Midden Excavation in Theory and Practice: a Han Period Midden Site at Tung Wan Tsai, Ma Wan Island, Hong Kong

Pamela Rumball Rogers and Ellen Widdowson
Institute of Archaeology, UCL

Site introduction

The site of Tung Wan Tsai is situated on the northeast corner of Ma Wan Island, which in turn lies off the northeast corner of Lantau, the largest of the many islands that make up Hong Kong (Fig. 1). Acid volcanic rocks of Mid and Lower Jurassic age, known as the Repulse Bay Formation, cover approximately three-fifths of the territory of Hong Kong, including Ma Wan, where it underlies tuff with granite intrusions and later basalt dykes. The surficial deposits of the island are mainly of colluvium, alluvium and Holocene marine sediment (Allen and Stephens 1971). The position of Hong Kong on the south coast of the Asian landmass and the north edge of the tropics gives it a sub-tropical, monsoon climate. It experiences cool, dry winters and hot, humid summers with heavy rainfall and tropical cyclones, or typhoons, bringing torrential rains, strong winds and a resulting rise in wave and tidal height. The natural climax vegetation of south coastal China is closely related to tropical and subtropical rainforest, grading from a littoral and mangrove vegetation along the coasts to evergreen oak formation at the higher elevations (Dudgeon and Corlett 1994; Corlett 1995). Evidence for the fauna found in these forests includes species associated with warmer, more tropical environments than present day Hong Kong, including barking deer, red fox, civet cat, wild boar, rhinoceros, crocodile, hippopotamus and elephant (Hill and Phillipps 1981). The seas and shores of the area were, as at present, rich in molluscan, fish and other marine fauna.

The site itself is situated on a back beach, approximately 5.4m above sea level, formed at the foot of a small hill (Fig. 2). By about 6000 BC, sea levels in the region had risen to up to 5m higher than those of the present day. At the time of the occupation of the site, from approximately 1650 BC to the third century AD, this hill would have been a small island divided from the rest of Ma Wan by shallow mudflats and a mangrove complex. By historical times, several millennia of sedimentation had infilled these areas, creating watered valleys with marshy environments.

Excavation of an area of 315m^2 revealed a site comprising two deposits (Rogers *et al.* 1995). Within the sandbar were numerous small assemblages of ceramics, bronze, worked shell and faunal and molluscan remains, associated with compaction and discolouration of the sand. These deposits, representing intermittent, short-term use of the site, belong to the Early to Late Bronze Age of coastal South China (1500-500 BC). Above this prehistoric sandbar was found a later deposit, dating from 450 BC to the second century AD, the period of the Warring States through to the Han period. It is this component of the site that is the focus of this paper.

At a depth of approximately 50cm, a compacted surface was exposed extending along the foot of the hill; incorporated into this surface were postholes, pits and a drainage ditch (Fig. 3). Material pressed into and lying on the surface included pottery, stone artefacts, iron objects and fragments, shells and two coins dating to the Han period. To the east (or seaward) of this surface lay a large area covered with a refuse deposit, consisting of large quantities of shell, coral, sherds, animal and fish bones, as well as

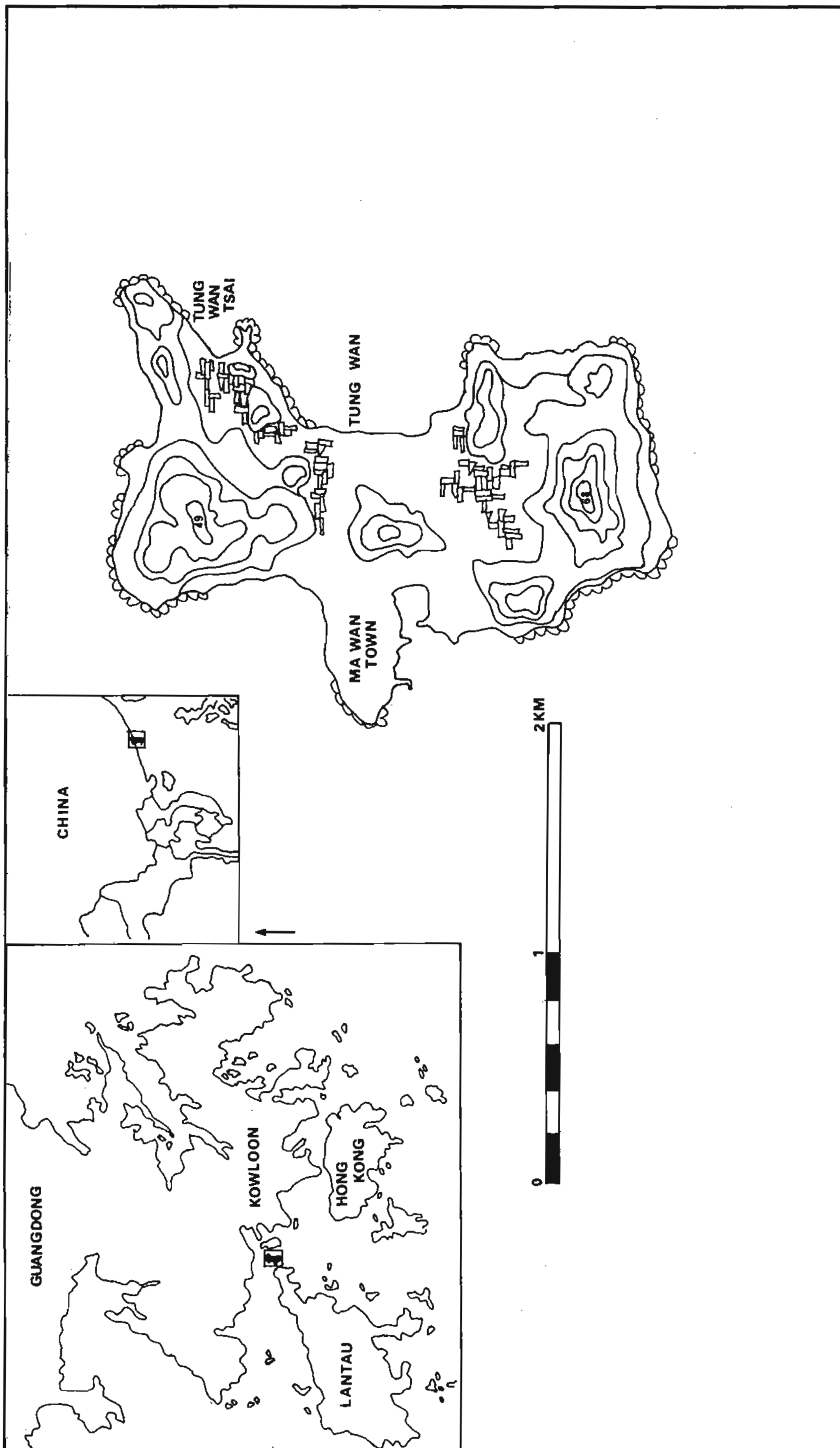

Figure 1 Maps of Hong Kong and Ma Wan Island within the region

objects of iron, bronze and stone and another Han period coin. Test pits to the north and south of the main excavation showed that both the surface and the refuse midden extend to the north, where the deposit has been disturbed by recent land alterations.

Aim of the paper

Although large middens are characteristic of many sites further up the Zhujiang River delta in Guangdong Province (Li in press), their occurrence is rare in Hong Kong. To date, the discovery of middens has been limited to a few prehistoric deposits, small in size

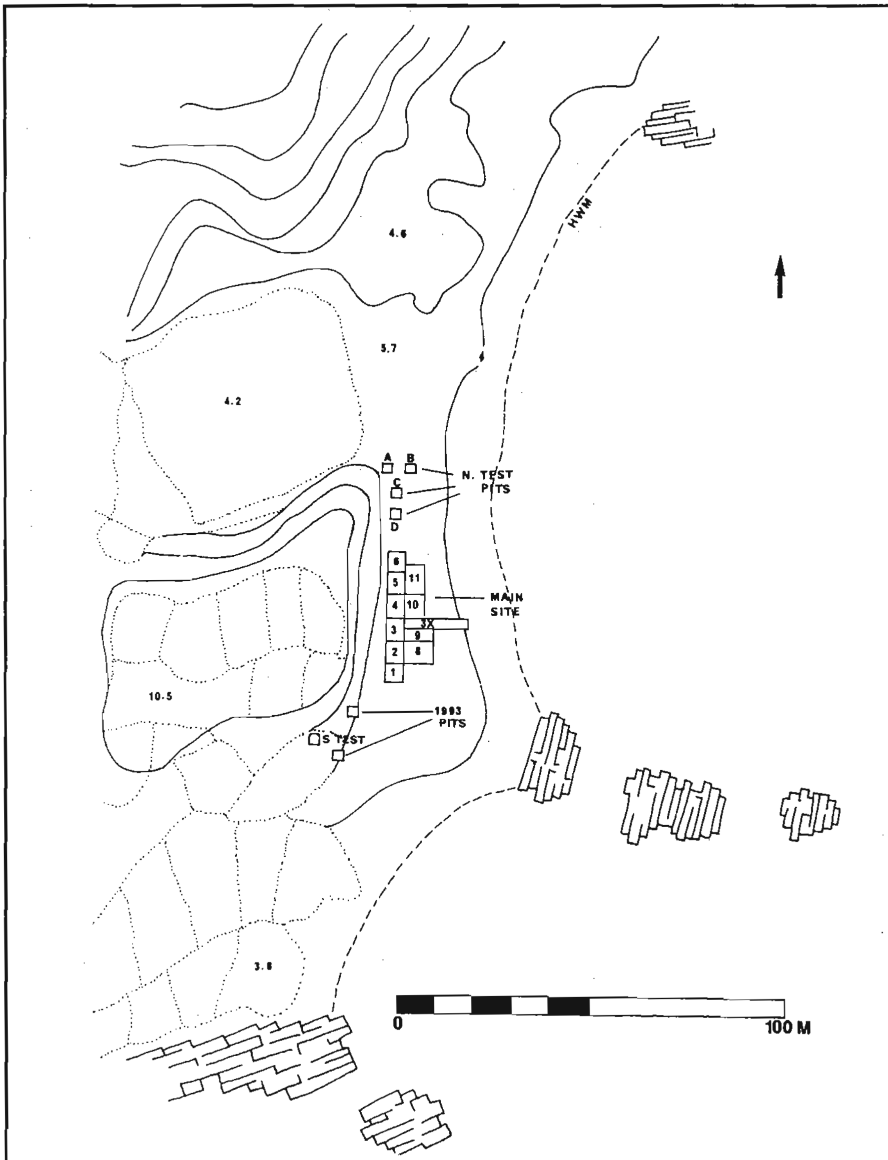

Figure 2 Map of Tung Wan Tsai, Ma Wan Island with excavation units

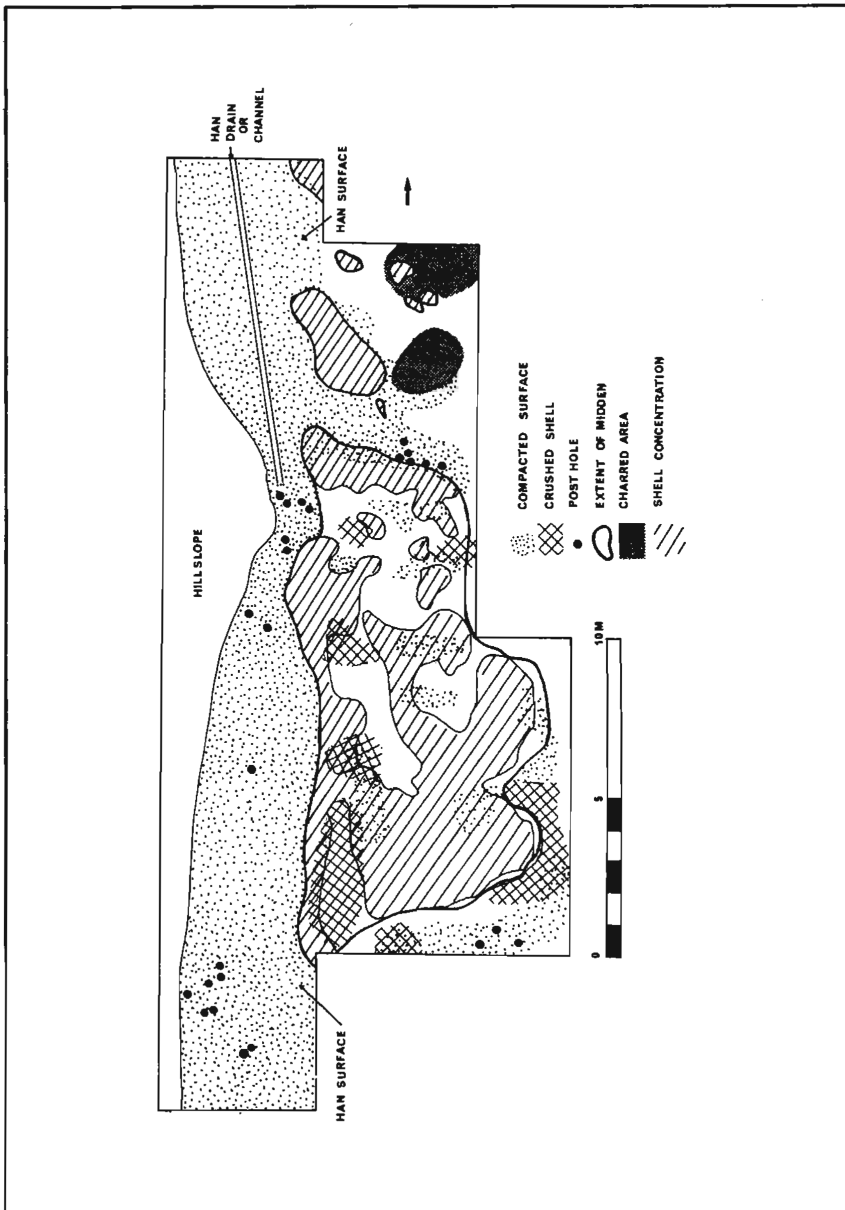

Figure 3 Plan of the Han period deposit, Tung Wan Tsai

and only partially excavated (Meacham 1978; Crawford 1984-5). The fact that the midden deposit at Tung Wan Tsai dates from the Han period is an additional incentive to examine it closely, as until recently the Han period was considered to be something of a blank in the archaeological record of Hong Kong. The primary aim of this paper is to present data which will go some way towards filling both of these information gaps.

The midden deposit at Tung Wan Tsai is sufficiently shallow and limited in size to allow almost complete recording. This scale facilitates observation of the patterning of the deposit and its relationship to the adjacent surface. At the same time it is large

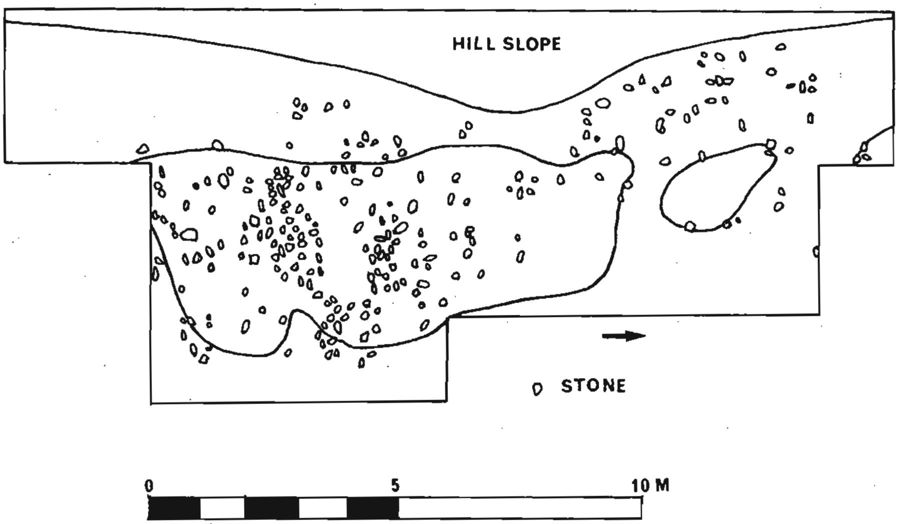

Figure 4 Distribution of non-artefactual stone within the Han period deposit

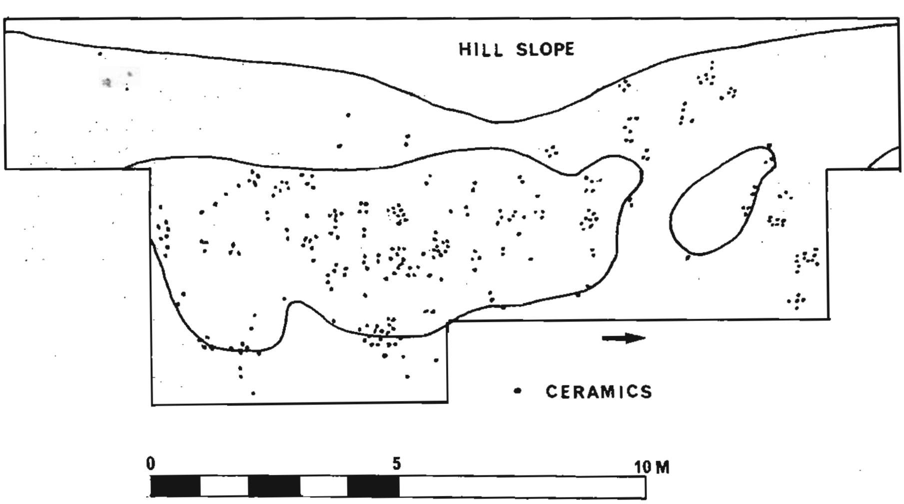

Figure 5 Distribution of ceramics within the Han period deposit

enough to say something about the way in which the midden deposits have accrued, expanded and altered over time. This paper will describe some of the ways in which we have approached these questions.

On-site methodology

The existence of the midden deposit was first recognized when it appeared overlapping the eastern edges of the compacted Han surface (Fig. 3). It was decided to expand eastward to reveal and record its extent before lifting the contents in a controlled manner. After clearing the surface, a $1m^2$ grid was strung and each unit was recorded on a standardized form, and then drawn and photographed. Each unit was then lifted and bagged, and the details of the deposit were recorded. Note was taken of variations in content, condition and colour throughout the depth of the deposit. Levels taken at the corners of each grid unit, at the top and bottom of the deposit, recorded variations in its depth. A random sample of 15 grid units were lifted in total, with all shells divided by species and counted, and all soils dry-sieved for analysis using a 2mm mesh. Numerous small fish and animal bones were retrieved by this method. In all other units, shell species were identified, described and quantified subjectively, and bones and soil variations were similarly recorded.

During the next stage, the excavation was extended to the north, and a different approach was employed. Rather than using the arbitrary grid, the area was excavated with the individual clusters and dumps of shell serving as the basic units for recording and recovery. It was felt that familiarity with the midden composition, gained by the preceding gridding exercise, allowed the excavators to use this more sophisticated approach. In terms of faunal and midden analysis, the use of depositional events as the unit of study proved more effective, and is recommended for future midden analysis where practical.

Post-excavation methodology

An attempt was made after excavation to integrate all the data from the units, both grid and depositional, into a composite picture of the midden deposit. The ceramic vessels were identified and links found between sherds in different parts of the midden and the Han period surface. All other artefacts were analyzed, along with soils, mollusca and bone remains. Figure 3 presents, in as much detail as scale allows, this composite map of the Han period deposit from Tung Wan Tsai. At the same time, analysis was focused upon specific individual depositional events within the midden, and on the way in which these events accumulated to form the midden as a whole. Figure 9 is an example of this level of detail and what it reveals.

At both these levels of inquiry, the issue of the components of the midden and their distribution and of the processes of midden formation and post-depositional alteration were considered.

Discussion

Components of the midden and their distribution

The midden deposit as a whole lies seaward of the hard-packed surface with which it is closely associated. It overlaps the edge of this surface and slopes downwards toward the southeast. The midden lies in a matrix of large-grained sand particles (95%) with colours clustering around 10YR 4/3 -4/4 - 4/6 to 5/4 (dark yellowish browns). The samples of the matrix tested low in iron and phosphate content and high in carbonate and organic content. In most areas of the midden the sand matrix was loose; with areas of particular looseness or compaction recorded and mapped.

Shellfish remains

Molluscan remains formed the bulk of the midden deposit; in some grid units this constituted only a scatter of crushed shell, while in other units whole shells were densely packed over the metre square. The main species found in the Han period deposit and their quantification by Minimum Number of Individuals (M.N.I.) Totals and Shell Mass in

Species	*Habitat*	*M.N.I.*	*S.M.*
Lunella coronata	Rocky/ Boulder	14,464	86.6
Batillaria sordida	Rocky/ Boulder	4,709	15.3
Thais luteostomata	Rocky/ Boulder	4,246	48.4
Nerita albicilla	Rocky/ Boulder	3,866	16.4
Nerita polita	Rocky/ Boulder	1,036	4.4
Nerita lineata	Mangrove	1,004	4.5
Monodonta australis	Rocky/ Boulder	798	3.0
Terebralia sulcata	Mangrove	524	6.7

Table 1 Quantification of the Gastropod species by M.N.I. Totals and Shell Mass (S.M.) in kg.

Species	*Habitat*	*M.N.I.(l.)*	*M.N.I.(r.)*	*S.M.*
Crassostrea gigas *	Estuarine	-	-	148.8
Asaphis dichotoma	Rocky/Boulder	377	427	4.4
Meretrix meretrix	Sandy Shore	210	214	8.4
Barbatia helblingi	Rocky/Boulder	211	199	2.1
Barbatia obliquata	Rocky/Boulder	133	134	0.6
Barbatia viriscens	Rocky/Boulder	94	90	0.9
Geloina erosa	Mangrove	4	4	0.2
Atactodea striata	Rocky/Boulder	80	78	0.1

Table 2 Quantification of the Bivalve species by M.N.I. and Shell Mass (S.M.) in kg. * Oyster category shells consist of *Crassostrea gigas* and possibly *Crassostrea rivularis, Saccostrea cucullata* and *Saccostrea kegaki*

kilogrammes is given in Tables 1 and 2. The M.N.I. was chosen as the most convenient means of recording large quantities of shell on site where numerical and distributional information was desired. The M.N.I. method is based upon counts of an easily identifiable and durable feature. Any incomplete remains identifiable by species but not retaining the M.N.I. feature are classified as fragments. The remains described as oyster (*Crassostrea gigas* and *Saccostrea cucullata*) were recorded by measurement in a container of known volume. This method was chosen as individual valve identification proved too difficult and time consuming to make M.N.I. quantification feasible.

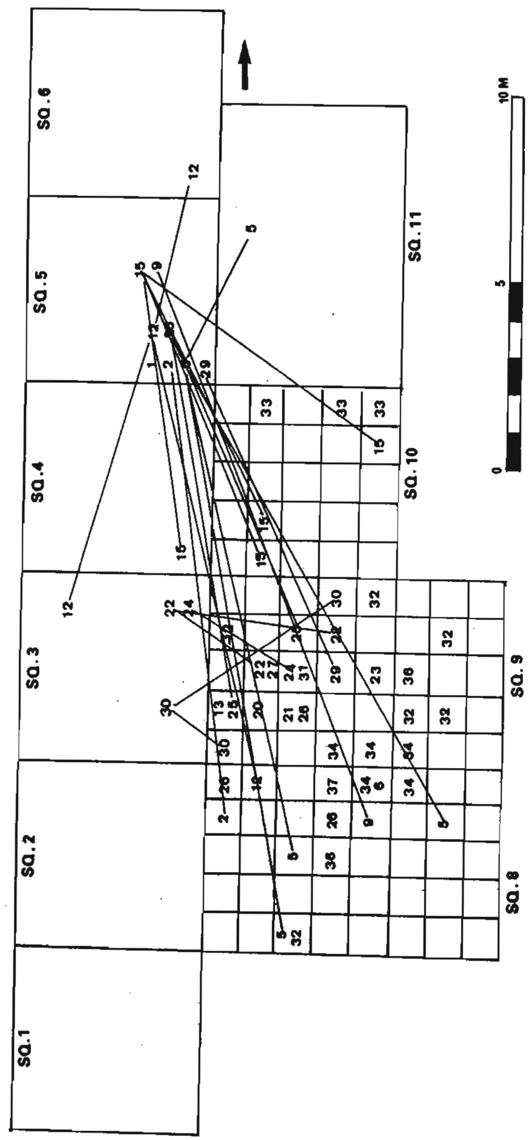

Figure 6 Distribution of joining sherds within the Han period deposit

The above methods were adopted because they were easily implemented and practical. The methodology is not sophisticated in nature, as the objectives of this study were to provide a general assessment for the faunal remains, not an in-depth palaeoeconomic analysis.

It can be seen that rocky/boulder species predominate with smaller numbers of mangrove, estuarine and sandy shore species. The continual but marginal presence of the mangrove species suggests that the collection of mollusca from this environment may have been secondary to another activity, evidence of which has not been preserved in the archaeological record. The deposition of sand dwelling species also remained marginal, with the same never making up more than one per cent of the recovered remains. The majority of the species would have been relatively easy to collect, not requiring specialized implements or techniques for procurement.

The condition of the shells was good, although they were less well-preserved than those in earlier sandbar deposits. The midden examples showed signs of possible exposure to the elements before burial. The majority of the recovered shells were complete. The smaller number of broken shells were also well preserved, the pieces retaining well defined sculpture and margins. Less than 0.5 per cent of the shell remains were recovered in a wave-abraded condition. These shells represented a limited number of species, the majority of which are sublittoral in habitat.

The maximum density of the shell deposit in terms of volume and depth was in Squares 8 and 9 to the southeast (Fig. 2). There were similarly dense but smaller deposits in Square 11, where the hard-packed surface extends towards the sea. The distribution of mollusc species within the midden is very irregular; most of the midden consists of mixed species, although single species deposits occur. There appear to be two distinct layers to parts of the midden, with one deposit clearly overlain by another heap of different species in a different alignment.

Animal and fish bone remains

The acidic nature of Hong Kong soils does not provide an ideal medium for bone preservation, so much information has been lost through decay. Vertebrate remains, however, have been recovered from local sites, and animals represented include species of fish, small mammal, sea mammal, reptile and large mammal.

The bulk of the faunal remains found at Tung Wan Tsai were from the midden deposit and consist of unidentifiable fish (two charred vertebrae and eight charred fragments), and small mammal bone fragments (98 charred fragments). Identifiable species include dog, a chicken-like bird and a small rodent, possibly porcupine. Most of the material was recovered by sieving, and the solid samples and the figures quoted for fragments must be considered as a considerable underestimate for the original deposit as a whole.

Stone remains

Non-artefactual stone occurred irregularly throughout the midden. A total of 242 pieces were found, of which 57 were water-worn pebbles (53 small and four larger), and 185 were angular rock fragments (112 small, 68 large and five very large examples). Several of the larger rock pieces had been shattered *in situ*. The stone was all local to the site, and includes tuff and granite rock pieces and quartz porphyry pebbles.

The concentration of non-artefactual stone was similarly densest in Squares 8 and 9. Of a total of 242 pieces of stone, 111, or 46 per cent, were concentrated in the block of grid units illustrated in Figure 4.

Artefacts in the midden

Ceramics

A total of 212 sherds were recovered from the midden deposit; approximately 40 per cent of these were from Coarse Ware vessels, both plain and decorated. Decoration consists of geometric or non-geometric motifs applied by carved paddle, or cording applied by a wrapped paddle. These vessels are primarily utilitarian forms such as cooking pots. Another 30 per cent of the sherds were from Fine Ware jars, stamped with net patterns

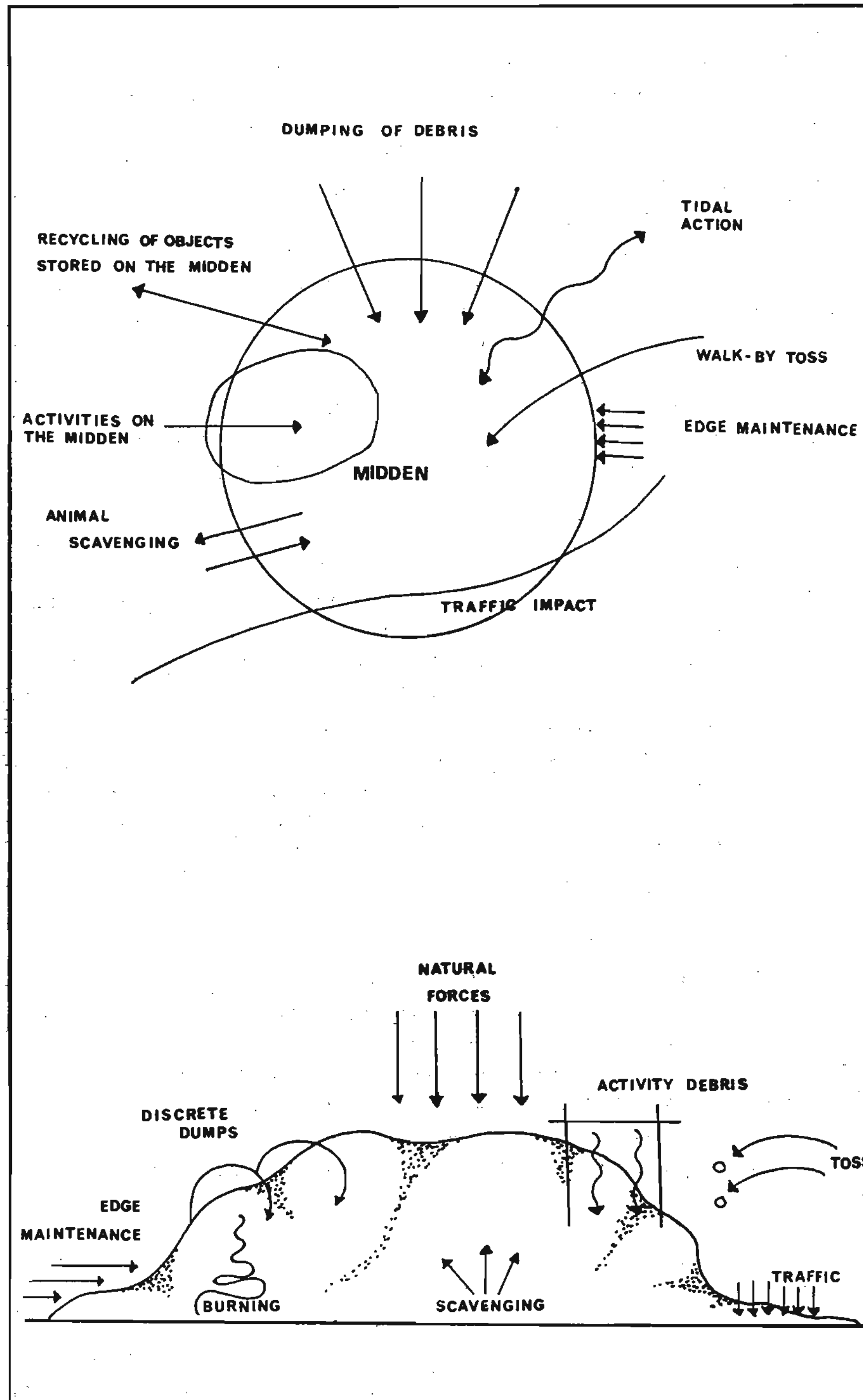

Figure 7 The forces of formation and alteration at work on a midden

and seal motifs. The remaining 30 per cent of the ceramics came from other Fine Ware vessels, comprising plain and glazed bowls and basins and corded pots with wide everted rims. All of these wares and forms can be firmly dated to the Han period.

The spatial distribution of the ceramics varies slightly from that of the shell and non-artefactual stone. Sherds occurred in clusters throughout the midden, including areas where the shell deposit was not particularly dense. There seems to be a tendency for these clusters to occur along the edges of shell mounds as well as in areas where the deposit of shell is very sparse (Fig. 5). None of the vessels represented was recovered intact, though a number were recovered in a partial state, having been deposited in the midden and then crushed or fractured *in situ*. During analysis it was noted that pieces of the same vessel were frequently found scattered over a wide area of the midden and the associated activity surface. In particular, a number of vessels from the midden were also represented by sherds from the surface of Square 5 (Fig. 6). It appears they may have been used in some functional context in this area of the surface immediately prior to discard.

Other artefacts

Few stone artefacts were found in the midden. These include one whetstone, one adze fragment, seven quartz chips and two porous sandstone bi-valve moulds for the manufacture of bronze axe heads. The latter are not a pair, but rather represent two different moulds. Similar moulds have been found in the region, dated to the Bronze Age, 1300-1000 BC (Meacham 1994).

The metal finds from the midden include three coins: a bronze Wu Zhu dated to the Early Eastern Han (AD 25-26); a bronze Tai Chuen Fifty coin dated to the Wang Ming (AD 7-14), and an unattributable bronze coin fragment.

Forty pieces of iron were recovered from the Han period midden deposit. Exact identification proved difficult because of the badly corroded and incomplete condition of the artefacts, although a basic attempt at identification of artefact types, on the basis of comparison with artefacts from Han tomb sites in Guangdong province, has allowed the following groupings:

six unidentifiable lumps
16 nail, wire or pin fragments
three adze or axe fragments
eight blade or spear-top fragments
one pick or chisel fragment
three harpoons or fishhooks
two spade fragments
one saw fragment

Four pieces of bronze were found: one small tooth-shaped object, a part of a fishhook, a three-winged arrowhead with a round, hollow shaft, and one small featureless fragment.

Six glass beads were recovered from the Han period midden. All are dark blue or black, four are tiny seed beads, one is a larger pentagonal bead and the last is a larger barrel bead. Fourteen fragments of a light greenish glass vessel were also found, and although they appear to be from the neck and shoulders of a small bottle, reconstruction was not possible.

These miscellaneous artefacts are not numerous enough to comment on their spatial distribution. They were all excavated from the denser portions of the shell deposit (Fig. 3).

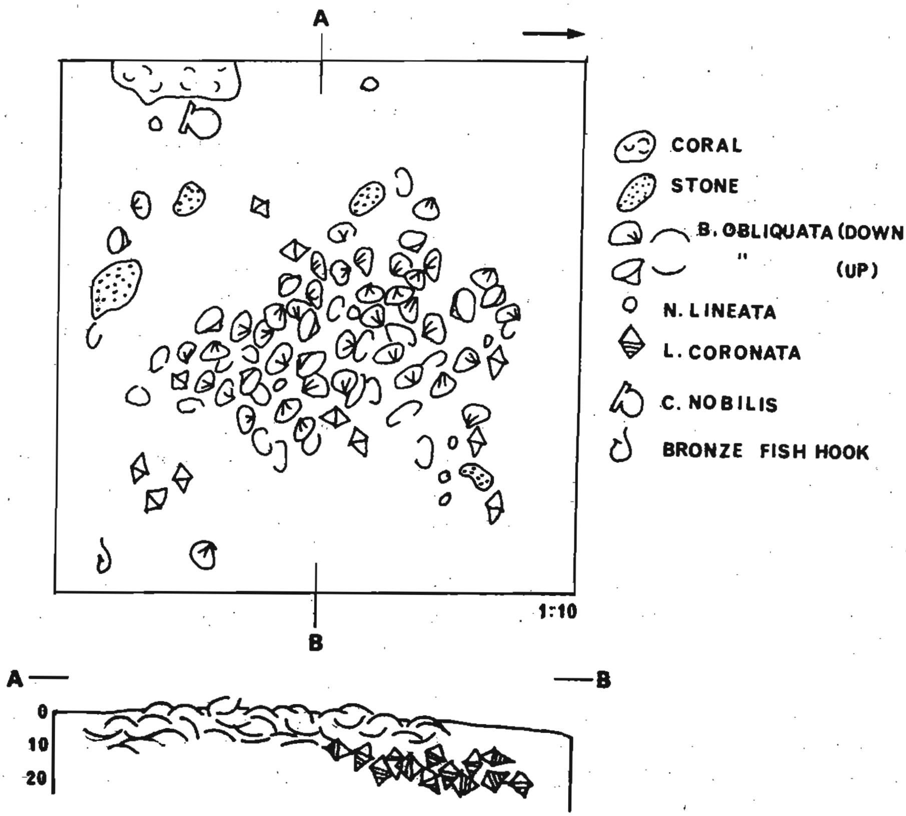

Figure 8 Detailed view of the deposit in Grid Unit #30

Observations on shell midden formation processes

Ethnological observation of how shell midden deposits are created, and subsequently evolve to reflect natural forces and human behaviour, provide an explanatory model with which to approach middens in the archaeological context (Meehan 1982; Rogers and Engelhardt 1993; McBryde *et al.* 1982). The following informal model is a brief time-lapse account of the hypothetical life-cycle of a midden deposit, from the first deposit of shell to abandonment and disuse (Fig. 7). It is based on personal observation of the processes in a coastal community in southern Thailand.

The process of midden formation begins with the premise that a given area is identified as midden space, and the first dump of debris is deposited on the surface. This is soon followed by more tips dumped on top and alongside the first deposit. Soon, passers-by perceive the area as a midden-in-use and toss refuse onto its surface. Someone from a nearby house empties the kitchen garbage onto the midden, full of fish remains, vegetables and bones. Dogs and chickens come to scavenge this organic refuse, and in the process they scatter shell beyond the accepted area of the midden. The offending shell is subsequently swept back from the path, and the broom is left in storage on the midden for future use. Two edges of the midden are regularly swept to keep shell and other debris out of the way, but the deposit continues to overflow and random shells are trodden upon and crushed into the continually compacting surface. The nearby communal area is swept clean and the debris from various activities such as mat weaving, wood chopping and vegetable processing is collected, dumped on the midden and burnt on top of the shell deposit. A basket full of oyster shells is left on the midden and nets are spread out over the midden surface to dry. Later these will be removed, but one piece may go unnoticed and be pressed by heavy rains down into the crevices between the shells where it is soon overlain by a dump of sweepings. Several fire-cracked stones and charred debris from

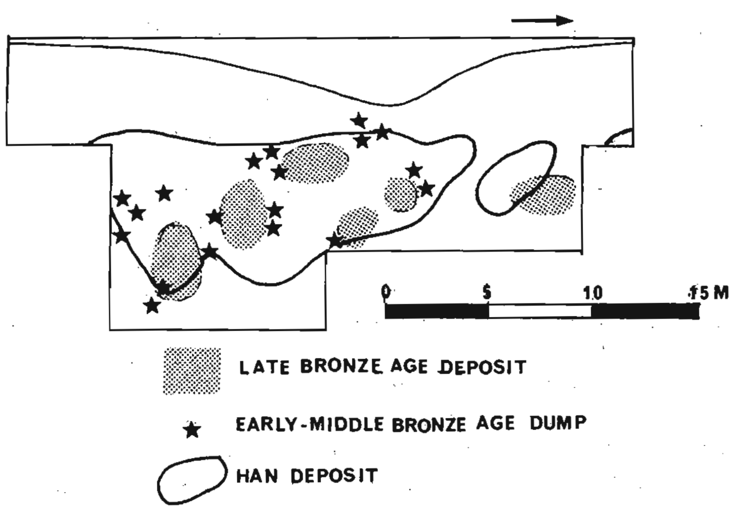

Figure 9 The spatial relationship between the Han period midden deposit and the earlier Bronze Age shell deposits

a cooking area are tossed onto the midden; one rests on top but the others roll down the far side of the midden; one cracks in two when it comes to rest against the trunk of a tree. Several people sit on boards on the midden surface to clean fish and crack open shells. The refuse from their tasks is tipped directly onto the deposit. At one end of the midden a rack is erected for the smoking of fish, and the remains of the slow-burning fire are swept onto the deposit. As the midden expands laterally over the site, attempts are made to confine it with rows of stones and logs laid along its edges. In time however, the deposit will overflow its bounds and join adjacent deposits, creating a continuous accretional midden with complex spatial and chronological stratigraphy.

With this notional picture of midden evolution in mind, one may examine the remains of an archaeological midden and attempt to decipher its history. The evidence from the Han midden at Tung Wan Tsai implies that the midden deposit was buried very shortly after abandonment. The shells in the deposit are in most cases whole, often with valves still joined at their hinges and sherds, which were crushed *in situ*, are still in their original positions of contact. There appears to have been little subsequent bioturbation.

Together these factors allow considerable confidence that the midden deposit represents both the depositional behaviour of its creators and the post-depositional processes which followed immediately after its last use.

The deposit is an accretional midden, created by numerous individual depositional events overlapping and creating what appears to be an area of continuous deposit. The evidence suggests that molluscan collection was primarily dietary and small scale. Many of the individual dumps are internally consistent in the species and the artefacts they contain, and are evidence of a single meal or similar short-term occupational event. This is clearly demonstrated by the data from individual Grid Units, such as Unit 30 (Fig. 8). On the top of the midden in this unit there was a single dump of 328 bivalves, most of which are whole, many still hinged and many nested. The majority of the valves lay with their concave sides facing down. Below this deposit and slightly to the east was a cluster of *Lunella coronata,* again almost entirely whole and also stained dark grey, presumably as a result of cooking.

In accretional middens such as this, the passage of time is represented not only in the vertical stratigraphy of the deposit but also in its lateral or horizontal extent. Interpretation of the sequence of deposition requires identification of contemporary and sequential dumps which may be disjointed in either or both of these spatial dimensions. The presence of sherd links in various parts of the midden and on the activity surface may represent chronological equivalents if the sherds were in their original discard positions. Looking at the ceramic links between sherds on the Han period surface and in the midden deposit, it is notable that sherds from the final use of the surface join with sherds at the outer margins of the midden (Fig. 6). This could be interpreted as evidence of the outward spread of the deposit from an original centre.

Various alterations or post-depositional events affecting the midden are visible in the archaeological record. A pattern of compaction and crushed shell can be seen in areas of the site, in particular around the periphery of the midden deposit (Fig. 3). The sand matrix is firmly compacted, with a crust-like surface. Any shell in this area is fragmented or finely crushed. Both features are presumably the result of trampling by traffic moving around and over the midden.

There is limited evidence for the burning of debris on the midden, in the form of stained and charred shell. The charcoal remains and ash resulting from the burning of organic debris would tend to be washed quickly down through the deposit, staining shells in the process. Areas of charcoal are associated with pieces of charred clay from stove or oven structures. These deposits seem more likely to be the result of stove dumps than of actual fires smouldering on the midden surface.

There are two areas of burning adjacent to the midden (Fig. 3). These two patches consist of dark, charcoal filled sand with a crisp and slightly compacted texture. Associated with these areas are small shell dumps, several stones and scatters of sherds.

Postholes were found in association with the midden, although not in the midden itself. They occur in two distinct clumps in the hard surface to the west, also in a group in the hard surface where it extends into the midden, and finally in the compacted path surface to the south of the deposit (Fig. 3). All are shallow, some are upright and others are sloping; and in some cases they appear to be in pairs. It is not possible to reconstruct the functions with which they were associated, although temporary structures such as lean-tos or racks seem most likely.

It would be of value to know what dictated the choice of this particular locus for this type of use. The lack of middens on other sites in Hong Kong limits the possibilities of site-use pattern identification. It is interesting, however, that a degree of patterning is visible within the site itself. In the earlier period of use, the many small clusters and dumps of shell of the Early/Middle Bronze Age and the larger deposits of the Late Bronze Age are located directly below the midden concentrations of the Han period (Fig. 9). Earlier shell contexts are in the form of small, discrete and often homogenous deposits in a sand bar matrix. These deposits appear to be evidence of small-scale processing for immediate consumption. The shell is a primary deposit, reflecting temporary, possibly seasonal, campsite utilization of the site. The Han period deposit however, seems to represent a different use of the same locus. The molluscan remains have been redeposited as secondary deposits at the periphery of the site. The remains reflect more frequent and perhaps longer-term processing of a wider range of molluscan species. The changes in the species exploited does not reflect major environmental change in the area, as the ratio between habitats exploited remains constant. The differences may instead reflect changes in cultural preference, both dietary and in terms of the manufacture of shell implements. It is interesting to note that the objective governing the collection of *Meretrix meretrix*, the main representative of the sandy-shore habitat, was tool-making in the earlier contexts, and dietary during the Han period.

Summary and conclusions

Although the midden deposit at Tung Wan Tsai is modest in depth and extent, it warrants description and discussion on two points. It is the first midden deposit of any size to have been found in Hong Kong and represents a major addition to our knowledge of the Han period in the area (Rogers 1995). The contents of the midden, their quantity, condition and distribution have been described. Using a loose ethnographic model of midden evolution and use, an attempt has been made at a preliminary analysis of the deposit. The interpretation of depositional patterns is a complicated and often contentious issue, even in parts of the world where shell-bearing sites have been intensively studied (Waselkov 1987; Bowdler 1983). As this is not the case in Hong Kong, only general statements can be made concerning the deposit at Tung Wan Tsai. The information presented here is intended to provide data and initial interpretations so that it will be possible, as further data becomes available from related sites, to develop palaeoeconomic models for the region.

Acknowledgements

The site of Tung Wan Tsai, Ma Wan Island was slated for development and was excavated in 1994, under the direction of the first-named author, on behalf of the Antiquities and Monuments Office of the Hong Kong Government. The project was funded by Sun Hung Kai Real Estate Development Agency Limited. The authors would like to thank the staff of the Antiquities and Monuments Office and the Hong Kong Museum of History for their generous help throughout the excavation, and to Dr. Brian Morton of the Swire Institute of Marine Science for aid in species identification. Special thanks and gratitude to Sophia Mirchandani, Julie Van Den Burgh and Nan Leininger.

References

Allen, P.M. and Stephens, E.A. 1971. *Report on the Geological Survey Of Hong Kong*. Hong Kong: Government Printer.

Bowdler, S. 1983. Sieving Seashells: midden analysis in Australian archaeology, in Connah, G. (ed.), *Australian Field Archaeology: A Guide to Techniques*: 135-144. Canberra: Australian Institute of Aboriginal Studies.

Corlett, R. T. 1995. *Human impact on the flora of Hong Kong Island*. Paper given at 4th International Conference on the Evolution of the East Asian Environment, Hong Kong.

Crawford, J.R. 1984-5. Po Yue Wan. *Journal of the Hong Kong Archaeological Society* 11: 64-79.

Dudgeon, D. and Corlett, R.T. 1994. *Hills and streams: an ecology of Hong Kong*. Hong Kong: University of Hong Kong Press.

Hill, D.S. and Phillipps, K. 1981. *Hong Kong animals*. Hong Kong: Government Printer.

Li Guo. (in press). *Neolithic Sandbar sites round the Pearl River Estuary area and Hainan: a comparative study*. Paper given I.P.P.A. Conference, Chiang Mai, January 1994.

McBryde, I. *et al.* 1982. *Coast and Estuary: archaeological investigations on the North Coast of New South Wales at Wombah and Schnapper Point*. Canberra: Australian Institute of Aboriginal Studies.

Meacham, W. 1978. *Sham Wan, Lamma Island. An archaeological site study* (ed). Hong Kong: Hong Kong Archaeological Society Monograph III.

Meacham, W. (ed.) 1994. *Archaeological investigations on Chek Lap Kok*. Hong Kong: Hong Kong Archaeological Society Monograph IV.

Meehan, B. 1982. *Shell Bed to Shell Midden*. Canberra: Australian Institute of Aboriginal Studies.

Rogers, P.R. 1995. Subsistence continuity in the Prehistory of South Coastal China, in Yeung, C.T. and Li, W.L.B. (eds.), *Archaeology in Southeast Asia*: 467-478. Hong Kong: University Museum and Art Gallery, University of Hong Kong.

Rogers, P.R. *et al.* 1995. *Tung Wan Tsai: A Bronze Age and Han Period coastal site*. Hong Kong: Antiquities and Monuments Office Occasional Paper No.3.

Rogers, P.R. and Engelhardt, R.A. 1993. *The Ethnoarchaeology of Southeast Asian coastal sites: a model for the deposition and recovery of archaeological material*. Paper given at I.C.A.N.A.S. Conference, Hong Kong.

Waselkov, G.A. 1987. Shellfish gathering and shell midden archaeology, in Schiffer, M.B. (ed), *Advances in archaeological method and theory* 10: 93-171. New York: Academic Press.