Chronology and Origins of Pottery in Northern Luzon, the Philippines, from the Late Neolithic to the Metal Age

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ABSTRACT

My excavation of the Catugan shell midden site in Cagayan, northern Luzon, Philippines, revealed five well-stratified layers. I conducted layer-by-layer comparative studies of the excavated pottery against two additional shell midden sites to confirm the sequencing of pottery from the Late Neolithic to the Metal Age in the stratified layers of the Catugan shell midden site. For the Late Neolithic period remains, I compared those found at the Catugan shell midden site and the Magapit shell midden site, verifying the contemporaneity of the pottery from Layer V of the Catugan shell midden site and the pottery from the upper part of Layer V of the Magapit shell midden site. For the Metal Age remains, I compared those found at the Catugan shell midden site and the Bangag I shell midden site, determining the contemporaneity of the pottery from Layer IV of the Catugan shell midden site and the pottery from Layer XI of the Bangag I shell midden site.

The established sequence shows the dominance of red-slipped pottery during the Late Neolithic period and the dominance of the black and brown pottery during the Metal Age. Hung indicated that the red-slipped pottery in Cagayan, northern Luzon developed from a late stage in the evolution of fine cord-marked pottery found in eastern Taiwan (Hung 2005: 109). The origin of the black pottery in Cagayan, however, has not previously been properly discussed(1). I suggest that one possible origin for the black pottery is southwestern Taiwan, based on a herringbone-shaped decoration made by short incisions represented in the Fengpitou site.

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(1) Mijares suggested that the black pottery might have come from western Taiwan (Mijares 2005: 85); however, he did not conduct the comparative study of the pottery of both areas that would be necessary to establish this.

I also discuss the drastic apparent change[2] from Late Neolithic to Metal Age pottery. This change was likely a result of modifications to interactions between eastern Taiwan and northern Luzon after the eruption of Mt. Iraya on Batan Island. Evidence of this volcanic eruption is indicated by the thick deposit of volcanic ash on top of the Neolithic layer containing red-slipped pottery at the Sunget site in the middle of Batan Island. The green beads of pseudo-jade from a local source found in Layer II of the Magapit shell midden site are also thought to be a reflection of this change.

My findings suggest that the decrease in the number of sites in the lower reaches of the Cagayan River during the Magapit period is related to the increase in shell distributions from Locations 1 to 5 on the Magapit hill, and thick shell deposits up to 5.6 m at the hilltop site of the Magapit shell midden. In other words, people moved from the lowland areas along the river to the hilly areas at Magapit, likely due to a change in the environment of the Cagayan River, such as a flood, and the greater variety of pottery decorations found in the upper layers of the Magapit shell midden site reflects this phenomenon.

Key Words: Late Neolithic, Metal Age, red-slipped pottery, black pottery, northern Luzon

[2] I still think that there is a gap or discontinuity between the red slipped and black pottery phases, although Mijares does not agree with this (Mijares 2005: 84-85). Detailed discussion of this issue will appear in another paper.

INTRODUCTION

The transition from the Late Neolithic to the Metal Age is a very important moment in any region of the world. In the Philippines, this change was demonstrated theoretically by Beyer (1947) and Beyer and de Veyra (1947) and archaeologically by Fox (1970) in Palawan. In their framework of Philippine prehistory, Beyer and de Veyra (1947) proposed that the Iron Age was initiated by people who brought new iron technology to the Philippines. Beyer (1948) also assumed that there was no pottery in the Philippines during the Neolithic. However, on the basis of his excavations of the Tabon Caves on Palawan Island, the Philippines, Fox (1970) presented the transition from the Late Neolithic to the Metal Age as a series of changes in tools. However, no transition from the Late Neolithic to the Metal Age was evident in the pottery remains. Moreover, he could not examine the transition from Neolithic pottery to Metal Age pottery by stratagraphic layer, although he had Neolithic pottery assemblages, such as that found in Ngipe't Duldug Cave, and Metal Age pottery assemblages, such as that found in Tadyaw Cave. He presented these findings by cave rather than by layer.

The main purpose of this article is to present the transition of Neolithic pottery to Metal Age pottery by stratigraphic layers excavated in shell midden sites in northern Luzon. Therefore, I begin by describing the excavation findings of the key site, the Catugan shell midden site, by layer. After comparing the results of excavations of three shell midden sites, I investigate the possible Taiwanese origins for both Neolithic and Metal Age pottery in northern Luzon, the Philippines. I conclude by discussing the questions of when, how, why this transition occurred.

I. The sequence from the Late Neolithic to the Metal Age: Results of the excavation of the Catugan shell midden site

I had the opportunity to excavate the Catugan shell midden site in August, 1996. As a result of this excavation, I was able to begin sequencing pottery remains and establish the chronology of pottery in this area. Therefore, I first review the results of the excavation of the Catugan shell midden site.

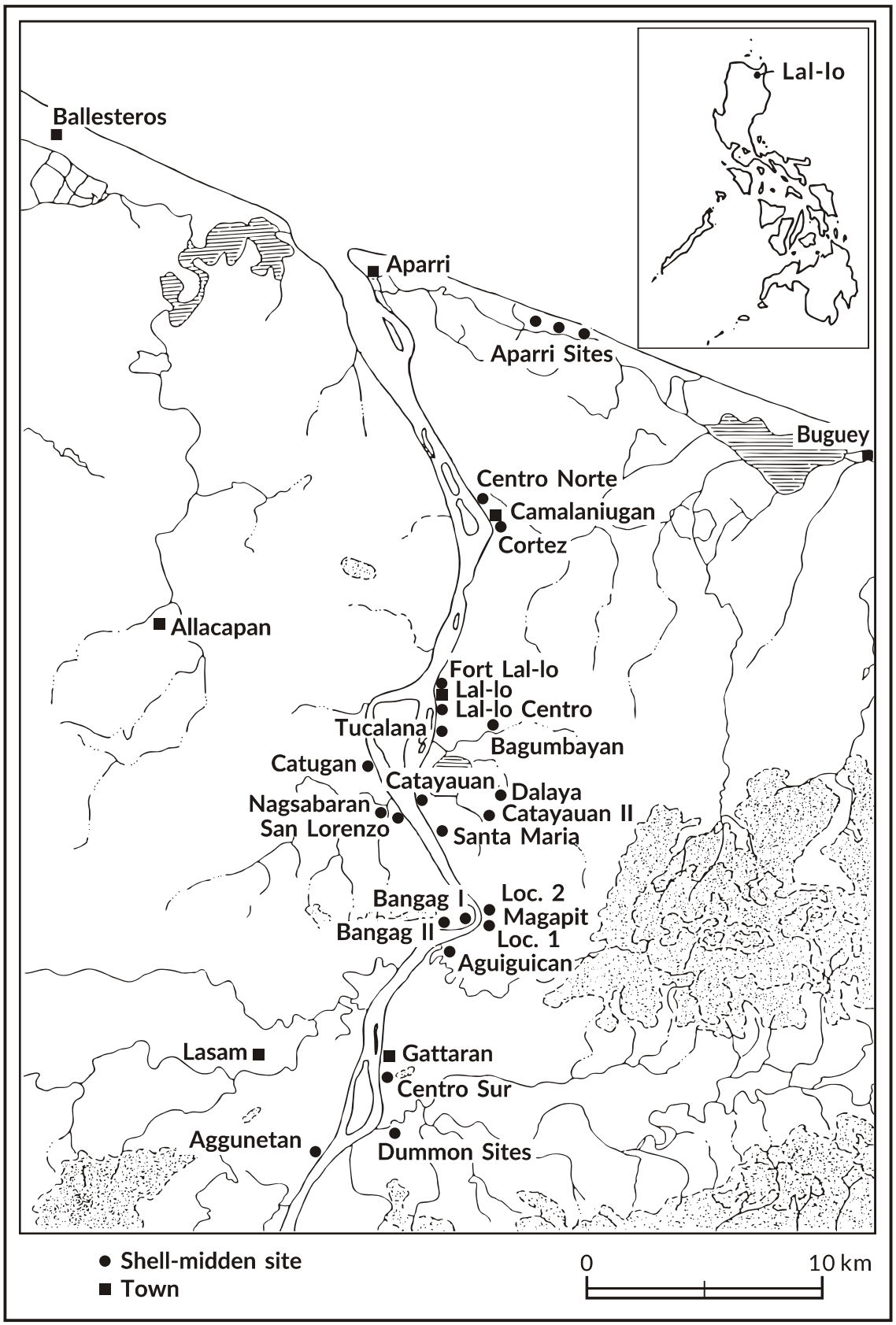

Fig. 1: Distribution of the Lal-lo shell midden site. (from Tanaka 1998a: Fig. 1 partially amended).

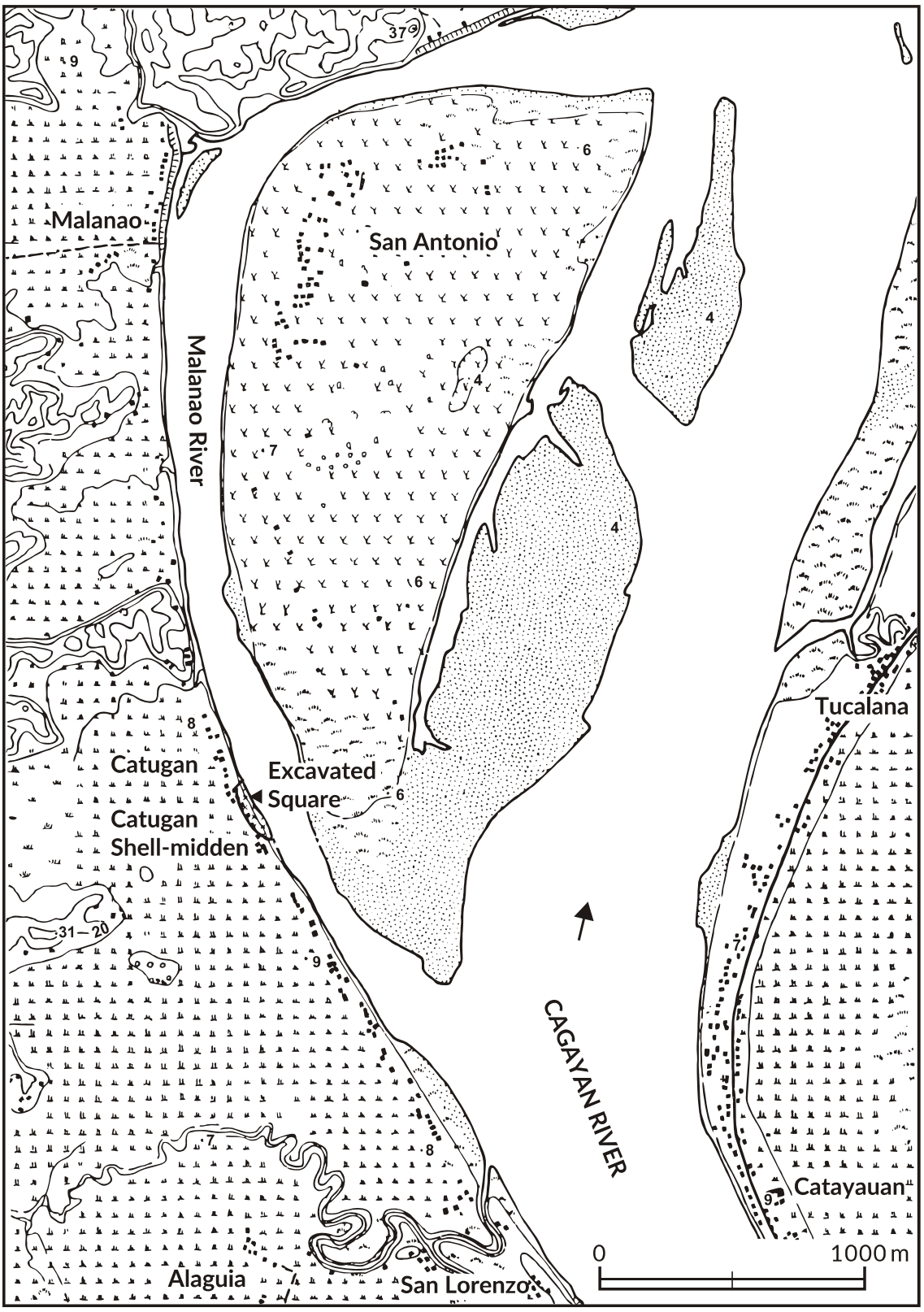

Fig. 2: Location of the Catugan shell midden site (from Tanaka 1998a: Fig. 2)

1) Location of the Catugan shell midden site

The Catugan shell midden site is located to 4 km southwest of Lal-lo Centro, the center of the town of Lal-lo (Fig. 1). Catugan village was formed on the west side of the natural bank of the Malanao River, a tributary of the Cagayan River (Fig. 2). The midden is estimated to be approximately 250 m long based on the distribution of shells on the surface.

2) Excavation of the Catugan shell midden site

In August 1996, I excavated(3) the Catugan shell midden site with my colleague from the National Museum of the Philippines (Tanaka 1998a). The excavation square was set on at the eastern ridge of a natural riverbank, where the eastern side is a steep cliff (Fig. 3).

(3) I conducted the excavation of the Catugan shell midden site in 1996 as a part of international scientific research financially supported by a fund from the Ministry of Education, Science, Sports and Culture in Japan (No. 07041006) through Prof. Hidefumi Ogawa, Associate Professor of Tokyo University of Foreign Studies. The re-excavation of the Catugan shell midden site is currently ongoing as part of a joint project between Kazuhiko Tanaka, from Tsurumi University, and Dr. Ame M. Garong of the Archaeology Division at the National Museum of the Philippines. This project is being financially supported by a fund from JSPS (Japan Society for Promotion of Sciences) (No. 19K01101), through Kazuhiko Tanaka. The latest excavation was conducted in February and March, 2020.

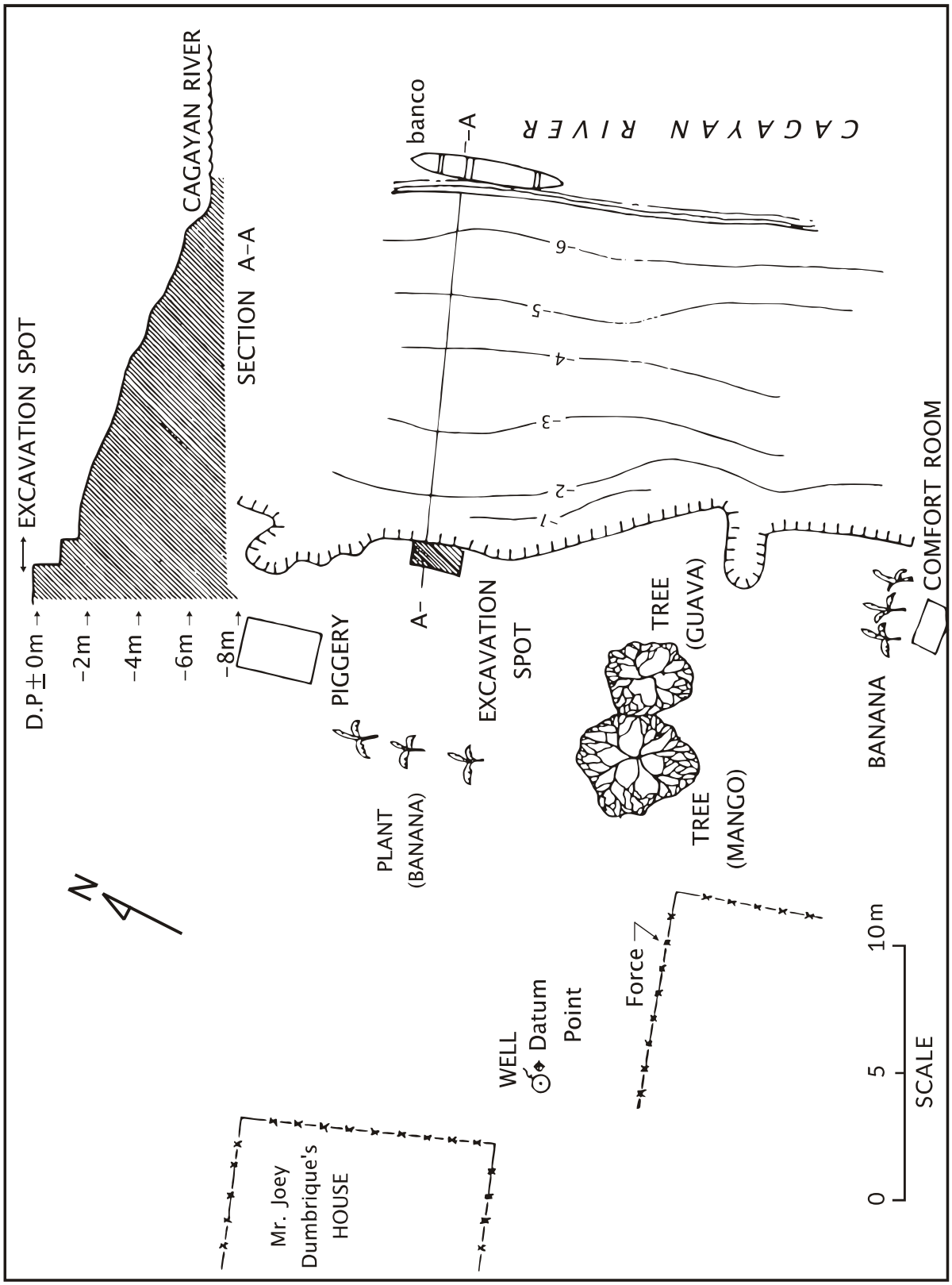

Fig. 3: Location of the excavated square of the Catugan shell midden site (from Tanaka1998a: Fig. 3)

3) Deposit and layers of the Catugan shell midden site

The deposit of the Catugan shell midden site is >3 m thick. It is divided into five layers: Layer I, blackish brown soil with a shell layer; Layer II, shell with blackish brown soil layer; Layer III, brown silt with shell layer; Layer IV, broken shell layer; and Layer V, clay layer (Fig. 4).

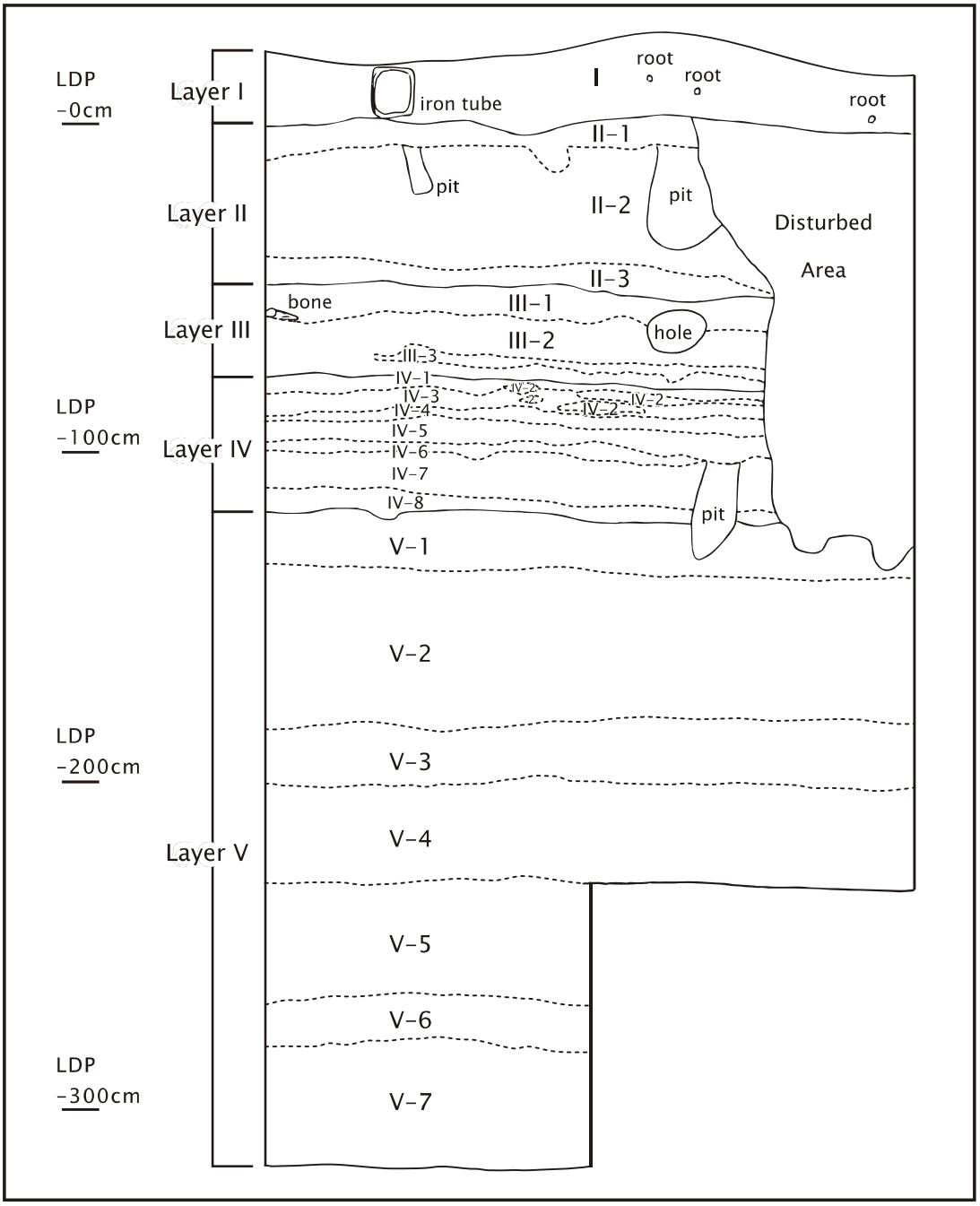

Fig. 4: Soil profile of the excavated square (west wall) of the Catugan shell midden site. (from Tanaka 1998a: Fig. 6)

4) C14 dates of the Catugan shell midden site

Three C14 dates were obtained from animal bone samples (Mihara et al. 2007). A sample from Layer III (-80-90 cm) was dated to 1725 ± 30 B.P. (NUTA2-7695). Another sample, also from Layer III (-90-100 cm), was dated to 1750 ± 30 B.P. (NUTA2-7696). A sample from Layer V (-170-180 cm) was dated to 2075 ± 30 B.P. (NUTA2-7697) (Mihara et al. 2007).

5) Excavated earthenware sherds of the Catugan shell midden site

In all, 540 artifacts were excavated from this site. Most of these artifacts are earthenware sherds. Here I review these artifacts by the layer in which they appeared.

5.1) Earthenware sherds from Layer II:

The earthenware sherds excavated from Layer II include brown and black pottery. The brown pottery is in the form of jars/pots and bowls. The brown jar/pot has a strongly restricted neck (Fig. 5-1). The lip of the brown bowl has a rounded tip (Fig. 6-1). The black pottery is in the form of jars/pots and bowls. The neck of the black jar is also restricted (Fig. 5-2), and the lips of the black bowls have a flattened tip (Fig. 6-2, -3).

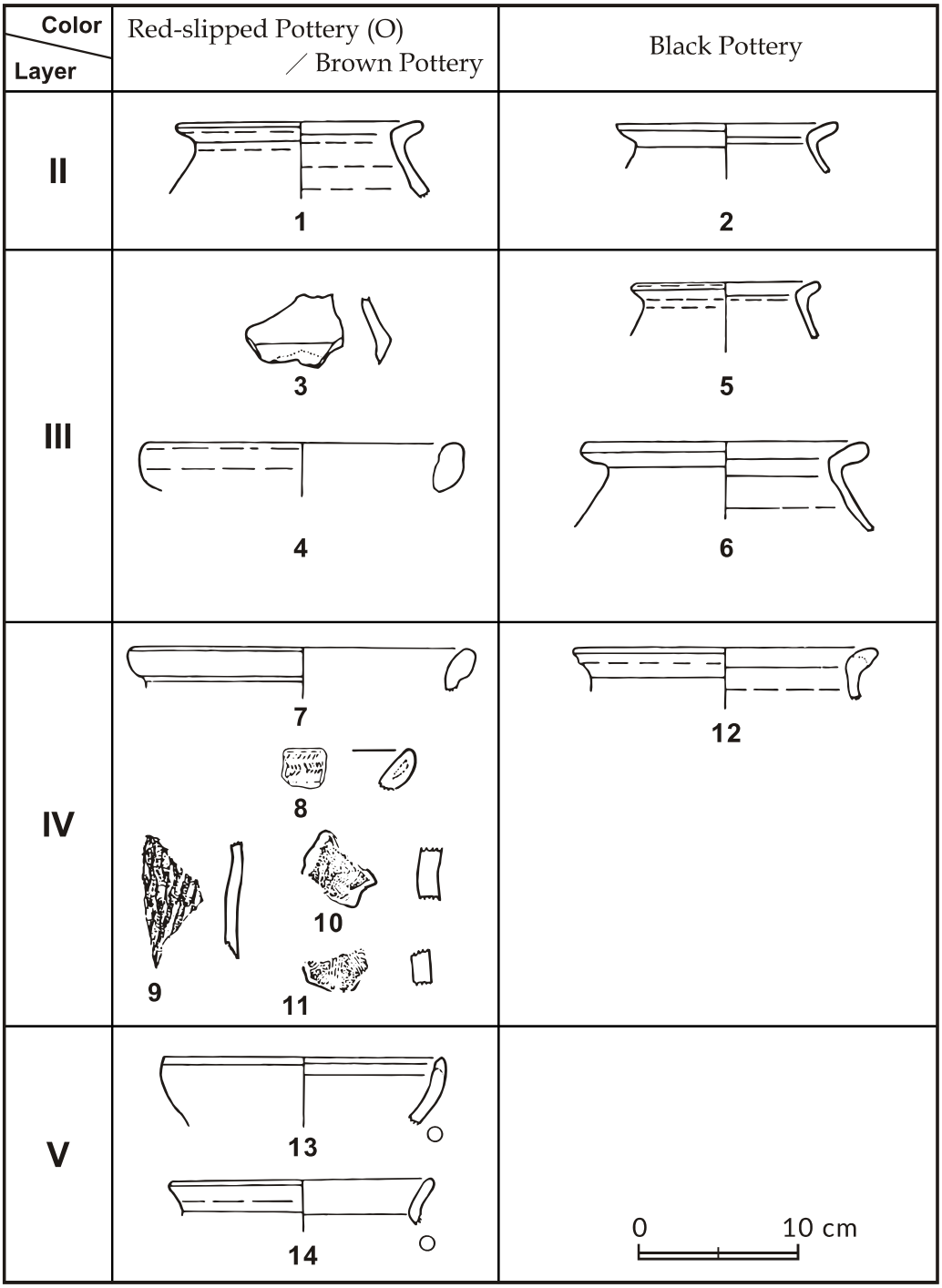

Fig. 5: Jars/pots from the Catugan shell midden site by layer. (from Tanaka 1999: Fig. 7).

5.2) Earthenware sherds from Layer III:

The earthenware sherds excavated from Layer III are also brown pottery and black pottery. The brown pottery is a jar/pot with a thickened rim (Fig. 5-4) and a jar/pot with a carinated body (Fig. 5-3). The black pottery is also in the form of jars/pots and bowls. The black jars/pots have a restricted neck (Fig. 5-5, -6). The black bowls have rims that are strongly bent outward (Fig. 6-4 to 6-6). They also have a small handle like a knob that attached to the outside of a bowl (Fig. 6-7). A sherd with a flat bottom, which may be a part of a bowl, was also found (Fig. 6-8).

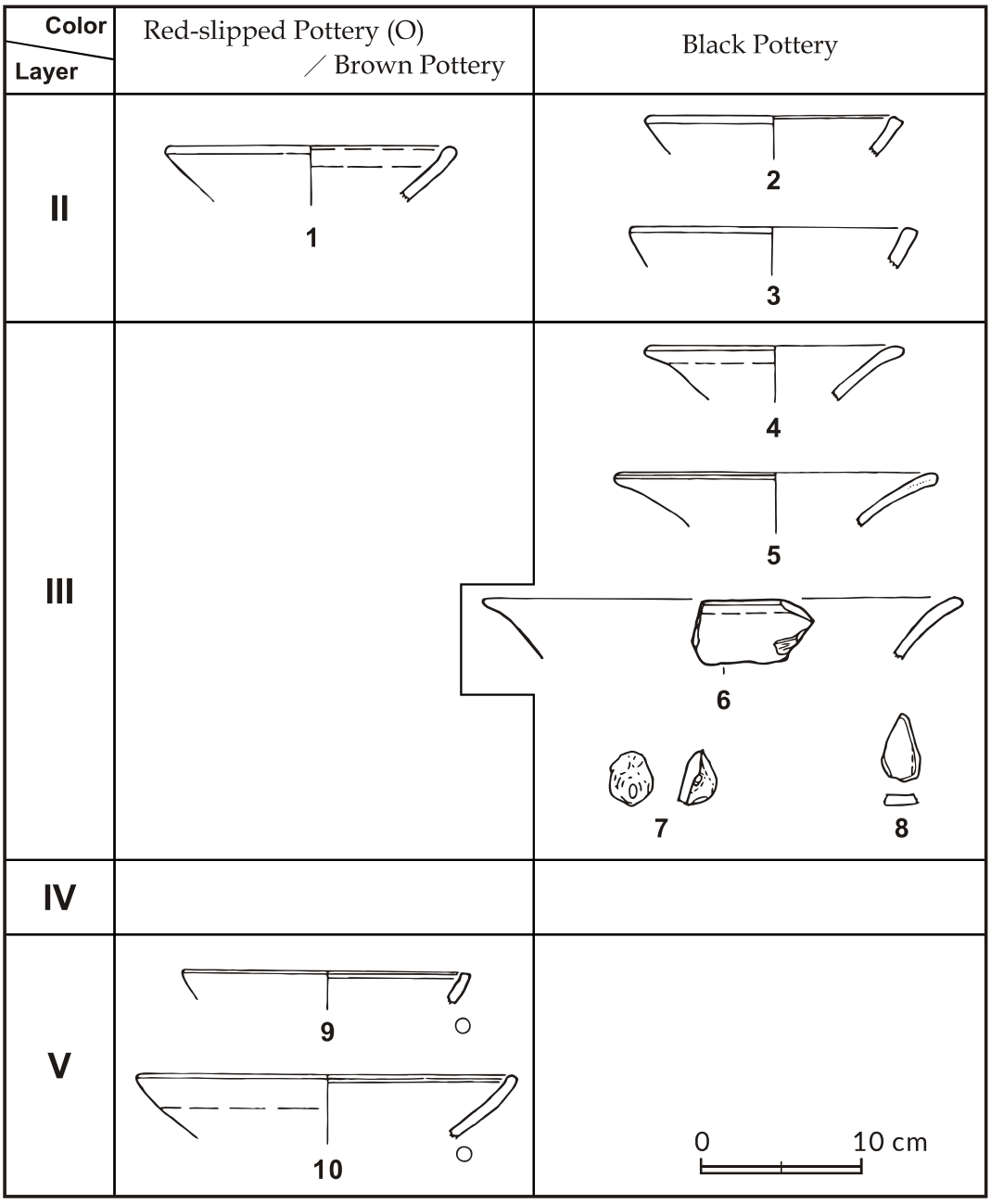

Fig. 6: Bowls/bowls with a ringfoot from the Catugan shell midden site by layer. (From Tanaka 1999: Fig. 8).

5.3) Earthenware sherds from Layer IV:

The earthenware sherds excavated from Layer IV are also brown and black pottery. The brown pottery is in the form of a plain jar/pot, a decorated jar/pot, and sherds of decorated bodies. The plain jar/pot has a thickened rim that is turned slightly outward (Fig. 5-7). The decorated jar/pot has an outwardly thickened rim whose inside is relatively flat and whose outside is decorated with three horizontal rows of short, slanting incisions. The directions of the slant of the incisions of each row differs. Those on the uppermost row slant down from the right to the left, those on the second row slant down from the left to the right, and those on third row slant down again from the right to the left (Fig. 5-8). A brown body sherd with paddle marks on the outer surface (Fig. 5-9) and brown body sherds with a comb-incised design similar to a running stream (Fig. 5-10, -11) were also found. The black jar/pot has an out-turned short rim whose central portion bulges out and has a pointed tip to its lip (Fig. 5-12).

5.4) Earthenware sherds from Layer V:

The earthenware sherds excavated from Layer V are all red-slipped pottery. They comprise jars/pots (Fig. 5-13, -14) and bowls (Fig. 6-9, -10). All of them are plain sherds. The plain, red-slipped pottery is in the form of jars/pots and bowls. Two types of red-slipped jars/pots were found. One has a restricted neck, an inwardly curved high rim, and a slanting flattened tip to its lip (Fig. 5-13). The other has a restricted neck, a low rim, and a rounded tip to its lip (Fig. 5-14). There are also two types of red-slipped bowls. Although both have a side that gradually narrows, one has a rim with a flattened tip to its lip (Fig. 6-9). The rim of the other one has a rounded tip to its lip (Fig. 6-10).

6) Transition in pottery from Layer V to Layer IV

As described above, a clear difference between the pottery found in Layers II to IV at Catugan shell midden site and that from Layer V is evident. Two main types of differences are seen in the pottery. The first concerns the difference in surface treatments. The pottery from Layer V has a red-slip. When applied to the surface of the pottery, the pottery turns red. The pottery from Layers II - IV shows carbon smudging or polishing. After the carbon is applied to the surface of the pottery, it turns black, and after polishing, the surface turns brown. The second difference relates to the forms of the main vessels, jars/pots and bowls. A jar/pot from Layer V has a high collar with a strong restriction, whereas a jar/pot from Layers II to IV has a low and outwardly thickening collar. A Layer V bowl has an inwardly turned rim, whereas a Layer III bowl has an outwardly turned rim and a flat bottom without a ringfoot. These two differences in surface treatment and form indicates a drastic change in the pottery-making tradition between the Layer

V period and the Layer IV period.

II. Comparison of red-slipped pottery from Layer V of the Catugan shell midden site to the pottery in each layer of the Magapit shell midden site

To establish the chronology of pottery types using the excavated remains of the Catugan shell midden site as a base, I sought out sites with similar pottery to the red-slipped pottery found in Layer V of the Catugan shell midden site. Among those sites where I led or participated in excavation, the most red-slipped pottery was found at the Magapit shell midden site. I compared the red-slipped pottery from Layer V of the Cagugan shell midden site with the pottery in each layer of the Magapit shell midden site, and found that the pottery from the upper part of Layer V is similar to that from Layer V of the Catugan shell midden site.

First, I review Magapit shell midden site research, excavated artifacts, and excavated pottery. Then, I present the results of the comparison between the pottery from the upper part of Layer V of the Magapit shell midden site and the pottery from Layer V of the Catugan shell midden site.

1) Location of the Magapit shell midden site

The Magapit shell midden site is situated on a limestone hill on the eastern side of the Cagayan River, approximately 30 km south of the river's mouth. The limestone hill, part of the Sierra Madre Mountain Range, which runs along the eastern side of northern Luzon, extends to the western side of the Cagayan River. The river cuts into the edge of the limestone hill, narrowing and meandering in this area (Fig. 7). Shell midden sites are spottedly distributed across 1 km from the north to the south of the western slope of this limestone hill on the eastern bank of the river. Five locations (Locations 1 -5) of shell midden sites at Magapit have been located (Ogawa and Aguilera 1992).

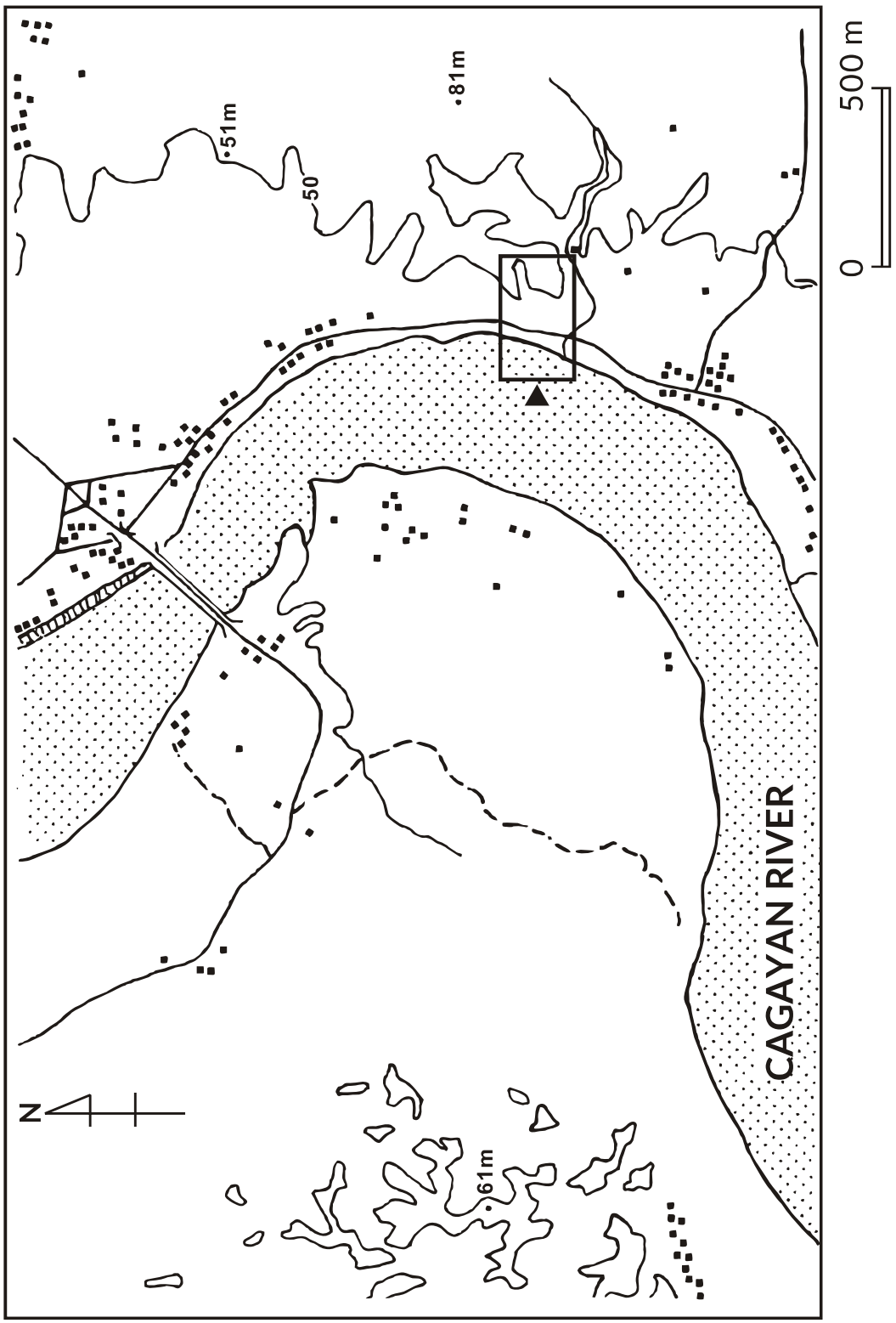

Fig. 7: Location of the Magapit shell midden site. (from Tanaka 2005: Fig. 2 upper)

Location 1 is the highest point upriver. A small stream called the Urgan creek gathers at the base of the limestone hill, and runs to the south of Location 1, finally discharging into the Cagayan River.

There are two ridges on the top of the hill, running from east to west. The western end of the northern ridge commands the Cagayan River, which runs to Lal-lo. The area between the two ridges resembles a small valley. The change in elevation between the top and the bottom of the ridge is approximately 10 m. A mound approximately 3 m high is found at the bottom of the valley (Fig. 8).

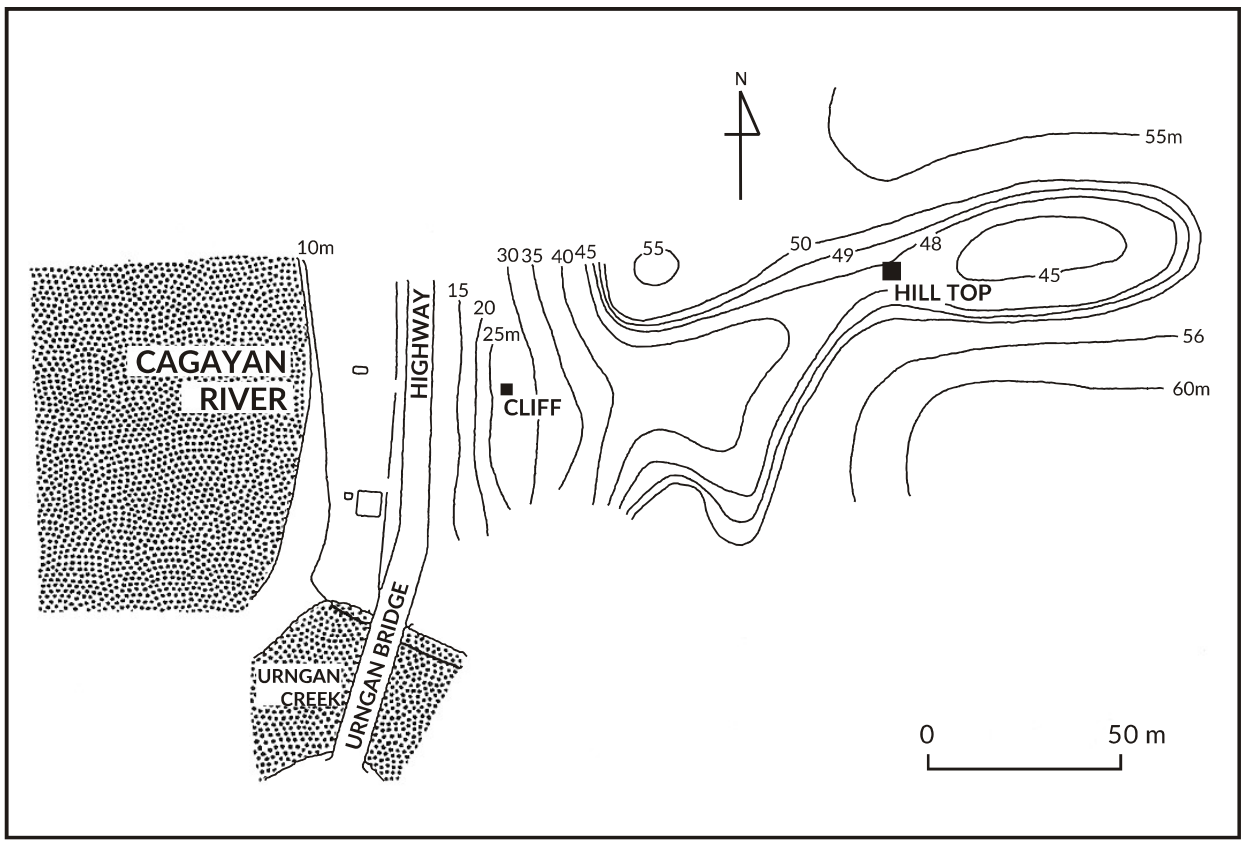

Fig. 8: Location of the excavated square of the Magapit shell midden site. (from Aoyagi et al. 1988: Fig. 8 partially amended).

2) Excavation of the Magapit shell midden site

The Magapit shell midden site was excavated from October to December 1987. It was conducted under the direction of Mr. Yoji Aoyagi, Professor of Sophia University in Japan. Mr. Melchor L. Aguilera Jr., Researcher of the National Museum, Mr. Hidefumi Ogawa, Graduate Student of Waseda University and Visiting Researcher of Ateneo de Manila University, and I, Graduate Student of Sophia University, also participated in this project.

An excavation square of 4 × 4 m was set up at the top of the mound between the northern and southern ridges at Location 1 (Fig. 8), at an elevation approximately 48 m above mean sea level. We planned to reduce the size of the square to 3 × 3 m at a depth of 1 m and to 2 × 2 m at a depth of 2 m. The vertical unit of the excavation, referred to as a spit, was 10 cm. Horizontally, the excavation square was divided into four quadrants, labeled A, B, C, and D. On the field, all of the soil that contained shells was sieved using a 6 mm mesh screen, and a 3 mm mesh screen was used for the pure shell layer, per spit and per quadrant. A report of the excavation was published in 1988 (Aoyagi et al. 1988), and a report on the excavated artifacts was published in 1991 (Aoyagi et al. 1991). In the report of the artifacts, most of the plain pottery was measured and drawn by me, except for the specimen shown in Fig. 11-10, which was measured and drawn by Mr. Hidefumi Ogawa. Most of the decorated pottery was measured and drawn by Mr. Hidefumi Ogawa, except for specimens shown in Figs. 12-25 and 55, which were measured and drawn by me.

3) Deposit and layers of the Magapit shell midden site

The thickness of the deposit of shells at the Magapit shell midden site was approximately 5 m and 60 cm (Fig. 9). The deposits at the site were divided into five main layers (Layers I to V) and two thin layers (Layers VI and VII). These layers are described as follows: Layer I, surface soil layer; Layer II, shells with a blackish-brown soil layer; Layer III, shells with a dark brown soil layer; Layer IV, broken shell with soil layer; and Layer V, pure shell layer. Two thin charcoal layers were identified in Layers IV and V. The deposit in Layer V was thick enough to be divided by the thin charcoal layer (Layer VII) into an upper part and a lower part at the center of Layer V, as a boundary.

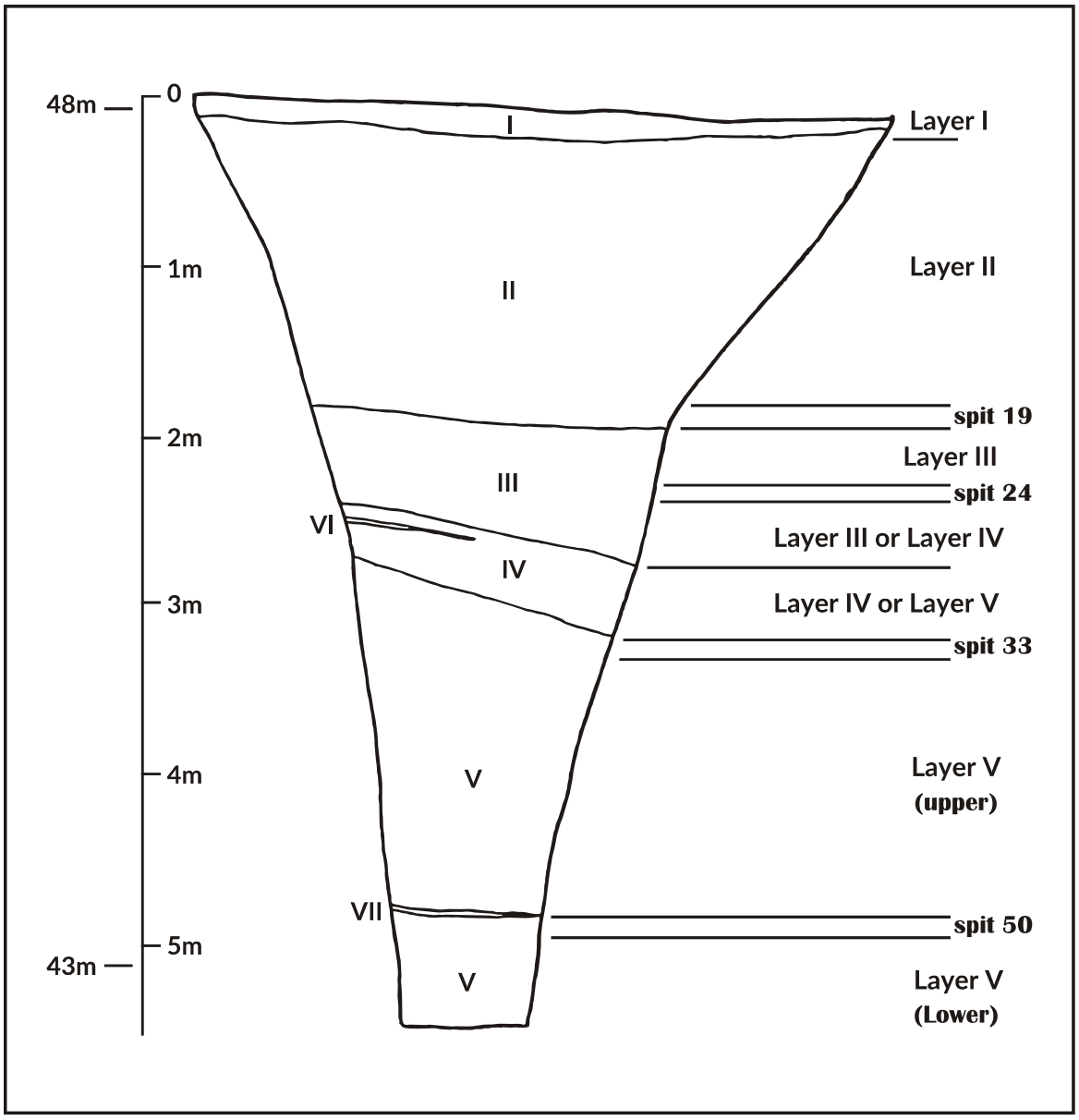

Fig. 9: Soil profile of the excavated square (east wall) of the Magapit shell midden site. (from Aoyagi et al. 1988: Fig. 9 partially amended).

4) C14 dates of the Magapit shell midden site

Two C14 dates were obtained from the charcoal samples at Layer II (Spit 9) and Layer III (Spit 20). The sample from Layer II (Spit 9) was dated to 2800 ± 140 B.P. (N-5396). The sample from Layer III (Spit 20) was dated to 2760 ± 125 B.P. (N-5397) (Aoyagi et al. 1991).

5) Artifacts of the Magapit shell midden site

The artifacts excavated at this site comprised earthenware sherds, stone tools, stone ornaments, clay ornaments, and bone objects. The stone tools included 23 quadrangular polished stone adzes, two polished stone chisels, four flakes and one grinding stone, also used as a hammer stone. Most of the quadrangular polished stone adzes and chisels were broken. The stone ornaments included two stone beads and one stone earring. There were five clay ornaments with perforation and 13 without. The three bone objects were probably parts of ornaments.

6) Pottery of the Magapit shell midden site

More than 20,000 earthenware shreds were excavated at the Magapit shell midden site. Although many decorated sherds were also found, especially in the upper part of the deposit, I focus mainly on plain pottery to compare it with the pottery found from Layer V of the Catugan shell midden site. First, I review the plain pottery by layer.

6.1) Plain pottery from Layer II

The plain pottery from Layer II is in the form of red-slipped jars/pots (Fig. 10-1, -2, 10-8 to 10-10) and red-slipped bowls (Fig. 11-2 to 11-4, 11-10). Some red-slipped jars/pots have restricted necks (Fig. 10-1, -2) and gradually outwardly bulging bodies under the rim (Fig. 10-8 to 10-10). The jars/pots have a straight outline on the inside and a slightly thickened outline on the outside (Fig. 10-1, -2). The sherd shown in Fig. 10-1 has carinations at the center of its body.

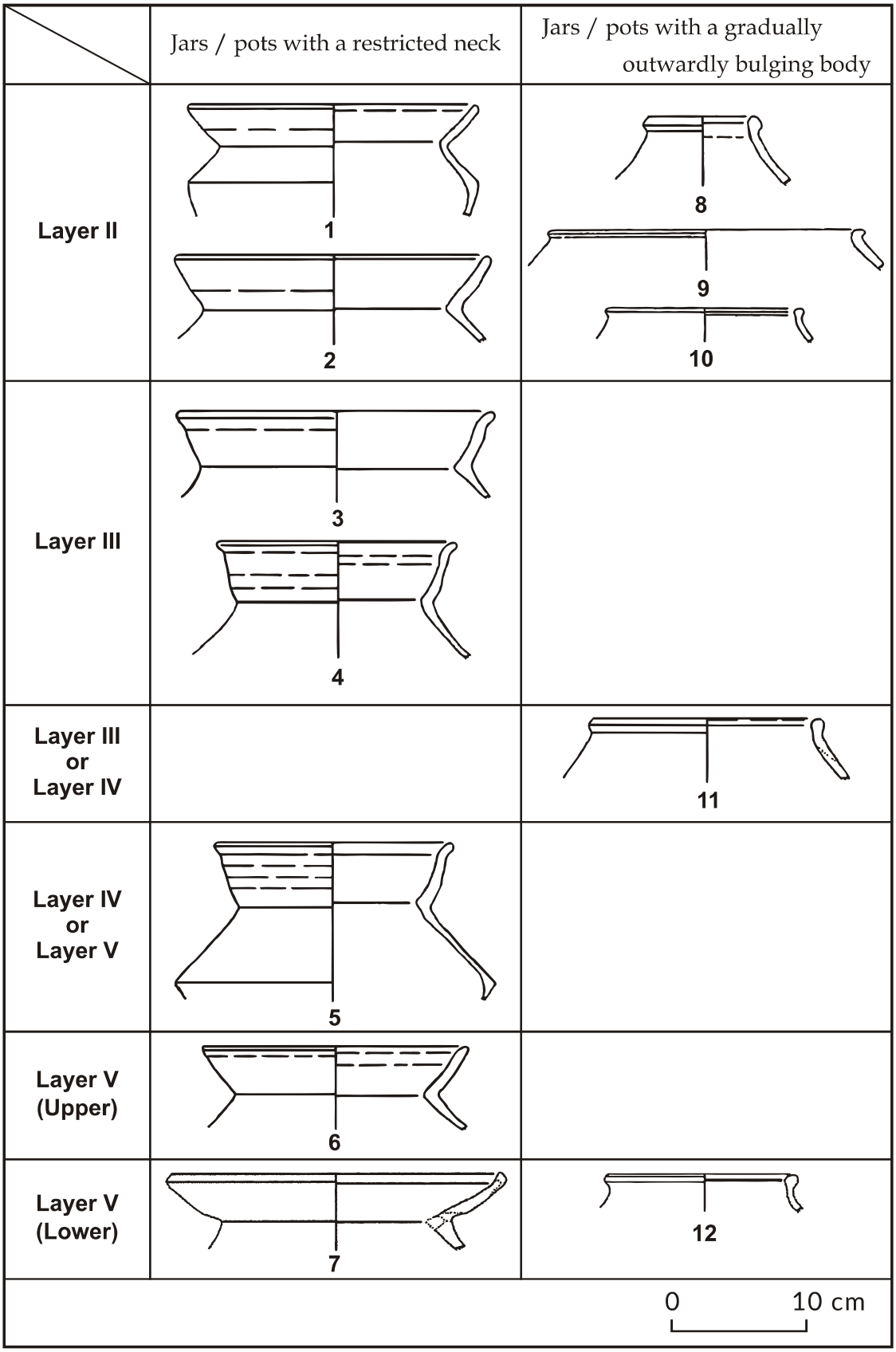

Fig. 10: Red-slipped jars/pots from the Magapit shell midden site by layer (1-12; from Aoyagi et al. 1991: Figs. 1-5, 8-9).

The red-slipped bowls from Layer II are either shallow (Fig. 11-2 to 11-4) or deep (Fig. 11-10). Some shallow bowls have outwardly thickened lips (Fig. 11-2, -3) and one does not (Fig. 11-4). The latter is deeper than the former and also has a rounded tip to its rim.

6.2) Plain pottery from Layer III

The plain pottery from Layer III is in the form of red-slipped jars/pots (Fig. 10-3, -4) and red-slipped bowls (Fig. 11-5, 11-11 to 11-13). Two red-slipped jars/pots have restricted necks and tall rims. Both also have inwardly curved outlines on the insides of the rims and a slightly out-turned tip to the lip. This could be intended to secure a covering.

The red-slipped bowls include both shallow (Fig. 11-5) and deep (Fig. 11-11 to 11-13) bowls. The shallow bowls have a depressed outline and a rounded tip to the rim (Fig. 11-5). The deep ones have a slightly inwardly turned tip of the lip and an inwardly curved upper portion of the body (Fig. 11-11 to 11-13).

6.3) Plain pottery from Layers IV or V[4]

The plain pottery from Layers IV or V is in the form of a red-slipped jar/pot (Fig. 10-5). It has a restricted neck, a tall rim, and an inwardly curved outline of the inside of the rim. It also features a slightly out-turned tip of the lip, which may function to hold on a cover. This lip shape is similar to that of the jar/pot excavated from Layer III. It has also a carination at the center of its body.

[4] The spit system was adopted for the excavation of the Magapit shell midden site. A spit is a unit of excavation of 10 cm. The excavated layer of the retrieved artifact was determined after checking the correspondence between spit and layer. Because Layer IV was inclined from north to south, it is difficult to determine the precise layers where artifacts were found based on their stratigraphic profile. For this reason, some objects are labeled as belonging to Layer IV or Layer V.

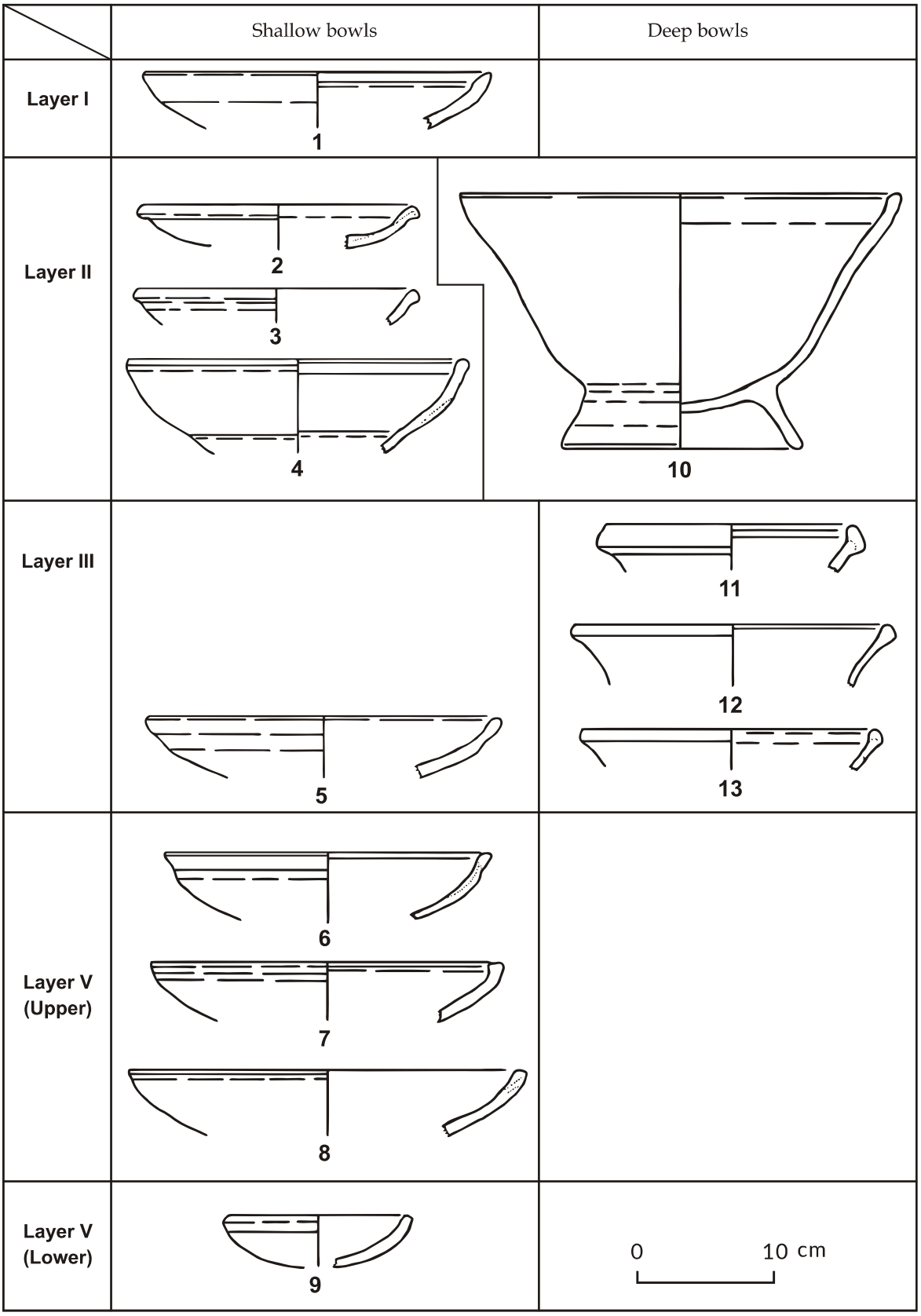

Fig. 11: Red-slipped bowls/bowls with a ringfoot from the Magapit shell midden site by layer. (1-13; from Aoyagi et al. 1991: Figs. 19-21).

6.4) Plain pottery from the upper part of Layer V

The plain pottery from the upper part of Layer V is in the form of a red-slipped jar/pot (Fig. 10-6) and red-slipped bowls (Fig. 11-6 to 11-8). The jar/pot (Fig. 10-6) has a restricted neck and a flattened inside of the tip of the rim, which may be for a cover.

The bowls are all shallow (Fig. 11-6 to 11-8). The bowls exhibit differences in lip form. They feature a flattened, slanting tip to the lip with a depressed outline for the rim (Fig. 11-6), a flattened, slightly slanting tip of the lip with a slightly depressed outline of the rim (Fig. 11-7), and a rounded tip of the lip (Fig. 11-8).

6.5) Plain pottery from the lower part of Layer V

The plain pottery from the lower part of Layer V is in the form of red-slipped jars/pots (Fig. 10-7, -12) and a red-slipped bowl (Fig. 11-9). One jar/pot has a restricted neck (Fig. 10-7) and another has a gradually bulging body under the rim (Fig. 10-12). The former has a slightly more restricted neck than those of jars/pots found at other layers. The tip of the lip of this jar/pot is thickened inward, with a slightly depressed portion underneath the tip of the lip. This may be for securing a cover. The bowl has a rounded tip to its lip and a slightly depressed portion at the outside of the lip (Fig. 11-9). The diameter of the rim is approximately 14 cm. This bowl is smaller than the bowls excavated from other layers.

6.6) Decorated pottery from Layer II

Here I review the decorated pottery from the Magapit shell midden site, as represented in Layer II. This pottery is largely divided into two groups: red-slipped and black decorated pottery. The red-slipped pottery is further divided into four groups based on the type of vessel, decorated jars/pots, probable parts of decorated jars/pots, decorated bowls, and probable parts of decorated bowls. The decorated jars/pots are further divided into two groups based on their form: a decorated jar/pot with a strongly restricted neck and decorated jars/pots with a slightly restricted neck or straight neck. One sherd of a decorated jar/pot with a strongly restricted neck features a row of impressed circles along and above the restriction on the inside of the sherd (Fig. 12-1). The decorated jars/pots with a slightly restricted neck are further subdivided into those with a decorated, relatively flat top of the lip (Fig. 12-2 to 12-5) and those with a horizontal applique at the neck on the outside (Fig. 12-6 to 12-8). The decorations on jars/pots with a slightly restricted neck and relatively flat top of the lip include: one row of impressed dots (Fig. 12-2), two rows of impressed

dots (Fig. 12-3), rows of dots with a comb impression (Fig. 12-4), and continuous triangles with an incised line (Fig. 12-5).

The decorated jars/pots feature decorated carinated parts (Fig. 12-33 to 12-38). The decoration patterns of those sherds include the following: one row of dots above and below a carination (Fig. 12-33); one row of an incised line, one row of dots above a carination, and one row of dots below a carination (Fig. 12-36); continuous triangles with impressed dots inside of the triangles above a carination and a row of dots below a carination (Fig. 12-34); a row of impressed dots above a wavy line of impressed dots above a carination, along with a row of impressed dots below a carination, and double wavy lines of impressed dots with a row of impressed dots inbetween the two wavy lines (Fig. 12-35); and vertical short rows of dots impressed by a comb tool and bordered by horizontal incised lines both above and below a carination (Fig. 12-37, -38).

Decorated bowls are divided into two groups: shallow bowls with an inwardly curving body (Fig. 12-9 to 12-24, 12-28, -29) and deep bowls with a slightly inward-curving body (Fig. 12-25 to 12-27, 12-30 to 12-32). Shallow bowls with an inwardly curving body are further divided into five groups based on the form of the rim. These include: shallow bowls with an inwardly-thickened, slanting lip (Fig. 12-11 to 12-13, 12-15 to 12-20, 12-23), a shallow bowl with a rounded tip to the lip (Fig. 12-9), shallow bowls with a flat tip to the lip (Fig. 12-10, -14, -21), shallow bowls with an outwardly slanting lip (Fig. 12-22, -28), and a shallow bowl with a bent lip (Fig. 12-29).

The decorations on shallow bowls with an inwardly thickened slanting lip comprised continuous chevrons of one incised line (Fig. 12-23), continuous chevrons of a row of impressed dots (Fig. 12-11), one continuously pressured incised line (Fig. 12-13), continuous chevrons of one continuously pressured incised line (Fig. 12-16), one straight line and continuous chevrons of one continuously pressured incised line (Fig. 12-17), continuous chevrons of one continuously pressured incised line with many dots impressed inside of chevrons on the inside and one dot impressed in the center of each chevron on the outer side (Fig. 12-20), two continuously pressured incised wavy lines (Fig. 12-15), two rows of impressed dots (Fig. 12-12), and three continuous lines (Fig. 12-19).

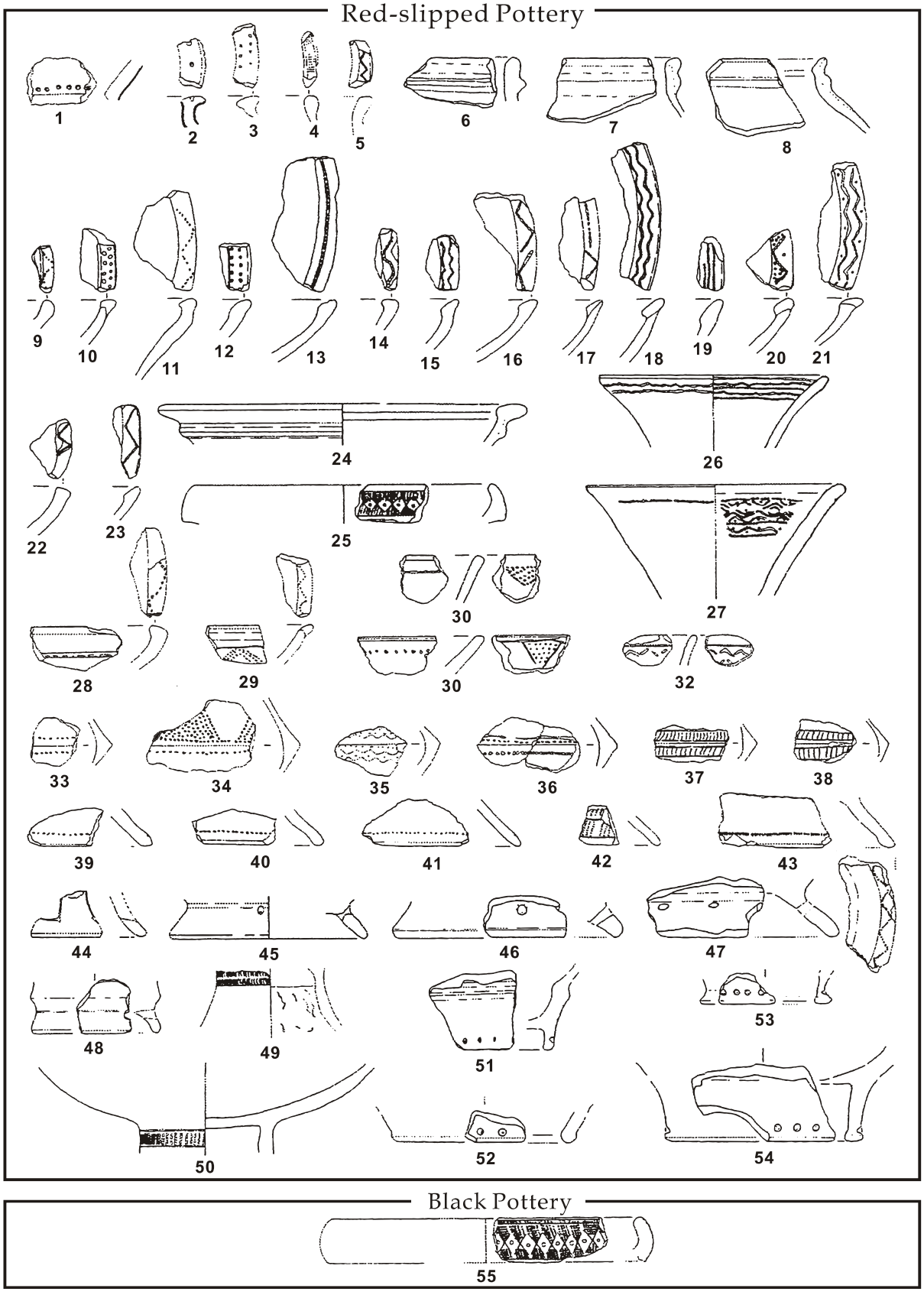

Fig. 12: Decorated pottery from Layer II of the Magapit shell midden site. (1-55; from Aoyagi et al. 1991: Figs. 9-12, 16-18, 22-24, 26).

The decoration of the shallow bowl with a rounded tip of the lip includes continuous chevrons of impressed dots (Fig. 12-9). The decorations of the shallow bowls with the flat tip to the lip include one continuous pressured incised line (Fig. 12-14), two rows of impressed dots (Fig. 12-10), and two continuous chevrons of continuously pressured incised lines with impressed dots that were executed at the center of each chevron on both the inside and the outside (Fig. 12-21).

The decorations of the shallow bowls with a flat top to the lip that slants toward the outside include continuous chevrons of a pressured incised line (Fig. 12-22) and continuous chevrons of impressed dots on both the flat top to the lip, and a horizontal pressured line (Fig. 12-28). The decoration of the shallow bowl with a bent rim includes continuous chevrons of impressed dots on the inside of the bent rim and chevrons of three rows of impressed dots below the bend on the outside (Fig. 12-29).

The deep bowls are divided into two groups based on their form: one sherd with a strongly curved rim and a body that gradually becomes narrower (Fig. 12-25) and five sherds with a slightly inward-turned or straight body that gradually becomes narrower (Fig. 12-26, -27, 12-30 to 12-32).

The bowl decorations for the strongly curved rim (Fig. 12-25) is executed at the outside of the rim. Incised horizontal lines were executed at both the upper and the lower parts of the rim. A continuous diamond pattern was executed by incised lines that make a repeated X form. A small circle is impressed using a bamboo tool at the center of each diamond pattern. A set of vertical or slightly slanting rows of dots are impressed by a comb tool in the area between the continuous diamond patterns and the horizontal incised lines.

Five sherds with a slightly inward-curving or straight body that gradually becomes narrower have five kinds of decoration. The first sherd (Fig. 12-26) is decorated with two horizontal, wavy pressured lines on the outside of the rim and four horizontal, wavy pressured incised lines on the inside of the rim. Lime is embedded in the depression of all of the lines (Fig. 12-26). The second sherd (Fig. 12-27) is decorated both on the outside and on the inside of the rim. The outside rim decoration is one horizontal pressured line. The inside rim decoration comprises two decorative bands. The upper band is bordered with a horizontal pressured line on both the upper and lower parts. Discontinuous diamond patterns are added with a pressured line at the central part of the band. Discontinuous chevrons created by a pressured line are drawn in the space between the upper border line and the discontinuous diamond patterns. A dot is also impressed at the center of each space. Double wavy pressured lines are also drawn in the space between the lower border of the band and the discontinuous diamond patterns, with a dot impressed at the center of each space. The lower

band of the decoration is bordered with horizontal pressured lines; the upper border of the lower band of decoration is shared with the lower border of the upper band of decoration. A horizontal, wavy pressured line is drawn through the center of the lower band of decoration. A dot is impressed at the center of the space between both the upper and lower border lines and the horizontal wavy pressured line. Lime is embedded in the depression of all lines and impressions.

The third sherd (Fig. 12-30) features one horizontal pressured line on the outside of the rim and a triangle composed of only impressed dots on the inside of the rim. The fourth sherd (Fig. 12-31) has one horizontal row of impressed dots on the outside of the rim, and a triangle that is drawn with a horizontal pressured line and the triangle's interior filled with impressed dots on the inside of the rim. The fifth sherd (Fig. 12-32) has a horizontal incised line and discontinuous chevrons drawn with an incised line below the horizontal line on the outside of the rim. On the inside of the rim, it has also a horizontal incised line and double discontinuous chevrons drawn with incised lines.

The ringfeet which were originally attached to the shallow bowls are the following sherds (Fig. 12-39 to 12-54). These can be divided into three groups: ringfeet with decorations (Fig. 12-39 to 12-43, 12-49 to 12-54), a ringfoot with a cutout, and ringfeet with perforations. The ringfeet with decorations can be further divided into three categories by their form: ringfeet that open from the root to the tip, a ringfoot whose outline goes down straight from the root to the tip, despite a portion of the tip being broken (Fig. 12-50), and ringfeet that become narrower from the root to the tip (Fig. 12-51 to 12-54). The first category of decorated ringfeet that open from the root to the tip have two locations for decoration: ringfeet with decoration near the tip of the ringfoot and ringfeet with a decoration near the root of the ringfoot (Fig. 12-50). Decorations located near the tip of the ringfoot comprise either a horizontal row of impressed dots on the outside of the ringfoot (Fig. 12-39 to 12-41), a horizontal row of impressed dots on the outside of the ringfoot and continuous chevrons of impressed dots on the thickened lip on the inside of the ringfoot (Fig. 12-43), or two bands of decoration bordered by incised lines on the outside of the ringfoot. In the last case, each band has a decoration of slightly slanting, vertical rows of three impressed dots from a comb tool (Fig. 12-42). Decorations located near the root of the ringfoot is only found in one sherd (Fig. 12-49). It is decorated by two horizontal rows of continuous nail-like impressions, probably made by a split bamboo tool near the root on the outside of the ringfoot. The second category of decorated ringfeet, those whose outline goes down straight from the root to the tip, is represented by one sherd (Fig. 12-50). Its decoration comprises a band made of vertical rows of impressed dots from a comb tool near the root of the ringfoot, on the outside. The third category of decorated ringfeet, those that become narrower from the root to the tip, is represented by four sherds (Fig. 12- 51 to 12-54). Although the form of the tips vary, all four have a

row of relatively deep impressed circles along the tip of the ringfoot. Moving from decorated ringfeet to the second grouping of ringfeet with a cutout is represented by only one specimen (Fig. 12-44), and it is a small, broken fragment. Although the overall form of the cutout is unknown, it has one side that is almost parallel to the tip of the ringfoot, and the other side meets it almost at a right angle to the first side. The third grouping of ringfeet with a perforation is represented by four specimens (Fig. 12-45 to 12-48). All four have a perforation at the root of the ringfoot, and their form opens from the root to the tip.

Decorated black pottery from Layer II of the Magapit shell midden site (Fig. 12-55) has a similar form and decoration to that of the red-slipped decorated pottery shown in Fig. 12-25. It also has a strongly curved rim and a body that gradually becomes narrower. The decoration of the black pottery is executed on the outside of the rim. Two horizontal lines are incised at the upper part of the rim, and one horizontal line is incised at the lower part of the rim. Continuous diamond patterns are executed by incised lines at the center of the band defined by the two horizontally incised lines. A small circle is impressed with a bamboo tool at the center of each diamond pattern. The slightly slanting, vertical rows of dots are impressed with a comb tool in the area between the continuous diamond patterns (Fig. 12-55).

7) Comparison between the pottery excavated from Layer V of the Catugan shell midden site and the pottery excavated from the upper part of Layer V of the Magapit shell midden site

As described above, plain red-slipped bowls and jars/pots were excavated from Layer V of the Catugan shell midden site. Two forms exist for the lip of the red- slipped bowls. One has a flattened top (Fig. 13-4), and the other has a rounded top (Fig. 13-5). I looked for similarly shaped bowls in the excavated pottery from each layer of the Magapit shell midden site and found them among the bowls excavated from the upper part of Layer V. These are bowls with a flattened top to the lip (Fig. 13-1, -2) and a bowl with a rounded tip to the lip (Fig. 13-3). Among the jars/pots, a jar/pot with a restricted neck was excavated from Layer V of the Catugan shell midden site. Although the degree of the bend at the neck differs, another jar/pot with a restricted neck was also excavated from the upper part of Layer V of the Magapit shell midden site (Fig. 10-6).

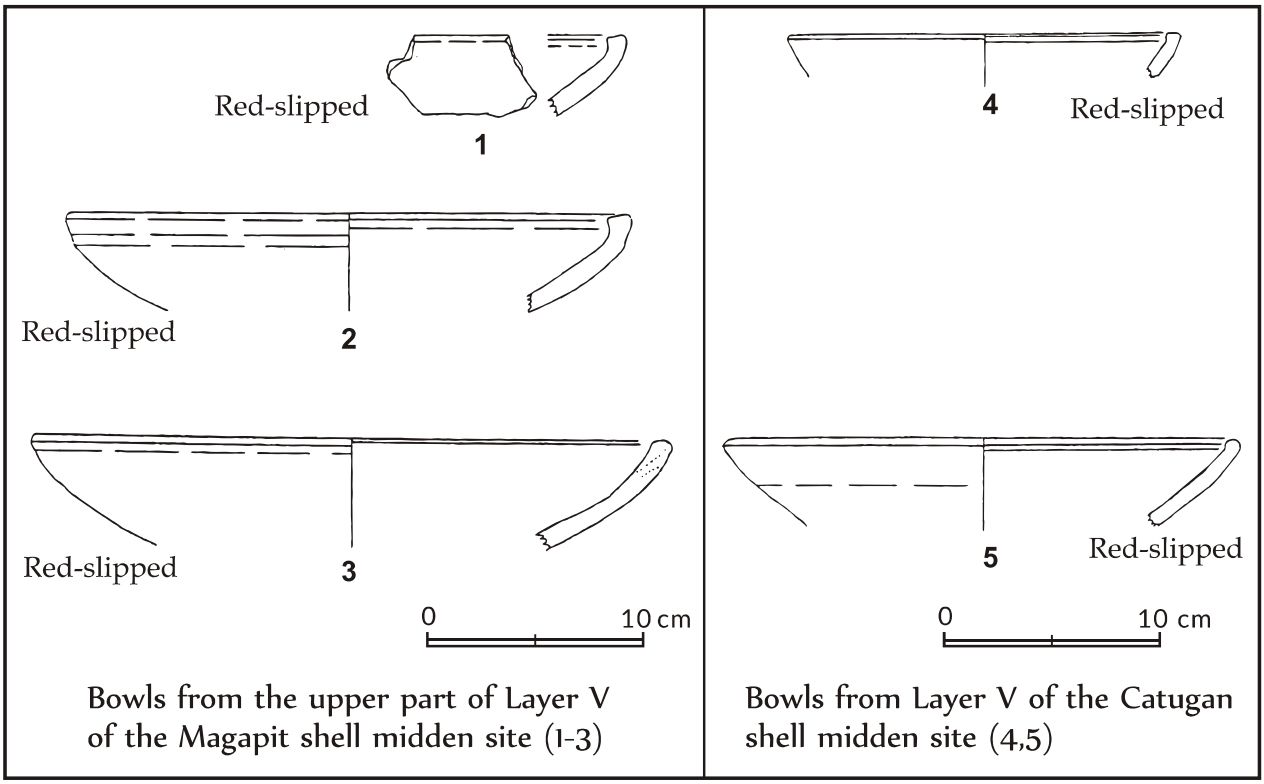

Fig. 13: Comparison between bowls from the upper part of Layer V of the Magapit shell midden site and that from Layer V of the Cagugan shell midden site. (1-3; from Aoyagi et al. 1991: Figs. 21; 4,5. Tanaka 1998a: Fig. 14).

III. Similar black and brown pottery—Comparative study of the pottery from Layer IV of the Catugan shell midden site and the pottery from the layers of the Bangag I shell midden site

As described above, Layer V of the Catugan shell midden site yielded similar pottery to that in the upper part of Layer V of the Magapit shell midden site. The next task was to find pottery comparable to that found in Layer IV of the Catugan shell midden site. Among sites with black and brown pottery, I chose the Bangag I shell midden site, one of my former excavations. First, I compared the pottery of Layer IV of the Catugan shell midden site with each pottery element of the Bangag I shell midden site by layer. Eventually, it was found that the pottery from Layer IV of the Catugan shell midden site was similar to that from Layer XI of the Bangag I shell midden site. Below, I review the excavation of the Bangag I shell midden site and the excavated pottery by layer. Then, I compare the pottery from Layer IV of the Catugan shell midden site with that from Layer XI of the Bangag I shell midden site.

1) Location and the shape of the Bangag I shell midden site

This shell midden site is found on a flood plain located on the bank of the Cagayan River opposite the Magapit shell midden site (Fig. 1). From the top view, the site looks like a deformed trapezoid (Fig. 14). The lengths of the four sides are as follows: 112 m, top; 147 m, bottom; 141 m, west; and 90 m, east.

2) Excavation of the Bangag I shell midden site

The destruction of this shell midden was in progress during 1996 to use the shells as adulterants in feed for chickens to harden their eggshells. Archaeological excavation was urgently needed before the site would be totally destroyed. Only a small portion of the highest part of the mound of shells remained at the beginning of the excavation in 1996. The size of this remaining portion is approximately 14.3 m long from north to south and 3 to 4 m wide from east to west. We set up an excavation square of 1.5 m × 1.5 m on the eastern side of the remaining portion (Fig. 14). The excavation[5] was conducted by my colleagues and me from August 31 to September 12 in 1996. The report of the excavation was published in 1999 (Tanaka 1999).

[5] I conducted the excavation the Bangag I shell midden site in 1996 as a part of international scientific research financially supported by a fund from the Ministry of Education, Science, Sports and Culture in Japan (No. 07041006) through Prof. Hidefumi Ogawa, Associate Professor of Tokyo University for Foreign Studies.

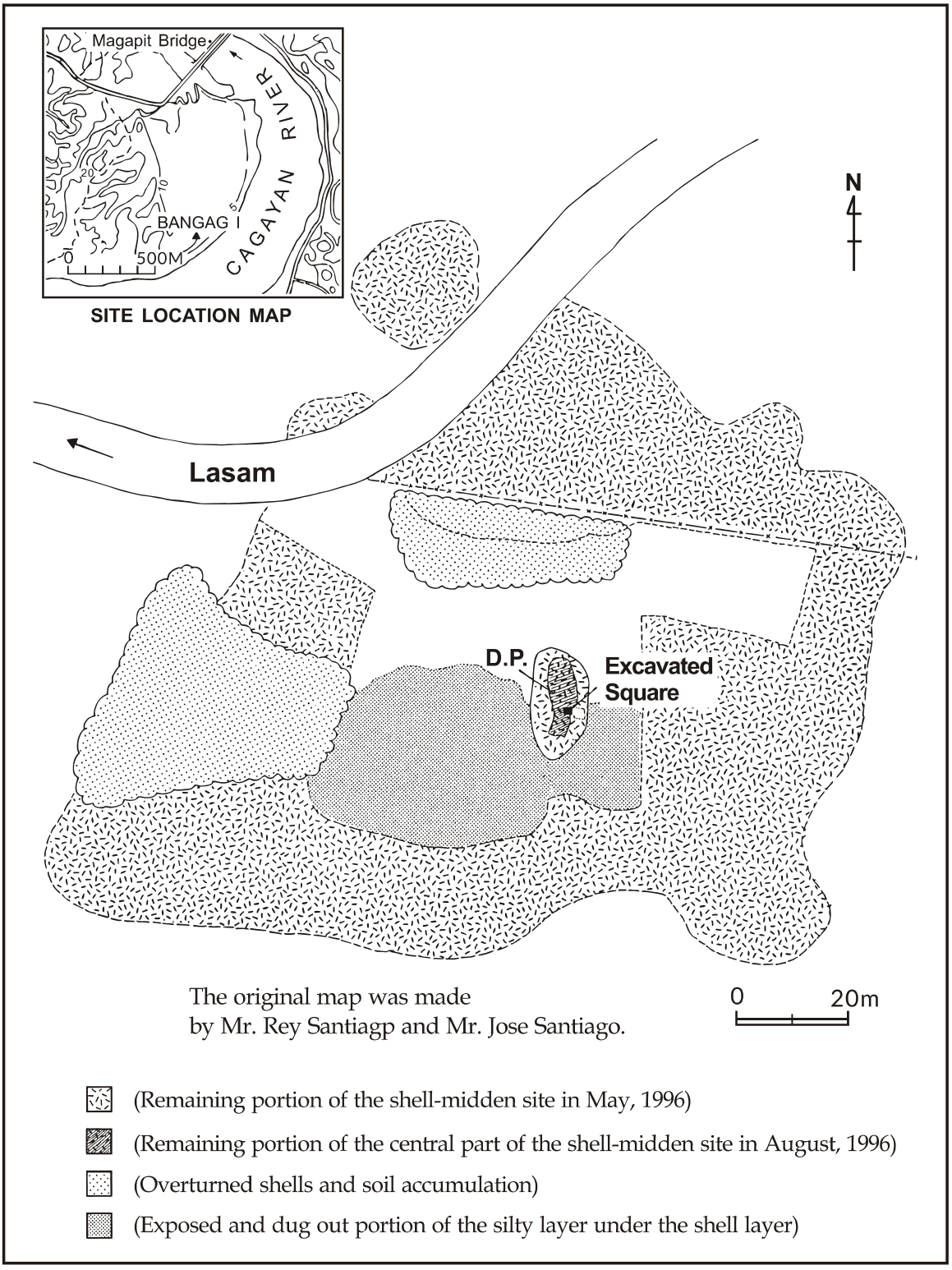

Fig. 14: Location of the Bangag I shell midden site and the excavated square. (from Tanaka 1999 Fig. 3).

3) Deposit and layers of the Bangag I shell midden site

The description of the site layers is as follows: Layer I, black soil with shell layer (surface soil); Layer II-①, shell with black soil layer; Layer II-②, pure shell layer; Layer II-③, broken shell with black soil layer; Layer II-④, broken shell with black soil layer; Layer II-⑤, shell with black soil layer; Layer III, pure shell layer; Layer IV, broken shells with black soil layer; Layer V, pure soil layer; Layer VI, black soil with shell layer; Layer VII, broken shell with yellowish brown silt layer; Layer VIII, dark brown soil with shell layer; Layer IX, shell with brown soil layer; Layer X-①, broken shell with black soil layer; Layer X-②, broken shell with black soil layer; Layer X-③, broken shell with charcoal layer; Layer X-④, charcoal layer; Layer X-⑤, broken shell with soil layer; Layer X-⑥, broken shell with black soil layer; Layer XI, shell with dark yellowish brown silt layer; and Layer XII, dark yellowish brown silt layer (Fig. 15).

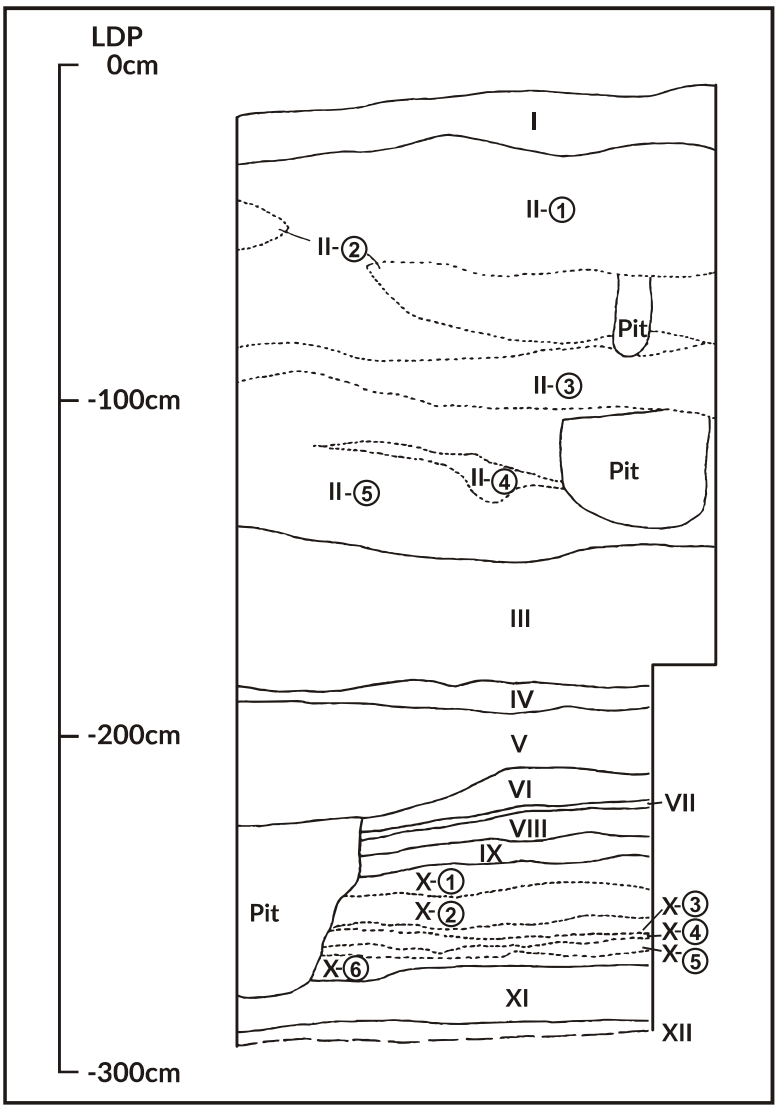

Fig. 15: Soil profile of the excavated square (north wall) of the Bangag I shell midden site. (from Tanaka 1999: Fig. 4).

4) C14 dates for the Bangag I shell midden site

Five C14 dates were determined from the animal bone samples. The sample from Layer II (-70 to -90 cm) was dated to 1750 ± 30 B.P. (NUTA2-7703). The sample from Layer VI (-210 to -220 cm) was dated to 1915 ± 30 B.P. (NUTA2-7704). The sample from Layer VIII (-222 to -227 cm) was dated to 1840 ± 30 B.P. (NUTA2-7705). The sample from Layer X (-255 to -265 cm) was dated to 2040 ± 40 B.P. (NUTA2-7706). The sample from Layer XI (-270 to -280 cm) was dated to 1965 ± 40 B.P. (NUTA2-7707) (Mihara et al. 2007).

5) Excavated artifacts from the Bangag I shell midden site

Aside from the earthenware sherds, an iron fragment, iron slag and glass beads were excavated in this shell midden site. The only iron fragment was excavated in Layer VI, attached to the inside of a black pottery bowl. One piece of iron slag was excavated in Layer II, and 82 glass beads were excavated in Layer II. One glass bead was excavated in Layer III.

6) Earthenware of the Bangag I shell midden site

From Bangag I, 3,800 pottery sherds were excavated. These are in the form of jars and/pots, bowls, covers, and feet. I focused on only plain jars and jars with a herringbone design made of short incisions to compare them with the sherds excavated from Layer IV of the Catugan shell midden site. Among the plain jars/pots, I focused only on those excavated from Layers II, VI and XI.

6.1) Plain jars/pots of the Bangag I site

The plain jars/pots excavated from Layer II included red-slipped pottery and black pottery. Both types of pottery have restricted necks and short rims. The red-slipped pottery does not have thickened rims (Fig. 16-1). The black pottery includes both rims that thicken outward (Fig. 16-2 to 16- 4) and rims that do not thicken (Fig. 16-5).

The sherds excavated from Layer VI are of brown and black pottery. The brown pottery is a jar/pot with a restricted neck and a low and almost straight rim (Fig. 16-6). The black pottery also has a restricted neck and low rim, but can be divided into two groups: jars/pots with an outwardly thickened rim (Fig. 16-7, -8) and jars /pots without thickened rim (Fig. 16-9, - 10).

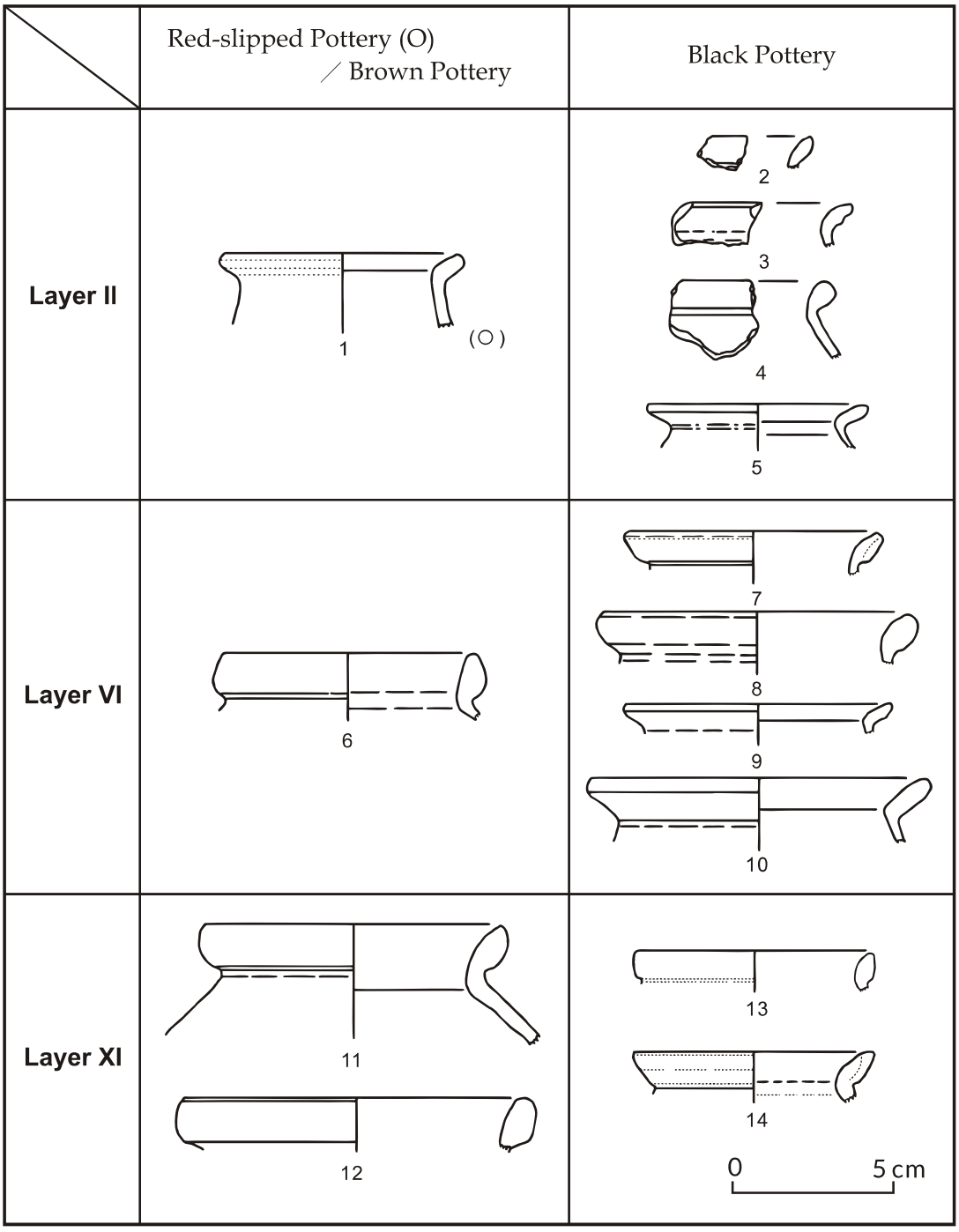

Fig. 16: Plain jars/pots from the Bangag I shell midden site.

The sherds excavated from Layer XI are of brown and black pottery. The brown pottery is from a jar with a restricted neck, an outwardly thickened rim, and a pointed tip to the lip (Fig. 16-11) and another jar/pot with a flattened tip to the lip and a rim profile that has a slightly outwardly bulging quadrangular shape (Fig. 16-12). The black pottery is divided into two groups: a jar/pot with a low and an outwardly thickened rim (Fig. 16-13) and a jar/pot with a rim whose center portion is bulged (Fig. 16-14).

6.2) Typical decorated pottery of the Bangag I shell midden site

The typical decorated pottery of the Bangag I shell midden site is in the form of jars/pots decorated with short incisions arranged into a herringbone shape. One piece was found in Layer VI, two in Layer IX, one in Layer XI, and one in Layer XII. Except for one piece from Layer IX, the others have a similar shape: jars/pots with a restricted neck, an outwardly thickening rim and a rounded tip to the lip (Fig. 17-1, 17-3 to 17-5). All four sherds have short incisions arranged into a herringbone shape on the outside of the outwardly thickened rim. However, there is a difference in the extent of the decorated portion and the composition of the elements of the design.

The sherd excavated at Layer VI has only three horizontal rows of short, slanting incisions on the portion of the outside of the rim that bulges outwards. The incisions in the uppermost row slant down to the left. The incisions of the second row slant down to the right. The incisions of the third row slant down again to the left. One piece of the decorated sherd from Layer IX (Fig. 17-3), one piece of decorated sherd from Layer XI (Fig. 17-4) and one piece of decorated sherd from Layer XII (Fig. 17-5) have these slanting incisions over almost all of the outside.

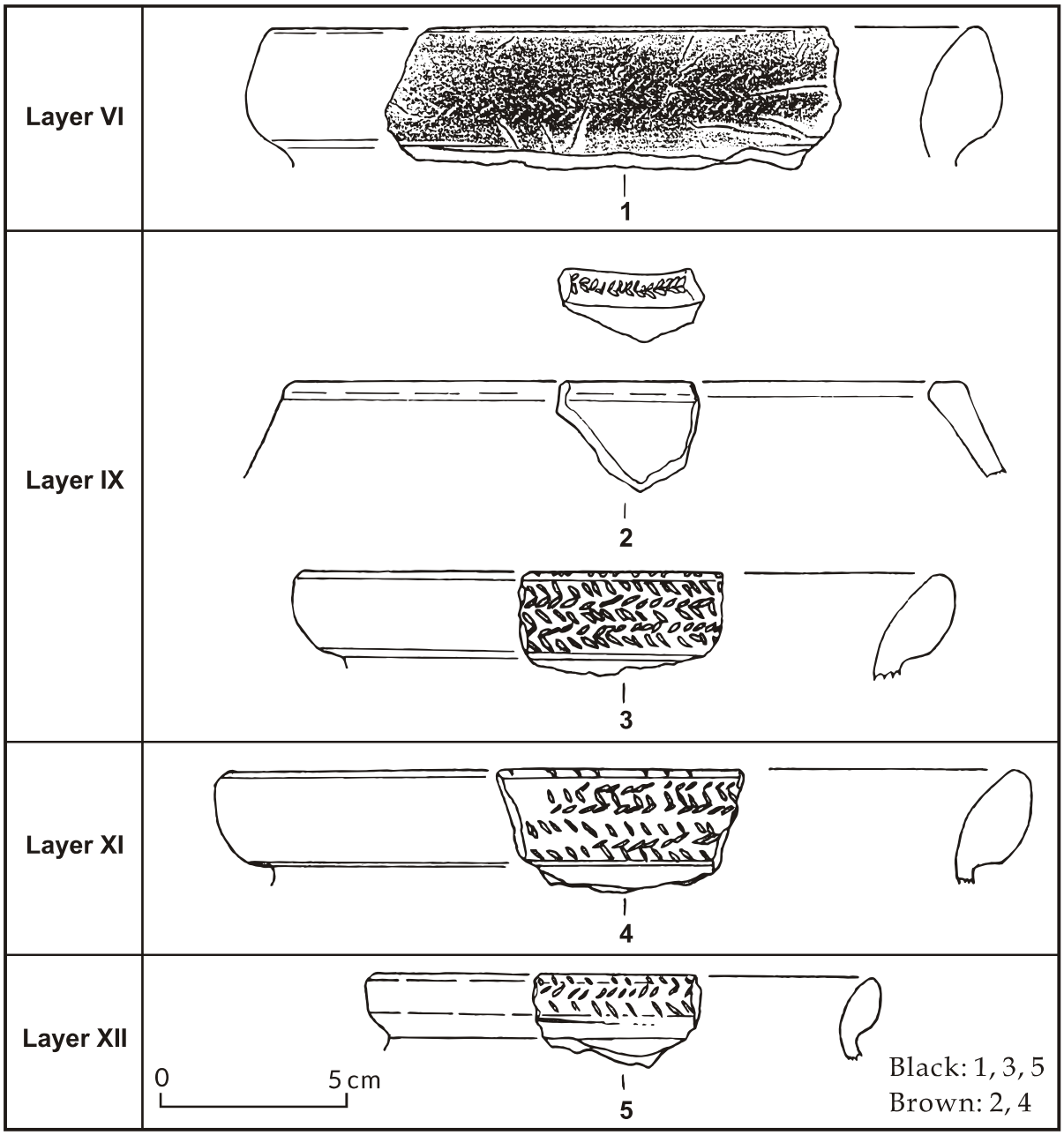

Fig. 17: Jars/pots decorated with short incisions arranged into a herringbone shape from the Bangag I shell midden site by layer. (1-5; from Tanaka 2011: Fig. 8).

Because the sherd from Layer XII is small, this coverage only includes three horizontal rows of slanting incisions. Meanwhile, the sherd in Layer XI (Fig. 17-4) has six horizontal rows of slanting incisions, and the one from Layer IX (Fig. 17-3) has five horizontal rows of slanting incisions. The second sherd from Layer IX (Fig. 17-2) has a different shape and a body that gradually bulges under the rim. The tip of the lip of the sherd is flattened and thickened inward. Two horizontal rows of slanting incisions forming the herringbone design are found on the flattened top of the lip.

8) Comparison between the pottery sherds excavated from Layer IV of the Catugan shell midden site and the pottery sherds excavated from Layer XI of the Bangag I shell midden site

Three pottery sherds of jars/pots were excavated from Layer IV of the Catugan shell midden site. Two are plain sherds, one of black pottery, and the other of brown pottery. The black pottery sherd (Fig. 18-1) has an out-turned rim whose central outside portion bulges outwards. The brown pottery (Fig. 18-2) has a flattened top of the lip and a thickened quadrangular rim, with rounded angles. The decorated sherd (Fig. 18-3) has three horizontal rows of short, slanting incisions that make up a herringbone design. I found that pottery fragments from Layer XI of the Bangag I shell midden site are similar to that from Layer IV of the Catugan shell midden site. One sherd is of black pottery with an out-turned rim whose outside central portion bulges outwards (Fig. 18-4). Another is a sherd of brown pottery with a flattened top of the lip and a thickened rim with a quadrangular shape and rounded angles (Fig. 18-5). The third is a sherd of decorated brown pottery with horizontal rows of short, slanting incisions that make a herringbone design (Fig. 18-6). There are six rows, which is double the number of rows for the sherd found at the Catugan shell midden site (Fig. 18-3).

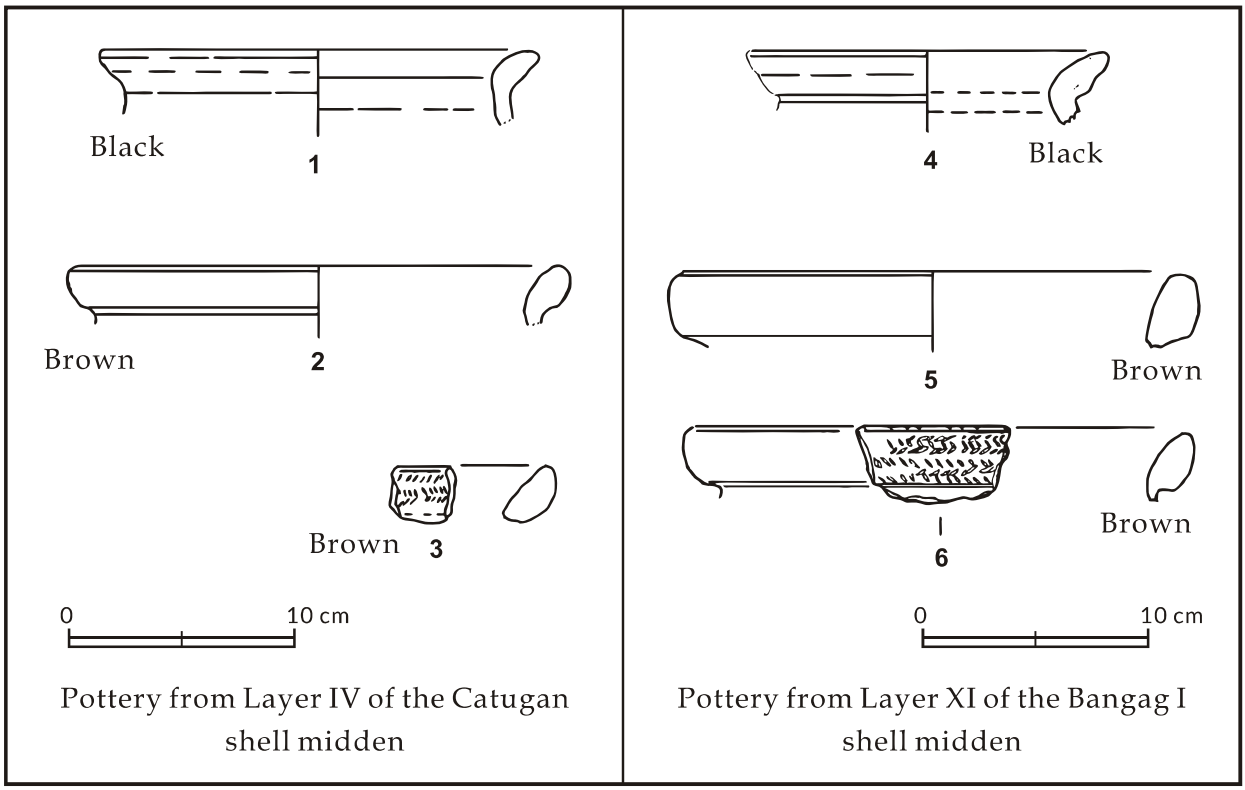

Fig. 18: Comparison between the pottery from Layer IV of the Catugan shell midden site and the pottery from Layer XI of the Bangag I shell midden site. (1-3; from Tanaka 1998a: Fig. 13; 4-5. Tanaka 2011: Fig. 6; 6. Tanaka 2011: Fig. 7).

IV. Discussion: Searching for the origins of two pottery traditions

In this article, I have pointed out the change in the pottery tradition from the Late Neolithic to the Metal Age, i.e., from red-slipped pottery to black and brown pottery, based on excavations of three shell midden sites in the lower reaches of the Cagayan River in northern Luzon. This change is not gradual, but drastic. It is easy to understand that this type of drastic change was caused by a change in the people who made and used the pottery.

At this point, another question arises. Who were the people who made and used the red-slipped pottery during the Late Neolithic, and the black and brown pottery during the Metal Age?

Bellwood remarked that the people who made and used red-slipped pottery in the Philippines during the Late Neolithic were from Taiwan (Bellwood 1997). He pointed out the similarities between red-slipped pottery with carination, incised, dentate-stamped motifs, and the design elements of circular stamps found in the pottery excavated in the Yuan Shan shell midden site in the Taipei basin in northern Taiwan and Batungan Cave No. 2 on Masbate Island in the Central Philippines (Bellwood 1997). After Bellwood, Hsiao-chun Hung, who studied under Bellwood, remarked on the similarity between the plain red-slipped pottery of the Nagsabaran shell midden site in Cagayan, northern Luzon, and the red-slipped pottery of the Chaolaiqiao (潮來橋) site in eastern Taiwan (Hung 2005) (Fig. 19). Plain red-slipped pottery with a restricted neck, tall rim, and slightly depressed inside of the tip of the lip was excavated at both the Nagsabaran site in northern Luzon and the Chaolaiqiao site in eastern Taiwan. This type of red-slipped pottery is similar to the red-slipped pottery excavated in the upper part of Layer V of the Magapit site, although the inside of the tip of the lip is not depressed. Several scholars have noted the similarities between these instances of red-slipped pottery and related them to the movement of the Austronesian-speaking peoples (Bellwood 1997, Hung 2005).

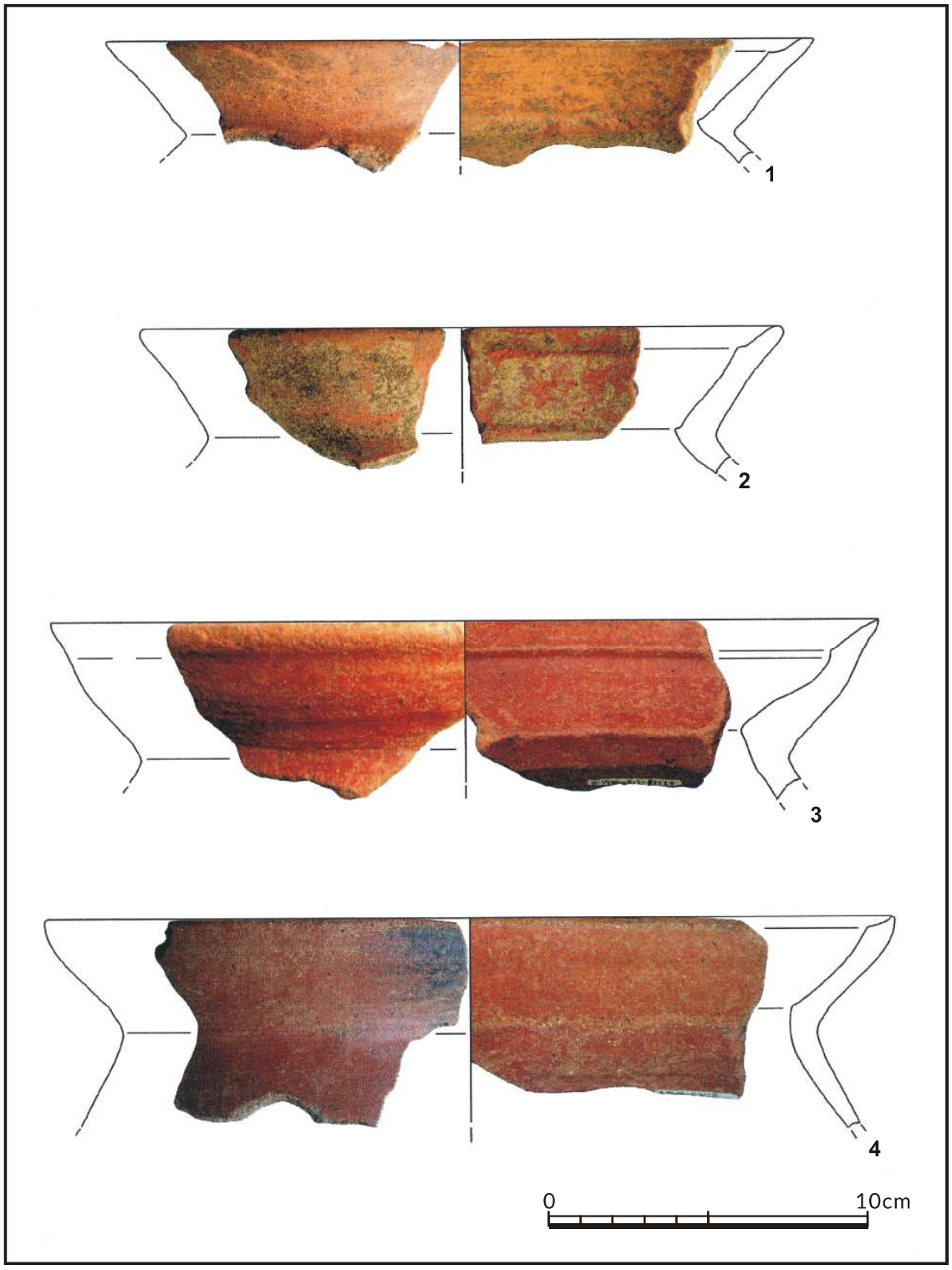

Fig. 19: Rims with an inner projecting lip from Chaolaiqiao, eastern Taiwan (1, 2), and Nagsabaran, northern Luzon (3, 4). (1-4; from Hung 2005: Fig. 5).

The pottery tradition of the Metal Age in northern Luzon is thought to have been introduced from the outside, although comparative studies between pottery found in northern Luzon and pottery from outside of the Philippines have not been developed yet. Seeking this understanding, I searched for pottery in Taiwan that was similar to the pottery of the Metal Age in northern Luzon. I found some pottery with a similar design--namely, several rows of short incisions--in the excavated pottery from the Fengpitou (鳳鼻頭) site[6] (Chang 1969) (Fig. 20). Black pottery was prominent during the Late Neolithic era on the southwestern coast of Taiwan. More studies are needed to evaluate whether people who made and used Metal Age pottery in northern Luzon were initially from here. I surmise that the people of the Fengpitou culture moved to northern Luzon. However, I do not think that they[7] developed the iron making technology locally, but rather adopted it from the outside[8].

[6] The Fengpitou site contains three different cultural layers. They include: the cultural layer of the Dapenkeng（大坌坑）culture of the Early Neolithic, characterized by the coarse cord marked pottery (Chang 1969: 57-59, Liu 1996: 30-35); the cultural layer of the Niuchouzi （牛稠子）culture of the Middle Neolithic, characterized by red-slipped and painted pottery (Chang 1969: 81-94, Liu 1996: 35-43); and the cultural layer of the Fengpitou（鳳鼻頭）culture, characterized by the pottery with short incisions arranged like a herringbone (Chang 1969: 94-105, Liu 1996: 43-50). I used the pottery of the Fengpitou culture for comparison.

[7] Recent studies of the ancient DNA of the skeletal remains found in Southeast Asia have made great contributions to the studies of the origin and the routes of migration of the people in Southeast Asia (Bellwood 2018, McColl et al. 2018, Lipson et al. 2018). The Studies of the ancient DNA of Southeast Asia indicated only one route of migration for the Austronesians to the Philippines (McColl et al. 2018: Fig. 4). It is the route from southern China via Taiwan to northern Luzon. Although I assume that the people moved several times from Taiwan to northern Luzon during the late Neolithic and the Metal Age, more samples and analyses are needed for the further detailed studies.

[8] The reason that I assume the iron technology was brought from the outside is described in the following. The pottery with short incisions arranged like a herringbone, which is similar to the design of the pottery of the Fengpitou culture, was discovered in Layer XII (the lowest layer) of the Bangag I shell midden site in northern Luzon. Meanwhile, the iron fragment was found only in Layer VI of the Bangag I shell midden site. Evidence of iron making, such as slag, was found only in Layer II of the Bangag I shell midden site. These facts indicate that the people of the Fengpitou culture moved to northern Luzon and settled there, then after several years or decades they accepted the iron product from the outside, and after several years or decades more they learned the method of iron making.

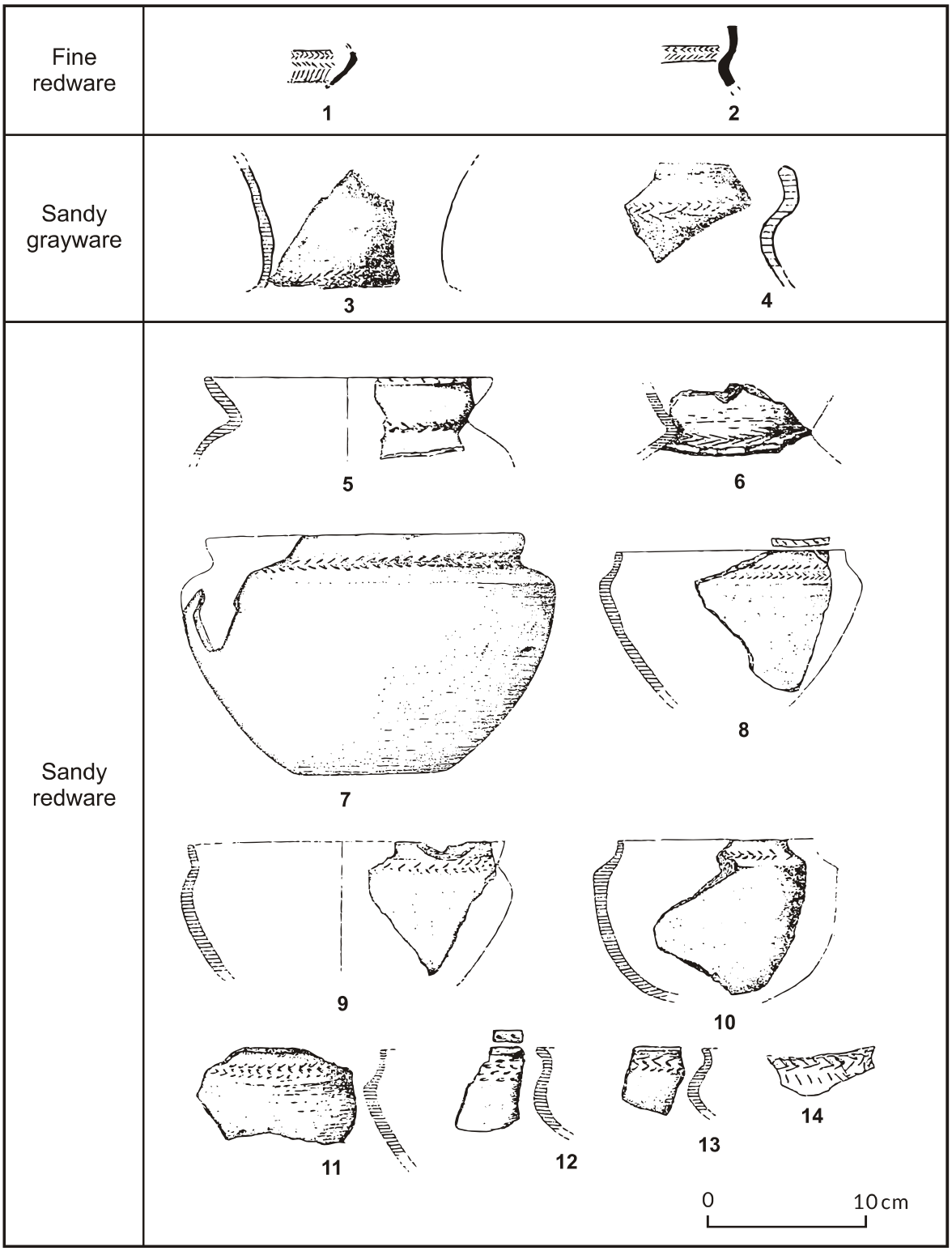

Fig. 20: Pottery decorated with short incisions arranged into a herringbone shape from the Fengpitou site, southern Taiwan. (1, 2; from Chang 1969: Fig. 51; 3. Chang 1969: Fig. 59; 4. Chang 1969: Fig. 60; 5, 6. Chang 1969: Fig. 54; 7-14. Chang 1969: Fig. 55)

Why did the pottery found in the lower reaches of the Cagayan River change between the Late Neolithic and the Metal Age? One cause may have lain in a change in patterns of interaction between the people of eastern Taiwan and northern Luzon caused by the volcanic eruption of Mt. Iraya on Batan Island. The Sunget site, located in the municipality of Mahatao in the center of Batan Island, has Neolithic cultural layers with red-slipped pottery. The excavation(9) of this site by Bellwood and others showed that the Neolithic cultural layer was covered by thick volcanic ash of around 1 m (Bellwood and Dizon eds. 2013: 36). There was no cultural layer on top of the Neolithic cultural layer, meaning that the Neolithic settlement at the Sunget site was abandoned after the eruption.

Change in the interaction between eastern Taiwan and northern Luzon is reflected in the change in the material used for ornaments, such as a bracelet and a bead found in Cagayan. Hung and her colleagues excavated a fragment of a bracelet made of Taiwanese jade,originating in Fengtian (豊田) on the eastern coast of Taiwan, at the Nagsabaran site in Cagayan (Hung 2005). Hung also reported similarities in the size, such as diameter, thickness and width, of the bracelets of the Nagsabaran site in Cagayan, Duyong Cave in Palawan, and those at the Beinan site in eastern Taiwan (Hung 2005: 120). Our excavation of the Magapit shell midden site revealed two green pseudo-jade beads(10) (Fig. 21). These were not made of jade from Fengtian in eastern Taiwan but of quartz schist(11) obtained at local sources. This is because the supply of jade and jade ornaments from the eastern part of Taiwan to northern Luzon was temporarily halted during the period represented by the upper layer of the Magapit shell midden site. Those living in Cagayan sought an alternative source of green stones in nearby areas.

(9) The re-excavation of the Sunget site is now ongoing as part of a joint project between Dr. Mitsuru Okuno, geologist at Fukuoka University, and Dr. Ame M. Garong of the Archaeology Division at the National Museum of the Philippines. This project is being financially supported by a fund from JSPS (No. 18KK0032) through Dr. Mitsuru Okuno. I also participated in this project. The most recent excavation was conducted in August, 2019.

(10) One of the beads (Fig. 21-2) was found during the work of water separation in the sample No. 4 from Layer II (Aoyagi et al. 1988: 82). I found the other bead (Fig. 21-1) near my foot as I was taking photographs in the excavation square after finishing the first meter of excavation. It might belong to Layer II.

(11) The material of these two beads was identified as quartz schist by Dr. Yoshiyuki Iizuka from Academia Sinica in Taipei (Iizuka and Hung 2009: 19).

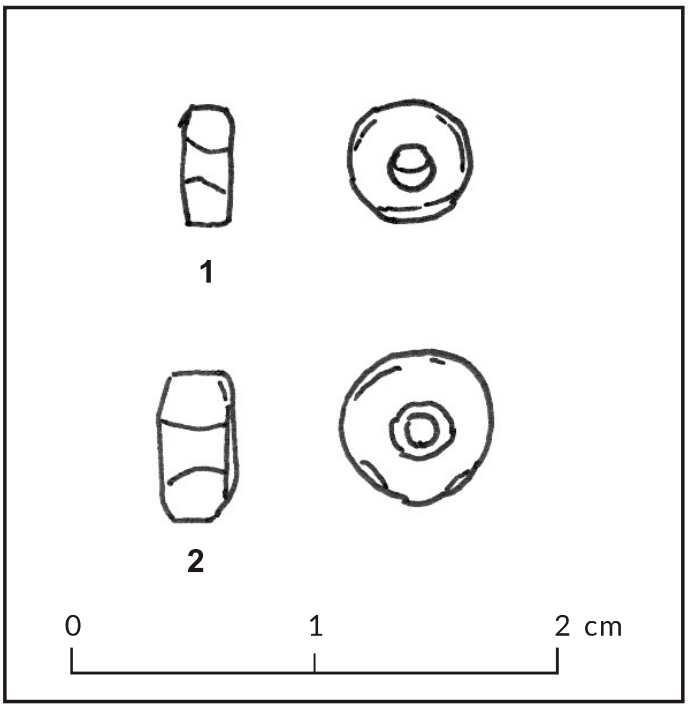

Fig. 21: Green beads of pseudo-jade from Layer II of the Magapit shell midden site

The other essential aspect explaining the change in the pottery is related to the decrease in the number of sites contemporary to the Magapit shell midden site. Ogawa noted earlier that, "The other sites aside from the Magapit shell midden site, which revealed the decorated red-slipped pottery, were located at the hilly area east of the Magapit shell midden site. There are no contemporary sites along the river with the Magapit shell Midden site" (Ogawa 2007: 272). I presume that this phenomenon is closely related to the thick shell deposit of 5.6 m at the hilltop of Location 1 and the wide distribution of shells from Locations 1 to 5 at the Magapit hill. In other words, people gathered at the Magapit hill during the period of deposits at the Magapit shell midden site. I also presume that the wide variety of pottery decorations in the upper parts of the Magapit shell midden site were caused by a concentration of the people at Magapit hill. The probable cause of transfer of settlement from lowland areas to higher hilly areas would likely be a change in the environment of the Cagayan River, such as a flood.

CONCLUDING REMARKS

In this article, I presented the chronology of pottery in the lower reaches of the Cagayan River from the Late Neolithic to the Metal Age. I used the pottery sequence of the Catugan shell midden site as a base because its excavation revealed five well-stratified layers with distinct pottery types. Then, I compared the pottery of each layer of the Catugan shell midden site with the pottery of the Magapit shell midden site by layer, along with the pottery of the Bangag I shell midden site by layer. I described the similarities between the red-slipped pottery from Layer V of the Catugan shell midden site and that from the upper part of Layer V of the Magapit shell midden site. This means that red-slipped pottery from Layer V of the Catugan shell midden site and red-slipped pottery from the upper part of Layer V of the Magapit shell midden site are contemporaneous. I also indicated the similarities between the black and brown pottery from Layer IV of the Catugan shell midden site and that from Layer XI of the Bangag I shell midden site. This confirms that the black and the brown pottery from Layer IV of the Catugan shell midden site and that from Layer XI of the Bangag I shell midden site is also contemporaneous. From this, I established a chronology ranging from the Late Neolithic in the Magapit shell midden site, represented by broken stone adzes, to the Metal Age in the Bangag I shell midden site, represented by an iron fragment. Although the red-slipped pottery remained prominent from Layers V to II at the Magapit shell midden site, the black pottery and the brown pottery became prominent only at the lowest layer (Layer XII) of the Bangag I shell midden site. The date of the termination of the Late Neolithic period is suggested by the C14 date from Layer II of the Magapit shell midden site: 2800 ± 140 B.P. (N-5396). Meanwhile, the date of the start of the Metal Age is suggested by the C14 date of Layer XI of the Bangag I shell midden site: 1965 ± 40 B.P. (NUTA2-7707). This change in pottery was drastic, and reflects a movement of people. In other words, the people who made and used the red-slipped pottery left northern Luzon before the Metal Age, and those who made and used the black and brown pottery came into northern Luzon during the Metal Age. I suggest that one possible place of origin for the people who brought the black and brown pottery was southwestern Taiwan, where the Fengpitou site is located. I hope to continue to research burial sites in northern Luzon to elucidate the relationship between southwestern Taiwan and northern Luzon. The study of burial sites and the human skeletal remains and artifacts will allow comparative study of human skeletal remains both from Taiwan and Luzon.

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菲律賓呂宋島北部陶器的年代和起源，從新石器時代晚期到金屬器時代

Kazuhiko Tanaka*

筆者在菲律賓呂宋島北部卡加延的Catugan貝丘遺址發掘時發現了五個分層良好的地層。本文將其出土的陶器與另外兩個貝丘遺址進行了逐層比較研究，以確認從新石器時代晚期到金屬器時代 Catugan 貝丘分層中陶器的順序。對於新石器時代晚期的遺存，筆者比較了 Catugan 貝丘遺址和 Magapit 貝丘遺址，驗證了 Catugan 貝丘第五層的陶器和 Magapit 貝丘第五層上部的陶器的同時性。對於金屬器時代遺留，筆者比較了 Catugan 貝丘和 Bangag I 貝丘的發現，確定了 Catugan 貝丘第四層的陶器和 Bangag I 貝丘第十一層的陶器的同時性。

本研究建立的序列顯示了新石器時代晚期紅衣陶的主導地位，和金屬器時代黑褐色陶的主導地位。洪曉純曾指出，呂宋島北部卡加延的紅衣陶器是由臺灣東部發現的細繩紋陶器演化的後期發展起來的（Hung 2005：109）。然而，卡加延黑陶的起源過去並沒有被適當的討論。筆者認為基於鳳鼻頭遺址中短刻劃的人字形裝飾，黑陶的一個可能來源是台灣島西南部。

本文還討論了從新石器時代晚期到金屬器時代陶器的劇烈明顯變化。這種改變可能是巴丹島伊拉雅火山噴發後，臺灣東部和呂宋島北部之間的互動發生變化的結果。這次火山噴發的證據昭示於巴丹島中部 Sunget 遺址的新石器時代含紅衣陶器的地層上厚實的火山灰沉積物。在 Magapit 貝丘第二層中，當地原料製成的綠色假玉質珠，也被認為是這種變化的反映。

筆者的研究結果表明，Magapit 時期卡加延河下游遺址數量的減少，與 Magapit 山丘上一至五號地點的貝類分佈增加，以及丘頂厚達 5.6 公尺的 Magapit 貝丘的堆積有關。換句話說，可能由於卡加延河的環境發生變化，例如洪水，人們從沿河的低地遷移到 Magapit 丘陵地區。Magapit 貝丘遺址上層發現的陶器裝飾種類繁多，反映了這種現象。

關鍵詞：新石器時代晚期，金屬器時代，紅衣陶，黑陶，呂宋北部

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