tinge. In addition, the basalt is less glassy and has a more uniform texture than Matangia andesite, with fewer phenocrysts.

These differences are quite subtle, and it would be difficult to differentiate between the two rock types without a close examination and comparison with reference samples. The bluish grey patina may prove useful in distinguishing Tahanga basalt from similar rock types.

Artefact Material

Cultural material found on Whiti Kareia pa, at site U13/1242, and at Maru Puwhenua pa includes worked (or broken) cobbles, cores, fragments, and flakes of andesite, and hammer stones (Figure 2). Many of the cobbles are well rounded and water-worn, and were obviously obtained from local streams. Weathered cortex present on some of the cores, fragments and flakes indicates that colluvial cobbles were also utilised. It appears that a number of the cobbles were purposely struck and broken, but not worked further.

The cores range from cobbles with only a few flake scars, to examples with numerous scars and little or no cortex remaining (Figure 2c). At least two of the cores collected have a well-defined striking platform, and large flakes had

clearly been struck from them (Figure 2b). Small flakes had been removed from several other cores. One definite core was found at the mouth of Orokawa Stream (Figure 2a).

Some of the larger flakes and fragments (up to 10 cm diameter) have cortex forming one side, indicating they were removed during the initial stages of working of the cobbles. A few of these show evidence of attempts at further reduction (Figure 2d). Other large flakes were obviously produced after considerable working of the cobble, and some of these also show clear signs of use, possibly as hammer stones. Very few small flakes (< 4 cm diameter) were found.

The hammer stones are composed of a slightly coarser grained andesite, with a higher proportion of phenocrysts. They are well rounded, and were probably also obtained from local streams. One shows well-defined bruising on parts of its surface (Figure 2e). Some cores seem to have been used as hammer stones as well.

Extent of Exploitation

Several other sites in the area were briefly inspected to find out if andesite cobbles had been exploited elsewhere. These included Orokawa pa U13/35, Whatirei pa U13/38, minor midden deposits along the rear of Orokawa beach, and the 'Boat Bay' pa U13/37 (Figure 1). One piece of flaked andesite was found adjacent to the main walking track, near where it crosses Oukori Stream, but a search of the slopes above revealed no other worked stone. A single small flake was also collected from a diffuse midden scatter near the mouth of Orokawaiti Stream.

Rounded cobbles were used as a minor source of stone flakes at 'Boat Bay' pa. One worked cobble and a flake were found below the pa, on the northern side of Boat Bay, and two flakes on the southernmost point of Homunga Bay (U13/707221). The rock type is similar to that utilised at Orokawa Bay, but could have been derived from a different geological formation.

Artefact collections from the Waihi Beach area, held at the Auckland Museum, were also examined. Among the material previously collected from Waihi Beach are a number of small adzes and roughouts of fine grained basalt or andesite, including one very small (8 cm long) adze made from an elongate flake, and a roughout (10 cm long) produced from a water-worn cobble. The

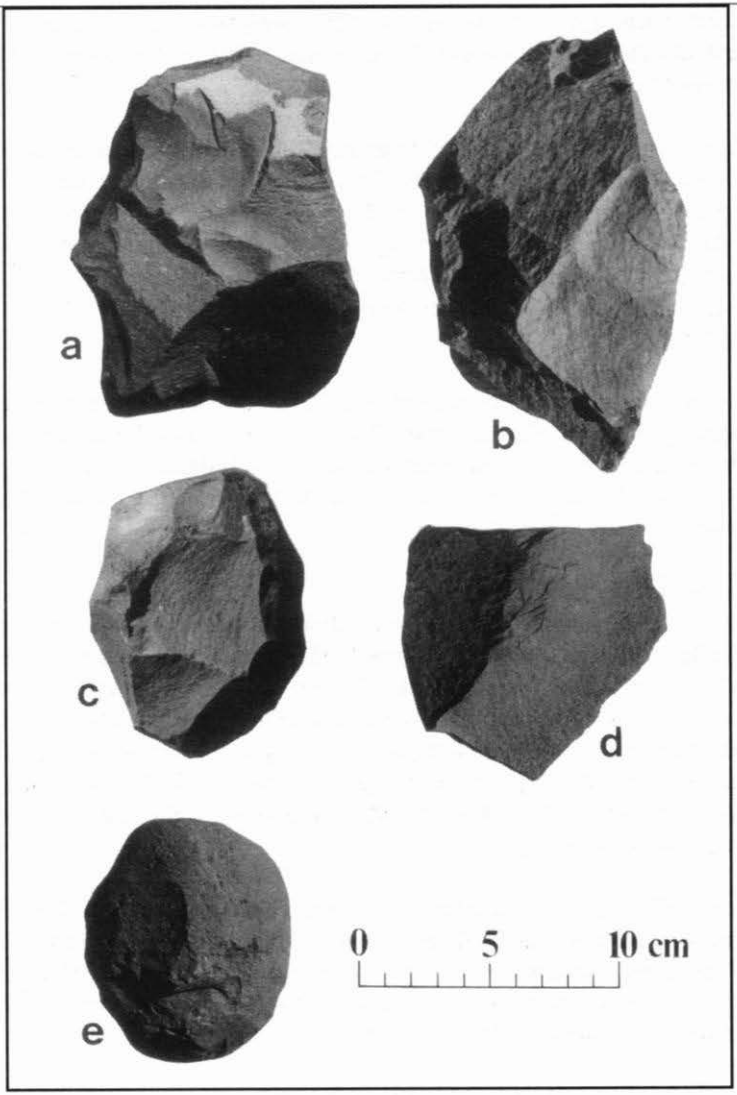

Figure 2. Selected andesite artefacts from Orokawa Bay. a – core with remnants of light-coloured cortex, mouth of Orokawa Stream; b – core with large flake scars, U13/1242; c – well-formed core, U13/1242; d – large flake showing secondary working, T13/16; e – hammerstone, T13/16.

rock type of these adzes appears very similar to the Matangia Andesite, but it would require a petrographic study to be certain. While the majority of the Waihi Beach adzes are probably made from Tahanga basalt, it is also possible that some could be composed of fine-grained andesite from a source other than Orokawa Bay.

A large stone assemblage collected by Jolly from Bowentown site U13/877? near the southern end of Waihi Beach also includes, apart from abundant Tahanga basalt flakes (Turner and Bonica 1994), a few flakes and pieces of medium grey andesite. This is slightly coarser grained than the andesite from Orokawa Bay, but as the flakes were clearly derived from water-worn cobbles, a local source is probable.

Only a single stone flake was apparently recovered during the recent excavation of Anatere pa (U13/46) at Athenree, 6 km south of Orokawa Bay (Phillips and Allen 1996). The material was identified at the time as "basaltic obsidian", but it is probably glassy rhyolite (pers obs.), and is not similar to the Matangia Andesite.

So far, then, it seems that andesite cobbles were exploited only at Whiti Kareia pa, site U13/1242, Maru Puwhenua pa, the mouth of Orokawa Stream, and in a minor way at, and in the vicinity of, 'Boat Bay' pa. The quantity of material used at the first three sites is very small, but it is possible that larger numbers of cobbles and boulders were worked at the mouths of Orokawa and Orokawaiti streams. Evidence of that may have been largely destroyed as a result of flooding and wave erosion.

Discussion

There is no definite evidence, at this stage, that anything other than flakes (and cores) were produced from the andesite cobbles. But why only flakes, what were they used for, and why was their use so localised? One possibility is that the andesite was a substitute for chert. I have not seen any natural occurrences of chert at Orokawa Bay, or found any chert flakes on sites that I have visited in the area, although J.D. Osborne (an amateur archaeologist) apparently found a "chert hammer and argillite flint(s)" at Orokawa pa in 1965. In contrast, there are many chert drillpoints, and a few small cores, in the Auckland Museum collections from Waihi Beach, and also abundant chert flakes in the Bowentown assemblage. However, this chert was most likely obtained from outside the area, at a much earlier period. Although the Bowentown site has not been dated it is

considered to have been occupied before 1500 A.D. (Turner and Bonica 1994: 11).

The very localised use of the andesite may indicate that access to lithic materials outside the area was severely restricted during occupation of the various pa. Obsidian flakes are quite scarce, even though the headland just north of Homunga Bay is the closest point of land to Mayor Island (27 km). It is also surprising that only two flakes and one small core of Waihi obsidian have been found in the area, despite a fairly extensive search.

The observations at Orokawa Bay have considerable implications for studies of lithic materials from eastern Coromandel sites in particular. Although the problem of distinguishing between the Matangia andesite and Tahanga basalt may only arise when dealing with artefacts from the Waihi Beach-Athenree area, it would pay to keep an open mind when examining artefacts of "Tahanga basalt" from other places. Andesites similar to the Matangia Andesite are found throughout central-southern Coromandel Peninsula and the northern Kaimai Range, and there is a possibility that some of these could also have been exploited. We can longer assume that all "basalt" flakes, roughouts, and adzes collected from eastern Coromandel sites are, in fact, made of Tahanga basalt.

Acknowledgements

My thanks to Dr Bob Brathwaite, Institute of Geological and Nuclear Sciences, for petrographic information on the Matangia Andesite; Brenda Sewell for providing samples of Tahanga basalt; Marianne Turner for information on the Bowentown assemblage; and Kath Prickett for assistance in examining collections at Auckland Museum, and comments on the paper.

References

Brathwaite, R.L. and A.B. Christie. 1996. Geology of the Waihi area. *Institute of Geological & Nuclear Sciences geological map* 21.

Phillips, C. and H. Allen. 1996. Excavation at Anatere Pa, U13/46 (N53/79), Athenree, Bay of Plenty. Unpublished report to Historic Places Trust.

Turner, M. and D. Bonica. 1994. Following the flake trail: adze production on the Coromandel east coast, New Zealand. *N.Z. Journal of Archaeology* 16: 5-32.