Part III

Formal Analysis of Lake Sentani, Lapita and Dongson decorations
10

The Lake Sentani design system

The analysis of types of Lake Sentani design elements and the design system\(34\), took place on the basis of five different types of objects and their decorations. The objects studied are: lime-containers (64 pieces), tobacco-containers (33 pieces), painted barkcloth (60 old and circa 70 more recent pieces), wooden plates (23 pieces) and drums (11 pieces) (Figure 10.1 and 10.2). All objects originate from Lake Sentani or the Humboldt Bay and were collected or described between 1858 and 1996. They derive from collections of ethnological museums in Leiden, Rotterdam, Amsterdam, The Hague, Nijmegen and Groningen. Also, objects in publications and catalogues abroad were consulted. The Sentani exhibition in Dresden (Germany), the permanent Sentani exhibitions in the University Museum in Abejura (Irian Jaya) and the Regional Museum in Waena (Irian Jaya) were studied as well. Recent objects and depictions of designs have been registered during a short fieldwork trip in 1996.

The choice for these objects is both coincidental and deliberate. During my term of probation in the Ethnological Museum in Leiden, I was asked to make an inventory of designs depicted on lime- and tobacco-containers and on barkcloth (Hermkens 1995a; Hermkens 1995b). These objects have been collected in Lake Sentani and the Humboldt Bay. As a result of exchanges and trade between the two areas, which included amongst others the exchange of lime- and tobacco-containers from Lake Sentani to the Humboldt Bay, there is no difference between Humboldt Bay and Lake Sentani designs depicted on tobacco- and lime-containers. The main source of these items is, after all, Lake Sentani. Painted barkcloth was produced both in the Humboldt Bay and Lake Sentani area. However, as with the tobacco- and lime-containers, it is difficult to distinguish between items collected in the Humboldt Bay and those collected in Lake Sentani. This is not the case with Lake Sentani wooden plates and drums. These items are, together with three-dimensional sculptures, different from the Humboldt Bay equivalents in both layout and design. In order to comprehend as many possible designs and design elements, these latter objects were added to the prior analysis of the containers and painted barkcloth. Besides this 'holistic' argument, the 'design exchange' hypothesis of Craig (1995) could be tested as well. His argument for studying arrow-designs is that since these objects are exchanged due to warfare and trade, the integration of 'foreign' motifs (e.g. Lapita) should be most clearly visible in these objects (Craig 1995: 238-239). Since one part of the objects studied were part of an exchange system between Lake Sentani, the Humboldt Bay and the Tanah Merah Bay, and the other part not, differences in the used design elements should be visible.

Some of the designs depicted on the objects have been drawn, especially objects derived from the Leiden collection (Hermkens 1995a). Others have been photographed or described. The two-dimensional,

\(34\) See for definition of design traits, elements and system, Part I.
rolled-off drawings of the lime- and tobacco-containers facilitated analysis since the whole design could be 'read' at once. This was obviously not necessary for the two-dimensional paintings on barkcloth and the decorations on wooden plates. However, by drawing some of these two-dimensional paintings and incisions, the structural layout of the design elements became more clear.

Figure III.10.1 Examples of designs on lime-(a) and tobacco-containers (b) and drums (c). I = homo-kelew design on lime-gourd.
Figure III.10.2 Examples of designs on wooden plates and barkcloth
10.1 Design traits and elements

The basic design traits of the five object-types consist of: a. ovals, b. curved lines, c. horizontal and vertical lines, d. zig-zag lines, e. triangles, f. rhombus, g. quadrants, h. meanders, i. and spirals (which can be composed out of curved lines or straight lines) (Figure 10.6 and 11.1). Variation is achieved by varying the direction of the basic traits and their size. The design elements of the object-types consist of both figurative and geometrical elements (Figure 10.3 and 10.6). The elements are fairly homogenous in their depiction on the different objects. The spiral takes an important place on almost all objects. An exception is formed by the figurative elements, which differ according to the object. A distinction can be made between figurative design elements on lime- and tobacco-containers, wooden plates and drums, and figurative design elements on barkcloth. The depictions on barkcloth are more realistic and often more detailed than the figurative elements on the other objects. The latter are mostly highly stylized animals, whose bodies are formed by a rhombus. The position of the legs and the character of the head and tail determine whether the animal depicted is a crocodile, a turtle, a frog or a lizard (Fig. 10.3).

With regard to the objects studied, depictions of humans are mainly restricted to spatulas, coconuts and drums. The human figures on the coconuts of the Ethnological Museum in Leyden, are all female (Fig. 10.4.a). The spatulas have mainly male or neuter (no genital organ) handles (Fig. 10.5.a). To my knowledge there are only three female handles in Dutch museums (one piece in Groningen) and private collections (two pieces). The combination male handle and (female) coconut does not occur. The female handles just mentioned, belonged to two gourds and one coconut. The coconut is decorated with a spiral-design, though without female figure. The gourds had spiral designs as well, hence no homo-kele-y- or rhombus-scroll designs, which are related to men like the Ondofolo and the medicine-men (see Part IV).

Two of the ten drums contain a human figure that is carved near the handles of the drums. These human figures are probably male, although they have no clear genital organs. However, one of the figures has the handle of the drum starting from its loins, giving the handle the appearance of a large phallus (Fig. 10.5.b). It is remarkable that human-figures are mainly depicted in three-dimensional sculptures or in relief. Paintings of human figures, similar to those depicted on the coconuts or spatulas, do not occur. The human-like figures that are painted on the barkcloth differ considerably. They often have animal traits, like a tail or fins. These painted figures do, however, resemble the female figures on the coconuts in the sense that their posture is the same (Figure 10.4.b). Both figures have a round head and belly, with the arms stretching out.

![Human figures on coconuts and barkcloth](image)

**Figure III.10.4.** Human figures depicted on lime coconuts (a) and barkcloth (b).
THE WAY OF THE OBJECTS

Figure III.10.3 Inventory of the most common figurative (animals) design-elements on lime- and tobacco-containers, wooden plates, drums and painted barkcloth of Lake Sentani. Stylized animals depicted on lime-containers (a), tobacco-containers (b), wooden plates (c), barkcloth (d) and drums (e).

Figure III.10.5 Human figures on spatula’s (a) and two drums (b). The left drum was acquired from W. Buitenhuys in 1959 (RMV: 3592-3). The right was collected by J.A. Witte in Sereh, Lake Sentani 1953 (RMV: 3210-15).

The number and arrangement of the design elements on each object, is another characteristic feature of Lake Sentani designs. On almost all objects, the number of different design elements is very limited and in general does not exceed a total of five elements (Figure 10.6). In general, only three of these elements are depicted on each object. Furthermore, the design elements are arranged according to the following principles:

1. One element repeated several times
2. Two elements of which one is repeated
3. Several elements which are repeated (alternately)
Figure III.10.6 Inventory of the most common geometric design elements on lime- and tobacco-containers, wooden plates, drums and painted barkcloth of Lake Sentani. Based on basic traits like: a= spirals, b= circles, ovals and stars, c= triangles, d= wavy and curved lines, and e= rhombus.

An exception to this generality are the design elements occurring on certain barkcloths. The ornamentations on barkcloths can be divided according to five decoration-types (Hernkens 1996: 54). Three of these types can be abstracted and described in terms of the three principles, mentioned above. The other two types have the following decoration:

1. Different -mostly figurative- elements which vary qua size and orientation, of which some are repeated at random.
2. One central figurative element.

These two types do not conform to the three constitutive principles above. This can be explained by the fact that they are recent innovations. The first type probably developed in the late twenties and early thirties, possibly due to the influence of the 'Arts and Crafts Exhibition' in Jakarta and the subsequent European interest in 'primitive art' (see Part IV). The latter type developed in the seventies (Nafri, Humboldt Bay) and the eighties-nineties (Asei, Lake Sentani), as a result of the growing economic (tourist) interest in the paintings (Figure 10.7).

The designs on lime- and tobacco-containers, wooden plates and drums are homogenenous in both the design elements and the principles according to which these are arranged. These design elements seem
to be based on a tradition, which has hardly changed under European influence. Also, there is no
difference between the design elements depicted on the exchange goods (limes- and tobacco-containers),
and the other objects. The only design elements and arrangements that did change, are those depicted on
barkcloth. However, the old spiral ornamentation was not discarded, but remained in use, although the
shape of the barkcloth was altered from elongated-shapes towards more rectangular ones. The 'new' central
figures were not arranged according to the 'traditional' principles mentioned above, but according to new
structuring principles.

It is clear that these changes in barkcloth shape and design elements do not imply discontinuity.
Since there is a gradual mix or coexistence of old and new design elements, old and new ordering
principles, and of elongated and rectangular shaped barkcloths, continuity exists. The adoption periods of
the new shape and design elements, which is "the time-lapse between the introduction of the new traits and
the definite disappearance of its predecessor" (Van de Velde 1979: 43), differ. The introduction of new
design-elements seem to have started or occurred in the late twenties and early thirties. These new
elements did, however, not replace the older ones. In fact, today people use the older along with the more
recent 'thirties' and very recent 'nineties' design elements in their paintings. Together with the new design
elements, new ordering principles were introduced. The adoptive period of the barkcloth-shape was not
that long. This innovation occurred probably earlier than the introduction of new design elements, since
the pieces that are documented between 1921 and 1926, already differ in shape from their predecessors
dated about 1858. The designs depicted on these barkcloths are similar, although the position of the
designs was altered according to the new shape of the cloth.

When accepting the definition of Van de Velde (1979: 43) regarding proper continuity, in which
"innovations appear and old traits disappear at different points of time, and the lengths of the respective
adoptive periods differ also" (Van de Velde 1979: 43), then the changes in barkcloth shape and design can
be considered as regular and continuous developments. However, the introduction of new design elements
was coupled to new ordering principles. Also, the adoptive period was equal on these variables. This
would mean that these changes are characteristic of pseudo-continuity (Van de Velde 1979: 43).
According to Van de Velde (1979: 43), pseudo-continuity could imply a general introduction of a new
style that would follow, for example, upon economic or social upheaval. This was indeed the case during
the introduction of the new design elements and their new ordering principles.

Thus, it seems that the two different forms of continuity can be distinguished in the development
of one type of object. However, it is difficult to prove this statement on a more statistical level. Especially
between 1858 and 1921, and between 1940 and 1970, little or no painted barkcloths were collected. This
could be explained by the diminished interest in the area or in painted barkcloths during these decades.
However, it could well be possible that there was a decrease in the production of painted barkcloth in these
periods. Whatever the reasons, due to these time-gaps, it is difficult to make a complete overview of
changes and traditions in barkcloth painting. This problem is enhanced by the fact that many collected
barkcloths do not have an exact purchase date (manufacture dates are completely absent). Thus, it is sometimes difficult to determine which barkcloth is older. This is mainly the case with barkcloths that were collected after the thirties and before 1970.

10.2 The design system

In the previous section it became clear that in the designs of the lime- and tobacco-containers, painted barkcloths, wooden dishes and drums, the number of design elements is small. These elements can be separated into two main elements:

1. Geometrical design elements. Of these elements, the a. spiral, b. triangle, and c. rhombus are the most important.

2. Stylized human and animal figures.

The variation in designs is achieved by the combination and modification of the elements. Thus, composition plays a major part in the establishment of the designs. By the optical effect of dark and white colours, the designs are strengthened and made more complex. The compositions of the designs are mainly centred on three basic principles which may operate in conjunction or separately.

Composition-principle 1: The designs on the objects (excluding the maro) are depicted in such a way that an equal relation between design and background is established. On some objects, this principle is carried through in such a way that there is no longer a front-figure and a background, but a mixture in which the background acts as a design (element) as well. On objects, for example wooden plates, which have one or more central figures, the background does, however, not play a minor role. The central figures are often drawn up out of smaller parts that comply with the equal figure-background relation or principle. Only the painted barkcloth contain clear central figures. These are mainly human- or animal figures. However, the geometrical (spiral) figures or designs depicted on maro, comply to the principle.

Related to this principle is another principle, that refers to the reversible character of the designs. The spatial composition of the design-elements is such that the field is divided into two identical forms. One is light (mostly white) coloured and the other dark. This implies that both forms are simultaneously figure and background. The most frequent example of this principle is the spiral. Other design-elements or motifs with which this dualistic 'yin-yang' effect is established, are the rhombus, triangle and wavy lines (Figure 10.8).

Figure III.10.8 The dualistic nature of the Lake Sentani designs.
**Composition principle 2:** The principles of (a) an equal relation between back- and foreground and (b), reversibility are connected with another characteristic, namely the generating of design-elements by means of rotation. Besides rotation, elements are generated by reflection and translation (see further next section: Symmetry analysis).

**Composition principle 3:** Symmetry constitutes an important aspect of the designs. In the case of the lime- and tobacco-containers it is mainly 'rotation symmetry' (Greenberg 1975: 41) that generates the designs. This means that the design-elements are rotated around a centre. These rotation-centres are often near the opening or neck of the containers. On the coconuts both poles are considered as rotation-centres, many pieces having a star-shaped motif at the bottom pole. The *homo-kelew* motifs (see figure 10.1) are centred around the belly of lime-containers.

The two-dimensional objects, like the barkcloth and the wooden plates, have no clear rotation-centre. However, most designs on these objects are centred in the middle or around the middle of the field. By some maro the middle of the field is marked as a rotation-centre with a circle. The figures are subsequently organised around this circle (Figure 10.9).

![Figure 10.9 Maro from Lake Sentani (151 cm - 95.5 cm). Acquired from L. van Lier in 1950. KIT: 1970-1.](image-url)
10.2.1 A symmetry analysis

In Part I, structural consistencies in designs were related to structural consistencies in other spheres of culture. These social structures are empirically visible and measurable (Washburn & Crowe 1988: 17). By employing a symmetry analysis on graphical designs, underlying structures or patterns may be identified. These patterns can yield insight into patterns of human behaviour and classification.

The symmetry analysis of Washburn and Crowe (1988) was already mentioned in Part I. With the help of mathematical principles they developed a procedure and flow chart of all possible finite designs, one- and two-dimensional patterns (for example wallpaper), and one- and two-coloured patterns. Their method is limited to plane symmetrical designs (two-dimensional), which are generated by at least translation (Washburn and Crowe 1988: 53). Since among the objects studied, mainly the containers, drums and some wooden dishes show design patterns, the choice to analyse these objects is explained. Although some spiral-designs painted on barkcloth could be read as patterns as well, I have limited the analysis to the objects just mentioned. Thus, the symmetry analysis will involve designs on lime- and tobacco-containers (54 and 33 pieces), which were collected in the Humboldt Bay and the Lake Sentani area. As the designs on these objects are similar (Hermkens 1995a-b), the divergent origin of collection has no impact on the analysis. Besides the designs on the containers, the patterns on wooden dishes (23 pieces) and drums (11 pieces) will be analysed as well. These objects are all collected in Lake Sentani, in general the Humboldt Bay equivalents differ considerably. By 'flattening' the designs on the cylindric, oval or round objects, the rolled-out designs could be studied. The designs on the wooden plates could be 'read' at once. The analysis is based on the fact that all generations in a plane are based on four basic movements:

1. translation
2. reflection
3. rotation
4. glide reflection

![Diagram of symmetry operations]

Washburn and Crowe (1988) distinguish infinite and finite designs. Finite designs do not contain translation symmetry, but can be generated by one of the other movements. Infinite one- or two-dimensional designs are at least generated by translation and are called patterns. In order to make a distinction between the different principles of symmetry, they use a type and subtype notion with help of letters, accents and numbers. In this thesis I will use their notation, explained by drawings and definitions.
In the symmetry analysis of the Sentani and Humboldt Bay objects, a separation is made between the analysis of lime-gourds (45 pieces), lime-coconuts (19 pieces), tobacco-containers (33), wooden dishes (23) and drums (11 pieces). However, all the designs are generated by one of the following principles (Supplement: Table 10.11):

1. p111: One-dimensional translation
2. p112: One-dimensional rotation
3. pm11: One-dimensional vertical reflection
4. pma2: One-dimensional vertical reflection and rotation
5. pmm2: One-dimensional reflection in two directions
6. combinations like p112-pm11
7. p1: Two-dimensional translation
8. cm: Two-dimensional reflection and glide-reflection
9. p2: Two-dimensional rotation
10. pgg: Two-dimensional rotation and glide-reflection
11. cmm: Two-dimensional rotation and reflection in two directions
12. pmg: Two-dimensional rotation and reflection in one direction
13. pm: Two-dimensional reflection in one direction

Besides these symmetrical patterns, some objects have designs which are not symmetrical patterns but arbitrarily repeated design-elements. However, the design-elements themselves are often generated by symmetrical rules, like reflection or rotation. These types of designs will be called asymmetrical. Next to these infinite design patterns, some objects, mostly the barkcloth and some wooden plates, have finite designs. These finite designs are often generated by motions as reflection or rotation. They are, however, not translated.

Patterns with this symmetry are generated by one-dimensional translation. Examples of this repeating of one single element, are the homekelew designs which are depicted on lime-gourds (a). Other examples of this pattern can be found on wooden dishes and drums.
2. p112
This class of symmetry involves one-dimensional patterns, which are generated by translation and two-fold rotations (half-turns) only (Washburn and Crowe 1988: 108). Examples of this motion are spiral designs on lime-gourds and tobacco-containers.

3. pm11
Designs which are generated by this class are one-dimensional patterns with vertical reflection. Examples of these designs can be found on lime-gourds only.

4. pma2
In this one-dimensional class there is a glide reflection axis in the (horizontal) length of the pattern. Vertical reflections are in lines perpendicular to the glide-axis, and the rotation points are halfway between the mirror axes (Washburn and Crowe 1988: 120). Examples of this class are the spiral-designs on lime-gourds and drums.
5. pmm2
In this class a central mirror axis runs through the length of the band, as well as a vertical mirror axis perpendicular to this axis. About all points of intersection of these mirror axes, there are halfturns. This structure is "frequently the underlying symmetry of a design whose symmetry is subsequently reduced by elaboration of motifs" (Washburn & Crowe 1988: 113). Of the objects studied, this class only occurred on drums (a). However, smaller bands, often above the main pattern, on objects like lime- and tobacco-containers are frequently generated by this motion (b).

6. combinations
Combinations of several one-dimensional designs occur on lime-containers (a) and drums (b). With regard to the lime-containers these designs are often generated by p112 and pm11 motions. One drum has a design made up by three bands, consisting of a pmm2 upper-, a p112 middle- and a p111 lower band.

7. p1
This simple two-dimensional class involves the translation of design elements along multiple axes (Washburn & Crowe 1988: 164). It occurs on a lime- and tobacco-container and on two dishes.
This two-dimensional class occurs on two lime-containers. Both patterns consist of spiral elements, which are vertically reflected. Since the elements are offset, glide reflection axes are situated between mirror reflection lines (Washburn & Crowe 1988: 181).

This two-dimensional pattern involves 180° rotations. In order to superimpose upon themselves, the elements have to make twofold rotations (Washburn & Crowe 1988: 184). This class of pattern occurs on lime- and tobacco-containers and wooden dishes.

Like the previous pattern, this class similarly has twofold rotation centres. It also has glide axes at right angles to each other (Washburn & Crowe 1988: 188). On lime-containers (a) and wooden dishes, this pattern is frequently used with spiral elements. These spirals are hooked, moving in opposite directions on alternate glide axes.
This class has both mirror reflections and twofold rotations. "Glide reflection axes pass between the elements, perpendicular to the mirror axes. Rotation centres lie on the glide axes, midway between mirror axes" (Washburn & Crowe 1988: 192). This pattern is most clearly recognizable in series of zigzags. On the objects studied, it only occurs as a main design on tobacco-containers.

This pattern has mirror reflection in one direction only. It occurs on one drum.
Despite the homogenous appearance of the designs on the lime- and tobacco-containers, wooden dishes and drums, some design patterns are used on certain objects only (Supplement: table 10.11). Therefore, each type of object will be discussed separately before formulating some general conclusions.

Almost all designs on the lime-gourds are symmetrical (Supplement: table 10.2), only three pieces (6.7%) are asymmetrical. However, in these asymmetrical designs, the design-elements themselves are generated by reflection. All the designs are one-coloured and most of the patterns (84.4%) are one-dimensional (Supplement: table 10.1). Especially design-type p111 frequently occurs, 46.7% of the gourds are decorated with designs that are generated by this principle. This is partly due to the homo-kelew motif (37.8%) that is generated by one-dimensional translation. The spiral-ornaments are generated according to classes p111, p112, pm11, p1, p2, cm and combinations of p112-pm11. Geometrical designs are also generated by class pma2, which is a combination of vertical reflection on a horizontal glide axis with half-turns. Two of these patterns are used on lime-gourds only and do not occur on any of the other objects, namely pm11 (vertical reflection) and cm (vertical mirror and glide reflection). Despite this apparent diversity in design-patterns, homogeneity is accomplished because all these classes are variations on mainly two principles of symmetry, namely rotation and reflection. Clusters of patterns that are made up by these basic motions are: p111-p1 (translation), p112-p2 (rotation) and pm11-cm (reflection). By varying with dimension and direction of repetition, each gourd is unique in the combination of design elements and gourd-shape.

The designs on the coconuts are mainly two-dimensional (63.2%; Supplement: table 10.3) and of the classes p111, p112, p2 and pgg (Supplement: table 10.4). Only one coconut has an asymmetrical (two-dimensional) design; its design elements are, however, symmetrical. The two-dimensional designs (p2 and pgg) consist of spiral ornaments only. The one-dimensional designs, which consist of two geometrical figures that are alternately repeated, are generated according to class p111, one-dimensional translation (Supplement: table 10.4). As with the lime-gourds, the variation in the use of patterns is limited. The decoration on twelve of the nineteen coconuts are generated by three patterns (p112, p2 and pgg) that are minor variations on one motion, namely rotation. The differences between these three classes are dimension and direction of repetition. In addition to spirals moving in the same direction, variation is accomplished by placing them in opposite directions.

The designs on the tobacco-containers are mainly two-dimensional (57.6%; Supplement table 10.5). As with the lime-containers, the most frequently used classes are p112 and p2 (21 or 63.4%). Besides these simpler classes, six containers have a more elaborated pattern according to classes pmg (mirror reflection in one direction and twofold rotation). This more complicated pattern does not occur on any of the other objects.

The designs on the wooden plates or dishes can be divided in finite (9 pieces) and infinite designs (14 pieces). The finite designs are mostly figurative designs. The infinite designs are mainly one-coloured, two-dimensional patterns and of the classes p1 (8.7%) and p2 (26.1%). All one-dimensional designs are
generated by class p111 (21.7%). Therefore, almost all the design-patterns on the dishes are generated by rotation and translation only. One design is organised according to class pgg, which is a combination of twofold rotations on glide axes that are at right angles to each other. This pattern also occurs on lime-containers.

The designs on the drums (11 pieces) are mainly one-dimensional (10 pieces). Only one design is asymmetrical. The most frequently used classes are pmm2 (2 pieces), which motion is rotation and reflection in two directions, p111 (3 pieces), p112 (2 pieces) and pma2 (2 pieces). Class pmm2 and class pm (1 piece) only occur on the drums. Thus, the designs on drums are generated by translation, rotation and reflection.

Finite designs occur mainly on the wooden dishes (and on barkcloth). On the coconuts, however, finite designs occur as well. They are placed at the bottom pole and are often star- or circle-shaped. These finite designs are mostly generated by reflection and rotation (Figure 10.10).

![Finite designs on wooden dishes (a) and coconuts (b).](image)

Figure 10.10 Finite designs on wooden dishes (a) and coconuts (b).

10.2.2 Concluding remarks

Some remarks have to be made with regard to the conducted analysis. Despite the clear method and flow-charts defined and made up by Washburn and Crowe (1988), ambiguities in the ascription of designs to classes remained. Some designs were difficult to read because of the addition of motifs which break up the underlying symmetry. Other designs could be interpreted according to more than one class. In all these cases, the largest possible symmetry has been taken. Therefore, it regularly occurred that a design, containing many design elements that were generated by more complex motions, had to be read as a simple p111 or p1 pattern because this was the only way to encompass the whole design.

Finally, the analysis of the patterns on the different objects revealed that most designs are based on simple principles of translation and rotation. When the different classes are clustered according to their basic motions (Figure 10.11), this becomes even more clearer. The designs on the different objects are mainly organised according to these two motions. Thus, by means of translation and rotation a certain level of variation is accomplished and, at the same time, a structural order is created. The order that comes to the fore, is symmetrical and dualistic. Due to this symmetrical dualism, all designs (including those on the barkcloths), are clearly related and make up a definite decoration-style.
### The Way of the Objects

**Figure 10.11** One- and two-dimensional patterns with their basic motions

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>One-dimensional</th>
<th>Two-dimensional</th>
<th>Total Design-patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Translation</td>
<td>p111</td>
<td>p1</td>
<td>41</td>
</tr>
<tr>
<td>Rotation</td>
<td>p112</td>
<td>p2; pgg</td>
<td>47</td>
</tr>
<tr>
<td>Reflection</td>
<td>pm11</td>
<td>pm; cm*</td>
<td>8</td>
</tr>
<tr>
<td>1 reflc. + rotation</td>
<td>pma2</td>
<td>pmg</td>
<td>10</td>
</tr>
<tr>
<td>2 reflc. + rotation</td>
<td>pmm2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Combinations</td>
<td>p111, p112, pm11</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

*In this class the rows of design-elements are offset.*

The principle of dualism derives from the main motif of the Lake Sentani style, the spiral. By rotating this motif, many variations can be achieved which, by adding white colour on the dark wood, gourd or bamboo, have a dualistic nature (Figure 10.12).

![Figure 10.12](image)

**Figure 10.12** The dualistic properties of the spiral. Each black spiral has a white opponent. a = single black spiral, b = double, open spiral, c = double, closed spiral.
11

The Lapita design system

During the Late Pleistocene and the Holocene, complex interactions between the populations of New Guinea and the Bismarck Archipelago, and between those of New Guinea and island Southeast Asia to the west, occurred (Kirch 1997: 43). Thus, groups of people were influenced by genetic and cultural flows from other groups of people. However, the first substantial and distinctively different population migrating into Near Oceania (New Guinea and the islands of the Bismarck and Solomon), occurred about 2,500 BC. These Austronesian speaking people migrated into the Bismarck Archipelago, where they encountered an autochthonous population which was linguistically and genetically distinct. Out of the subsequent, complex genetic, linguistic and cultural interactions that occurred between the migrated and indigenous groups, the Lapita phenomenon would occur (Kirch 1997: 44).

Lapita-style pottery is known from amongst others Ataipne on the northeast of New Guinea (PNG), Manus, Mussau, the Bismarck region, Watom Island off the coast of New Britain, the Solomon Islands and from sites in remote Oceania, which encompasses Vanuatu, New Caledonia (west Lapita) and western (east Lapita) Polynesia (Golson 1972: 554; Kirch 1997: 5, 19, 55). In this discussion it is important to acknowledge that contacts between the north coast of New Guinea and the Bismarck Archipelago occurred both prior, during and after the Lapita period. Some scholars argue that these historical contacts are still visible in modern New Guinean (and other) material culture and are searching for Lapita proto-types, not only in more ancient rock-art (for example C. Ballard), but also in present day artifacts.

One of the scholars who argue for a continuity between Lapita and modern New Guinean designs, is Newton (1988). He has suggested that a continuity between prehistoric Lapita decorations and historical and modern Melanesian material can be discerned. According to his analysis, Lapita designs figure prominently in the two-dimensional art of Lake Sentani (Newton 1988: 16; section 11.1.1). Following Newton's assumption, Craig (1995) has conducted a study of Lapita, and northern and central New Guinea designs. His proposition is that the cultural expansion of Austronesian cultural traits can be explained by mechanisms of trade, gift-giving and warfare (Craig 1995: 240). Since arrows are supposed to be frequently exchanged, Austronesian cultural traits (amongst others in the form of arrows) should be visible in locally made arrow designs. In central Irian Jaya, for example, the role of warfare ensures the widespread consistency in arrow designs (Heider 1970 in: Craig 1995: 240). The result of his comparative analysis indicates the possibility of three episodes of influence (Craig 1995: 255-256):
1. an early period characterised by simpler designs from the early Lapita period in the Bismarck Archipelago (Ambitle, Talasea and Eloaue), which correlates with arrow designs throughout the north coast and central New Guinea regions.

2. a younger period characterised by the more complex designs from the later Lapita period, which are found on arrow designs throughout the northern foothills and the central range from the Mountain-Ok to Lake Kogiago. The later period of Lapita pottery designs, originating from Watom, Reef Santa Cruz, New Caladonia, Vanuatu and Fiji.

3. a more recent period characterised by complex designs found on arrows from the northcoast, Border Mountains, upper Sepik, Mountain-Ok and Porgera-Lagaiap River regions of New Guinea, which seem to appear closely related to contemporary southeast Asian designs.

Hence, there seems to be no relation between the Lapita pottery designs from the Bismarck Archipelago and the more complex arrow designs from, among others, the northcoast, upper Sepik and Border Mountains of New Guinea. In addition to his analyses, Craig argues that a direct comparison can be made between the designs on certain objects of Lake Sentani and equivalent paraphernalia of the Border Mountains and upper Sepik (Craig 1995: 256).

11.1 Lapita and Lake Sentani design traits and elements compared

Since I had no direct access to Lapita material, the required Lapita designs were retrieved from divers scholars. Drawings and pictures of Lapita designs were acquired from the following publications: Green 1979a, 1979; Sharp 1988; Spriggs 1993; Craig 1995; and Kirch 1997. Some 516 design elements or motif types and their distribution over the Bismarck Archipelago, Reef Islands & Santa Cruz, New Caladonia, Vanuatu and Fiji, were recorded by Anson in 1983 (Craig 1995: 248). He concluded that the pottery decoration of Lapita can be subdivided into two groups. The first group representing an earlier period with a simpler style in the Bismarck Archipelago consisting of Ambitle, Talasea and Eloaue. The second group representing a later, more complex Lapita style consisting of the more eastward area of Watom, Reef Santa Cruz, New Caladonia, Vanuatu and Fiji (Anson in Craig 1995: 248). More recently, excavations in the Mussau Islands revealed that complex 'face' designs were present in the Bismarck area as well (Kirch 1997: 133). In this study the inventory of Green (1979: 44) will be used, displaying early widespread Lapita motifs and western Lapita motifs originating from Watom, the Reef and Santa Cruz Islands, the New Hebrides and New Caladonia (Figure 11.4), thus excluding the Bismarck Archipelago. According to Craig the simple designs of this region do not correlate with designs of the upper Sepik and Border Mountains, which, in their turn, are similar to Lake Sentani motifs. Although accepting this hypothesis, available Mussau and Bismarck motifs are incorporated in the analyses as well.

Unfortunately this extensive work (D. Anson, 1983. *Lapita pottery of the Bismarck Archipelago and its affinities*. Ph.D Thesis University of Sydney) was not available to me when writing this thesis.
The designs depicted on Lapita pottery are mainly the result of two techniques, incision and dentate-stamping (Hunt 1988: 129). Dentate-stamped pottery is most frequent in early sites, in most cases a small amount of incised designs is present as well. Gradually incising increases and even persists longer in time than dentate-stamping (Hunt 1988: 129). Most of the decorated sherds are red-slipped. The percentage of decorated sherds in Lapita sites varies between one and thirty percent of total site inventories (Bellwood 1987: 48).

The basic design traits from which the array of Lapita designs was constructed, consists of 25 elements (Figure 11.1). With these basic traits more complex design elements and subsequent designs were achieved. The basic Lapita traits consist of lines, ovals, circles, triangles, meanders and rectangles. The Lapita style is largely geometric. However, figurative elements like anthropomorphic faces (Green 1979a: 21; Spriggs 1993: 14) and stylized animals (Kirch 1997: 138) occur as well. The geometrical designs vary from simple rows of parallel lines and curves to more elaborate geometrical patterns, like interlocking Y's that have a spiral-like appearance (Figure 11.3). The geometrical rows are placed on the upper surface of the pot and arranged in horizontal bands (Bellwood 1987: 48). This 'zoning' is one of the style characteristics of Lapita designs (Craig 1995) and seems to be a characteristic of late Neolithic pottery of eastern Indonesia and the Philippines as well (Bellwood 1987: 48). The 'face'-motifs (Figure 11.3) are also placed on the upper surface of the pot. These motifs are composed out of rectangular meanders, oval eye-motifs and curvilinear, spiral-like, lines or concentric circles. Mostly a small geometrical band is placed above the face-motif.

Figure III. 11.1 Basic Lapita design traits (After Sharp 1988: 65).

Figure III.11.2 Basic Lake Sentani design traits.
When comparing the Lapita design traits (Figure 11.1) and elements (11.4a) with the lake Sentani equivalents (11.2 and 11.4b), several similarities but mainly differences can be perceived. Interesting is the use of spirals and spiral-like interlocking Y's, in mainly the western Lapita pottery designs (Figure 11.3 and 11.4). Another point of mutuality between Lapita and Lake Sentani motifs is the use of star-shaped motifs (Figure 11.3 and 10.10). But this is as far as the similarities between the traits and geometrical elements of the two designs range. Although both the Lapita and Lake Sentani traits are variations on 18 basic design traits (when following the ordering of Sharp 1988 and excluding the spiral which is composed out of curved or straight lines) (Figures 11.1 and 11.2), the specific traits of the two designs differ. Of the 25 design traits (Figure 11.1) from which Lapita motifs are constructed, only 11 traits are used in Lake Sentani motifs (Figure 11.2). Also, the Lake Sentani traits are more divers, when excluding the spiral, 36 traits are commonly used in motifs. Hence it seems that despite the shared eleven traits, it can be expected that the basic composition of Lake Sentani and Lapita motifs is different because most of the traits differ.

FIGURE III.11.5 Common Lake Sentani motifs and patterns. D = motifs on drums. L = motifs on lime containers. T = motifs on tobacco containers and B = motifs on wooden dishes or bowls.
The differing Lake Sentani and Lapita traits and their expected (different) influence on motifs is confirmed by the differences between the design elements of Lapita (Figure 11.4) and of Lake Sentani (Figure 11.5). Only 3 of the early, wide-spread Lapita motifs are used in Lake Sentani designs (M2.4-T9, M19.1-TL1 and M24.5-T5). The western motifs M58.1 and M58.2 show some resemblance with Lake Sentani patterns D12.1 and D12.2. The Lapita 'face' motifs (a) and the M67's are similar to the Lake Sentani patterns T14.1 and T14.2. Finally the Anson 516, and 242-3 motifs (b) from Ambitile (Bismarck Archipelago) are similar to respective T14 and D10. Thus, of the approximately 29 different motifs depicted in Figure 11.4 only 8 equivalents can be found in the Lake Sentani designs.\footnote{Since not all possible Lapita motifs have been studied (note 32), the amount of similarities between Lake Sentani and Lapita motifs could be larger.}

Also, when comparing these geometrical motifs, one has to be aware of the universal use of elements like the spiral, rhombus, triangle, oval and quadrant. Therefore, the formal comparison of geometric elements gives no indisputable facts about possible relationships between the two designs. It only states that people use universal elements. The ordering of these elements is, however, subjected to cultural influences and can be specific for local groups of people (see section 11.2). This can also be stated for the depiction of figurative elements. Contrary to the geometrical elements, the depiction of animals is more cultural specific. Although the fact that animals and anthropomorphic figures are universally depicted, the specific shape and species of these figures is not universal. An analysis of the specific layout of figurative elements can therefore reveal some possible relationships.

11.1.1 Figurative designs

In this section the figurative elements of western Lapita and Lake Sentani designs will be compared. The figurative elements of Lapita designs on pottery consists of animal figures (Figure 11.6a and 11.7a) and anthropomorphic faces (Figure 11.6b). The animal designs do not appear to be regularly depicted on pottery, since (to my limited knowledge) there are only a few sources who mention them. At the Talepakemalai site in the Mussau Islands, three fitting potsherds were excavated, which have an anthropomorphic face design with on either side of it, four-limbed creatures (Kirch 1997: 138; Figure 11.6a). These animals show a striking similarity with Lake Sentani ones, which are depicted on the rocks of Doyo Lama, on wooden plates and in tattoo patterns (Figure 11.7b). According to Kirch (1997: 138), the Lapita creatures depicted on the Mussau sherds, are two-headed. However, as with the Lake Sentani stylized figures, the difference between the front- and back-side is difficult to determine, but it exists. The orientation of the face-design (often depicted near the rim of a vessel) indicates that the orientation of the creatures, which are placed on either side of the face, is upwards as well, placing the tail below. The figure on the right clearly has a neck with a round head and a more triangle-shaped tail (Figure 11.7a).
Figure III.11.6 Stylized animal figures and anthropomorphic faces on Lapita pottery. a. Three sherds excavated at the Talepakemalai site in the Mussau Islands (Kirch 1997: 138). b. Large cylinder with anthropomorphic design excavated at the Talepakemalai site in the Mussau Islands (Kirch 1997: 137).

Figure III.11.7 Stylized Lake Sentani and Lapita animal figures. a. Lapita. b. Lake Sentani. 1= figures depicted on the rocks of Doyo Lama. 2= figures on wooden plates. 3= tattoo patterns.

Besides these similarities in turtle or lizard like creatures, depictions of birds are similar as well. Although to my knowledge birds are not depicted on pottery, the bearers and descendants of the Lapita Cultural Complex engraved birds on rocks. The bird-motif of Easter Island in the far eastern Pacific, can be traced 'back' to the Solomon Islands and also in the Humboldt Bay and Lake Sentani area (Figure 12.1). In the Solomon Islands bird-motifs are engraved on peddles and carved on canoe-prows. In the Humboldt Bay and Lake Sentani area, bird-motifs are engraved on canoes as well, but also painted on house-boards and barkcloth.

According to Newton (1988: 16), the anthropomorphic Lapita face-design can be seen in Lake Sentani barkcloth paintings as well. Especially the abstract reverse spirals in a zoned arrangement (Figure 11.8a) are in accordance with Newton's Lapita '2' design (Figure 11.8b.2). Newton (1988: 16) interprets this specific Sentani motif "[...] as a face, with the oval extended into a dentate mouth-like form, and the lateral scrolls as eyes" (Newton 1988: 16). This description clearly favours the linkage with the Lapita '2' design since this motif is a summary version of design '1', a schematic version of Lapita-designs in which a human face is depicted (Figure 11.8b.1). When comparing these motifs, personally I do not see any clear
ressemblance. The assumption that the Lake Sentani scroll motif is face-like, is not confirmed either by Sentani people who described the motif as a fish or tadpole (Oral communication 1996; see also Part I). However, the divergent meaning of a motif does not have to imply discontinuity. Since meaning resides in the specific context of the motif's use and depiction, a motif can be integrated without knowing or incorporating its former meaning. Therefore, the apparent similarity between a Lake Sentani and Lapita motif can be difficult attested. It can, however, be argued that continuity of one single motif does not yield anything. No information about its supposed continuity (it could also be a local development), nor about the interaction between two groups of people.

![Diagram of Lake Sentani and stylized Lapita designs](Figure III.11.8)

Figure III.11.8 Lake Sentani barkcloth designs (a) and stylized Lapita designs (b). 1 = Lapita design type 1. 2 = Lapita design type 2 (detail sherd, New Caledonia). 3 = Lapita design type 3 (canoe prow, Admiralty Islands) (Newton 1988: 14).

In summary, with regard to the comparison of Lapita design elements with Lake Sentani motifs, three statements can be offered:

1. both the basic design traits and the geometrical motifs are divergent. This means that regarding these elements, there are no, or only minor, similarities between Lapita and lake Sentani designs.

2. in contrast to the geometrical elements, the figurative, animal elements appear to be similar in their depiction. However, in order to substantiate this latter similarity, more depictions of stylized animals on Lapita pottery would be needed.

3. based on the local interpretation of the scroll-motifs and the total absent of anthropomorphic faces in both the two-dimensional and three-dimensional art of Lake Sentani, the influence of the Lapita 'face-motif' in the art of Lake Sentani, seems to be minimal. However, the basic form of this motif is similar to the meander shape (for example TL2 and T14 in Figure 11.5), which is frequently used in Lake Sentani designs (especially on lime- and tobacco-containers).

11.2 Lapita structural principles compared with Lake Sentani design principles

In order to make more 'reliable' statements about congruence or relations in designs, the structural principles according to which the Lapita and Lake Sentani designs are organised will be compared. In the previous section the structural principles of Lake Sentani designs were analysed and it was concluded that mainly 'translation' and 'rotation' were frequently used in the ordering of patterns.
THE WAY OF THE OBJECTS

According to Craig (1995: 248), the structural principles of Lapita pottery of Melanesia include:


2. "Mirror image patterns" (After Mead, Craig 1995: 248). Mirror image patterns have design elements subjected to mirror image symmetry around a horizontal axis (Craig 1995: 243, 248). These patterns equate with Washburn and Crowe's (1988) p1m1, but they can also apply for classes like pma2, pmm and others.

3. "A pattern resulting from 'shifting the mirror image chain a half place to the side' (After Mead in Craig 1995: 248). This pattern can apply to all classes which have glide axes that make the elements offset to each other. Thus, this general pattern can apply to Washburn and Crowe's (1988) pmg, pgg, p2, cm

4. 'very complex compositions' or agglutination (Craig 1995: 248), which could apply to all two-dimensional patterns.

With these general 'structures' a comparison with Lake Sentani designs is only partially possible. What comes to the fore is the absence of 'rotation' in these descriptions of Lapita design structures, rotation being the major motion in Lake Sentani designs. In order to confirm this statement, the symmetry analysis of Washburn and Crowe (1988) is applied on the Lapita motifs that are depicted in Figure 11.4a 37 (Figure 11.9).

<table>
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<th>Motion</th>
<th>Total</th>
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</thead>
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<td>translation</td>
<td>7</td>
</tr>
<tr>
<td>p1m1</td>
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<td>20</td>
</tr>
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</tr>
<tr>
<td>pmm2</td>
<td>reflec.rotate</td>
<td>11</td>
</tr>
<tr>
<td>pm</td>
<td>reflection</td>
<td>2</td>
</tr>
<tr>
<td>cm</td>
<td>reflection</td>
<td>4</td>
</tr>
<tr>
<td>pmg</td>
<td>reflec.rotate</td>
<td>2</td>
</tr>
<tr>
<td>pmm</td>
<td>reflec.rotate</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>N= 54</strong></td>
</tr>
</tbody>
</table>

Figure III.11.9 Classes of Lapita designs.

Most of the one-coloured 54 design patterns are one-dimensional, only 9 are two-dimensional. Most of the patterns pertain to class pm11, which implies vertical mirror reflections, perpendicular to the central axis of the band. Another frequently used class is pmm2 in which mirror reflections are both horizontal and vertical with halfturns about all points of intersection of the mirror axes (Washburn & Crowe 1988: 113). Thus, in these Lapita patterns, reflection plays a major role (51.9% of the patterns are generated by reflection alone, 35.2% by reflection and rotation).

37 It would be better to submit a far larger amount of Lapita motifs to a symmetry analysis. However, when writing this thesis, only limited information and material regarding Lapita designs was available to me.
Thus, compared with the Lake Sentani patterns, in which translation and rotation are important motions, the Lapita designs are generated by a different principle. The Lapita classes pm11 and pm2 hardly occur in Lake Sentani designs (Figure 10.11; Supplement table 10.11). The latter class is found on some drums only. The most frequent used class in Lake Sentani designs 'p112', does not even occur in the Lapita designs. However, there could be a bias in my analysis due to the fragmentary depiction of Lapita designs. The motifs presented by Green (1979: 44) are mainly rim or border designs. These are often placed above or below the main design. However, the main designs of Lapita pottery, mostly anthropomorphic faces (Figure 11.3) are ordered according to class pm11 as well. Therefore, it may be assumed that, contrary to Lake Sentani designs, Lapita designs are mainly generated by vertical reflection. Thus, based on this symmetry analysis, the Lapita and Lake Sentani design structures do not correspond with each other.

11.3 Conclusion

In summary, four main arguments can be stated.

1. The basic geometrical design traits and the geometrical motifs are divergent. This means that regarding these elements, there are no, or only minor, similarities between Lapita and Lake Sentani geometrical designs.

2. In contrast to the geometrical elements, the figurative, animal elements appear to be similar in their depiction in Lapita and Lake Sentani designs.

3. Based on the local interpretation of the scroll-motifs and the total absence of anthropomorphic faces in both the two-dimensional and three-dimensional art of Lake Sentani, the influence of the Lapita 'face-motifs' in the art of Lake Sentani, seems to be minimal. However, its basic form, the meander, is frequently used in Lake Sentani designs.

4. The structural principles that govern the Lapita and Lake Sentani designs are different. The former designs are generated by reflection, the latter by translation and rotation.

So, the only similarities and therefore possible continuities that may occur between Lapita and Lake Sentani designs concern some single motifs like the stylized animal figure or Newton's 'face'-motif. The stylized animals are depicted on sherds excavated on the Mussau islands, which are situated near the island Manus in the Bismarck Archipelago. The Lapita face-motifs, which also show some resemblance with Lake Sentani patterns, are found in this site as well (Figure 11.4a; Kirch 1997: 134-5). Thus, based on these few examples, it seems that Lake Sentani motifs are most related to motifs originating from the Mussau Islands. To make this statement more reliable, more depictions of not only stylized animals on Lapita pottery would be needed, but also an analysis of a wide range of Lapita designs from different sites.

However, as already stated, the continuity of one or maybe two motifs gives no information at all. Unlike the structural analysis, which clearly showed that there is no congruence between Lake Sentani and Lapita designs. Therefore, the mutual influence on either design system can be disregarded.
The Dongson design system

The discovery of a few Dongson bronzes in Irian Jaya, amongst others in Asei, Lake Sentani, supported many scholars in their conviction that 'Bronze Age' influences may have influenced prehistoric cultures of New Guinea. Analogies between Dongson and recent designs were especially made for the art of the Massim area of east Papua New Guinea (Golson 1972: 582). This because Massim art is characterized by detailed spiral or scroll ornaments, which resemble the designs on Dongson bronzes. Furthermore, some objects like gobaela ('shell-currency presentation sceptre'; Meyer 1995: 152-3) are shaped like Dongson axes or, when viewed with the blade pointing down, the representation of the single masted mythical canoe that brought the people from their ancestral lands to their present home (Meyer 1995: 141). However, the Massim territory is far beyond the present range of bronze finds. Furthermore, there are no substantial archaeological data that may support these hypotheses.

However, in Lake Sentani Dongson bronzes were present, although their arrival in Asei occurred probably not too long ago, possible being traded in exchange for birds of paradise and other goods in the 16th-17th century. It would be too optimistic to presume that these objects can be correlated with a Dongson expansion into Melanesia around the turn of the era. Although some scholars argue that at this time certain Indonesian objects, mainly bronzes and textiles, were dispersed eastward to West New Guinea (Newton 1988: 10), the exact dates of their arrival in the Bird's Head 38 and subsequent dispersion along the northeast, are unknown. Important for a possible integration of Dongson motifs in Lake Sentani designs, is the fact that although Dongson bronzes were present in the area, most of these artifacts are undecorated (Van der Sande 1907). Only two of the six Dongson bronzes found in the Lake Sentani area, are decorated, though with minor designs only. The decorations on one of the two axe blades consist of a row of triangles, followed by two curvilinear motifs, surrounded by curved lines (RMV: 1528: 445). The other object has small rows of connected spirals and some meander or zig-zag lines (RMV: 1528: 447).

Even though the motifs depicted on the Dongson bronzes are frequently used in Lake Sentani designs, it would be rather surprising if these designs have determined or substantially influenced the entire design system. Thus, despite the fact that some Dongson bronzes were present in the area, their influence on the local design system should not be over emphasized.

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38 Some remnants of these bronze artifacts were found in the Bird's Head, where several fragments of kettledrums were preserved as sacred objects by the Mejbrat (Newton 1988: 10).
12.1 Some formal analogies

Several scholars have made analogies between recent Melanesian and Dongson motifs. Mino Badner (1972: 625) even argues for the existence of the Dongson ship-of-the-dead complex in the art of the Admiralty Islands on the basis of mythological, functional and visual parallels with Indonesian-Dongson images and concepts. Visual parallels are made with the spiral ends on wooden bowls and with a bird-head motif that occurs on Dongson ships-of-the-dead and canoe-prows of the Admiralty Islands (Badner 1972: 607). Other scholars expand the geographical region by advocating a relation between Chinese, Eastern European, Southeast-Asian (e.g. Dongson) and, via Dongson, Melanesian designs (Schuster 1972: 258). Schuster's argument is based on formal design similarities between Carpathian brooches, Chinese embroideries, Dongson bronzes and shell-amulets from the Solomon Islands. Besides these apparent formal similarities, he compares the depiction of birds in the different regions and concludes that these all look very much the same. He denies the argument of independent developments for the shell-ornaments of the Solomon Islands, by pointing to the strong western analogies. He concludes that: "a whole complex of peculiarly conventionalized bird-motifs reached the Solomon islands from the West. The funnel through which the tradition carrying these motifs poured into the Pacific was Southeast Asia - more specifically the area dominated by the Dongson Culture at the time around the turn of the era" (Schuster 1972: 284).

Schuster's analogies are solely based on formal similarities of motifs. This extreme diffusionist perspective is not founded on archaeological evidence and ignores the possibility of independent developments of motifs. None of the different types of objects, which decorations he compares, were found in any of the other regions. Besides these methodological problems, the formal analogy he makes between Dongson and Solomon bird-motifs is not very convincing. In fact, the bird-motif of the Solomon Islands clearly resembles the bird-motifs of the northeast of New Guinea and the Pacific islands, for example Easter Island (Figure 12.1). Since there are no indications of Dongson features or people pouring into the remote Pacific, the dispersal of the bird-motif is more likely associated with earlier Austronesian (Lapita) influences (see previous section). The descendants of the Lapita people colonised Easter Island around AD 690 ± 130 (Bahn 1993: 53).

Figure 12.1 Dongson (1), Solomon (2), Humboldt Bay (3) and Easter Island (4) bird-motifs.
12.1.1 Contextual analogies

The previous formal comparison of Dongson birds with Melanesian and Polynesian frigate birds, is also made by Bleckman (1973). However, he incorporates this bird-motif in a Dongson amphibian complex that entails motifs derived from amphibians, avian life, and prenatal stages of human development, which is accompanied by myths (Bleckman 1973). Bleckman argues for its dispersal over pre-Buddhist Indonesia, New Guinea, Melanesia and Polynesia (including Easter Island) and tries to support his Dongson tadpole hypothesis by pointing to an accompanying creation myth which survives today among the Wa tribes of Burma and Yunnan province, China. The presence of an abundant Oceanic amphibian life and Oceanic legends that also refer to the amphibian origins of mythical persons, seems to support his thesis.

Bleckman's formal analogies between tadpoles depicted on Dongson ko daggers and Melanesian material, are quite bewildering. Besides the supposed formal resemblances, Bleckman argues that the frog and tadpole, which play an important part in (Dongson) creation scenes and myths, are depicted on diverse Melanesian objects, like a Solomon carved shell and a Papuan Gulf ancestor shield (Figure 12.2). The different components of the ancestor shield form an analogy to the creation scenes depicted on the Dongson ko (Figure 12.2a). The confronting fish-like forms (drawing 1) are derived from tadpoles. "They outline (literally create) a central humanoid embryo (drawing 2) that shares characteristics with a frog" (Bleckman 1973: 4). This interpretation of ancestor shields as creation scenes, expressing the giving birth and growth of life, can be confirmed by the function and use of the shields. Ancestor shields, or gope, can be divided in three types that are associated with initiation cycles, individual clan-ancestors and young, uninitiated boys who possess their own small gope. These latter boards help the young boys grow towards their adulthood or initiation (Meyer 1995: 117). The human figures on the boards have their limbs depicted as long oval loops (Meyer 1995: 117). Similar in design are the skull racks or agiba of the more eastward Kerewa people. These racks were used to attach human trophy and animal skulls (Meyer 1995: 118-119). Thus, it may be concluded that the boards were used in a context of growth, initiation, life and dead, hence the creation and end of life, like the ko daggers.

Insofar as this relation between Dongson creation scenes and designs depicted on Papuan Gulf ancestor boards may be possible, Lake Sentani has only scroll motifs that are described by local inhabitants as tadpoles or fish (Figures 1.1.1, III.11.8). Besides their formal analogy with tadpoles or fish, they resemble -when turned up side down- little, stylized single-masted canoes, like the gobaela in the Massim area, which are possibly related to the ship-of-the-dead designs on Dongson gongs. They also resemble the spiral-handles of the Admiralty Islands, which are, according to Badner (1972: 614-5), related to the Indonesian Dongson ship-of-the-dead complex. In Lake Sentani any more substantial data confirming this latter hypothesis are absent. Origin myths reveal nothing about ships or other aspects of the Dongson ship-of-the-dead complex. Also, although amphibian life is abundant in the Lake Sentani area and frogs are frequently depicted on wooden bowls, barkcloth and tattoo patterns, they are not
mentioned in creation or any other myths known to me. However, the creation myth of Lake Sentani starts with an egg out of which life (the female earth) came forth (Part IV).

![Designs on Bronze Ko daggers and ancestor board from the Papuan Gulf](image)

Figure III.12.2 Designs on Bronze Ko daggers (a), compared with an ancestor board from the Papuan Gulf (b) with its three components: 1. fish-like form derived from tadpoles, 2. frog-shaped motif, and 3. amphibian skull-like (3a) motif (Bleckman 1973).

12.2 The Dongson and Lake Sentani design system compared

The Dongson style is most visible on bronze kettle-drums. Three parts of such a drum have been discovered in Irian Jaya, namely in the Bird's Head among the Meybrat people (Bernet Kempers 1988: 291, 413-414). However, only fragments of the tympan, the 'batter-head', were found. Revealing no other decorations than the star-shaped motif at the centre of the tympan (Bernet Kempers 1988: 413-414, fig. 8.01, 8.02 and 8.03).

The design elements depicted on Dongson drums consist of stylised animals (frogs (depicted three-dimensional only), elephants, deer, birds, tigers, horses and fish), figurative elements (boats and houses with people) and geometrical patterns (Glover 1992: 224; Heekekeren 1958; Bernet Kempers 1988; Figure 12.3 and 12.4). The geometrical elements consist of rectilinear meanders, running or interlocking spirals, dot and circle infill elements, hatched triangles and ladders (Glover 1992: 224; Heekekeren 1958: 97-98). One of the most prominent animals depicted on the drums are flying cranes. Boats or ships with crews in feathered head-dresses, constitute another characteristic element of Dongson drum designs (Glover 1992: 224). These scenes are depicted in large horizontal bands. Stylised animals and geometrical
patterns are respectively arranged in bands and smaller rows. The rows consist of only one single repeated geometrical element. The larger figurative bands contain one single repeated element or a mixture of diverse figures that have a narrative appearance, the scenes. On the drums, several rows are placed horizontally below each other creating a zoned arrangement of varying and similar geometrical patterns. Between several geometrical rows, often a band of stylised figures, like animals or figurative scenes, is placed. These larger bands sometimes contain vertical rows, parallel and below the handles of the drum.

The symmetry analysis of Dongson designs was solely based on patterns depicted on Hegar I type kettle-drums. Depictions of these drums were retrieved from Bernet Kemper’s (1988) inventory of Hegar I types. A total of 24 drums or fragments of drums could be studied (Supplement: Table 12.1 and Table 12.2). Due to the often fragmentary or unclear depictions of the drums, not all designs present on the drums could be 'read'. The studied drums originate from different geographical locations, like Java, the lesser Sunda Islands, the Moluccas, Irian Jaya and mainland southeast Asia. The 'ages' of the drums differ as well. Although the contexts of the drums varied, their appearance is homogeneous. All studied drums have a star-shaped motif on the tympan. Around its central depiction, which is often slightly elevated, rows and bands of geometrical and figurative patterns or figurative scenes are placed. Sometimes three-dimensional frogs are placed on the outer rim of the tympan. The bodies of the drum have a zoned arrangement as well. Figurative scenes displaying boats and their crew, are mainly depicted on this part of the drum. Scenes with houses and humans, often dancing and making music, are also depicted on the tympan. The meaning of these figured scenes changes according the interpreter (Bernet Kemper 1988: 131-137).

Figure III.12.4 Dancers and musicians, drum 11.30 (In: Bernet Kemper 1988: 122)
<table>
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<th></th>
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Figure III.12.5 Geometrical Dongson (kettle-drum) elements depicted in rows. * = Example of similar patterns depicted in bands.

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Figure III.12.6 Figurative Dongson (kettle-drum) elements depicted in bands.
Almost all design patterns (a total of 121)\(^{39}\) depicted on the twenty-four Dongson drums are one-dimensional. Only the decoration on the handles and one figurative pattern (Figure 12.6, type 2) are two-dimensional, consisting of translated birds in two directions. All patterns are one-coloured. The handles on all the drums were decorated with a vertical pmg pattern, consisting of a two-dimensional reflected herring-bone motif. The most frequently used design elements are concentric or dotted circles (type 1), 'ladders' or short straight lines (type 3), running, interlocked spirals (types 6) and connected concentric or plain circles (type 7). Next to these geometrical elements the dominant depicted figurative elements are birds, mostly flying cranes (type 1). These different types of elements are repeated in rows and bands according to three motions. Types '1' and '3' are governed by reflection, types '6' and '7' by rotation and figurative type '1' by translation.

Conclusively, the dominant patterns on Dongson kettle-drums are generated by translation (p111), reflection (pmm2 and pm11) and rotation (p112) (Supplement Table 12.2 and 12.3). Especially reflection (43 patterns) and rotation (41 patterns) are dominant. Compared with Lake Sentani designs, in which reflection only plays a minor part, the Dongson designs have a less complex and more static character. This static appearance is due to the predominantly horizontal zoning of one-dimensional single patterns in rows and bands. The simple character of the main design elements, concentric circles and italic or vertical short lines, is somewhat reduced by adding one or sometimes two rows with running spirals. By repeating and alternating these geometrical rows and combining them with figurative bands and scenes, alternation and complexity is established.

Finally, it can be stated that the design system of Dongson drums, does not resemble the Lake Sentani design system. The only clear congruence can be found in the spiral patterns - which also accounts for the dominant position of rotation in both design systems- and the star-shaped motif depicted on the tympan. Also, the row with stylised lizards (Figurative type 5) on a tympan of one of the drums, is similar to equivalent figures in Lake Sentani designs. However, the overall lay-out of the Dongson designs with clear zoning and narrative like figurative scenes, is not characteristic of Lake Sentani designs. In fact in Lake Sentani designs, depictions of human figures rarely occur. Moreover, the structural lay-out of both design systems is different. One of the main symmetry classes in Dongson designs, reflection, is hardly present in Lake Sentani designs, which are governed by translation and rotation.

\(^{39}\) This total of 121 patterns is not the whole amount of rows and bands that are depicted on the twenty-four drums. Of each drum an inventory is made of the different patterns (Supplement Table 12.1). Thus, repeated identical rows or bands of patterns on a drum are not included.
Some remarks, more analogies and conclusions

Summarizing the previous chapters, it can be said that there is no congruence and therefore no continuity between Lapita and Lake Sentani ordering principles. The same holds for Dongson structural principles, which are significantly different from Lake Sentani principles. The only similarities between Lapita, Dongson and Lake Sentani designs are some motifs. The formal analogies between Dongson and Lake Sentani motifs concern the spiral patterns and the star-shaped figures. Those between Lapita and Lake Sentani designs encompass motifs like the single spiral, star-shaped figures, round meanders and figurative animals. Especially the figurative elements seem to be important since these are frequently depicted on Lake Sentani barkcloth and rocks, and figure prominently in tattoo patterns. Thereby, certain of these depicted animals had a special relation with the Lake Sentani people, which is expressed among others in food prohibitions, in the monopoly on depiction of specific animals and in their occurrence in myths (Parts IV and V).

Green (1979a) already established a congruence in these materials (pottery, barkcloth and tattoos) during (and prior to) the Lapita period. It is even argued that the art of barkcloth manufacture (plus decoration) and tattooing was spread over the Pacific by the ancestors of the Polynesians, the bearers of the Lapita Cultural Complex (Green 1979a: 16). Next to this congruence in materials, Green (1979a: 26-31) established a continuity in design elements and principles of composition as well. Thus, the designs depicted on Lapita pottery and Polynesian barkcloth and tattoo patterns, seem to correlate. Lake Sentani people also made frequent use of barkcloth and tattoos, however, the structural patterns of these designs (mainly spiral ornaments and figurative elements, mostly animals) are divergent from the Polynesian equivalents in which geometrical patterns dominate. However, the transposition of certain motifs, like animal figures, could have occurred, leaving the structural system of either ‘culture’ intact. If there has been (direct or indirect) contact between the Lapita people of the Bismarck Archipelago (or other regions) and ancestors or predecessors of the modern Lake Sentani inhabitants, it is most likely that the receiving party did not copy total designs, but selectively chose some locally, interesting motifs. Since the animal designs on Lapita sherds are quite rare, it could therefore also be argued that the Lapita people incorporated New Guinean animal designs into their own design system, displaying them not in tattoos and on barkcloth, but on pottery and subsequently in rock-art.

The transposition of motifs could also be argued for some Dongson design elements, especially with regard to the rows of intertwining spirals, which the Lake Sentani or other Papuan groups could have incorporated in their design systems. Subsequently, elements or motifs could be locally adapted and transformed, giving them new meaning and new significance.
13.1 More analogies

Apart from the few formal analogies between Lapita, Dongson and Lake Sentani material, other analogies can be made as well. For example, a comparison can be made between designs from the Yami, who live on the little island Botel Tobago, east off the southeastern coast of Taiwan, and Lake Sentani designs. The Yami are more or less isolated from Taiwan and were able to maintain much of their indigenous culture (Ch'i-Lu 1972: 399). They depict their designs on house-posts, wash-strakes of boats and stern ornaments. Designs consist mainly of saw-teeth, zig-zag lines, diamond series, concentric circles and human figures. These figures are called 'magamae' and refer to a legendary figure who has taught the Yami the art of boat building and agriculture, which are two of the most important cultural traits of the Yami. The human figures are round-headed, broad-shouldered, narrow-waisted and are depicted standing with their hands raised and legs crossed. On their head's they have headdresses, sometimes in the form of spirals and feathers. The hands are also sometimes expressed in the form of spirals or feathers. The designs are usually painted in three colours; white made of lime, red from lateritic soil and black from soot scraped from boiling pots (Ch'i-Lu 1972: 399).

It is remarkable how some of the Yami designs and techniques resemble Lake Sentani motifs and techniques. Since the Formosan aborigines are culturally and linguistically Malayo-Polynesian, the Austronesian expansion probably started with the colonisation of Taiwan around 3,000 BC 40 (Solheim 1984: 42-43; Bellwood 1985: 120-121; Kirch 1997: 48), transpositions of motifs between groups in Taiwan, the Philippines and the northeastern of New Guinea could have occurred.

The Austronesian expansion included many (archaeological) features, like pottery, which are also indicative for Lapita (Kirch 1997: 47). Together with the Austronesian language, these traits were spread through Taiwan, the Philippines, Sulawesi and Halmahera, in about one-thousand years, reaching Halmahera by about 1,600 BC (Kirch 1997: 47-48). The Lapita ceramic complex can be seen as an extension of these later Neolithic Southeast Asian ceramic complexes (Kirch 1997: 52). For example, relationships between Lapita and Southeast Asian designs are suggested with respect to Sulawesi. In the Kalumpang site on the Karama river, Neolithic ceramic assemblages have been excavated, whose designs show not only a striking similarity with Lapita motifs and human-face designs (Kirch 1997: 50), but also with Lake Sentani motifs. For example the double spiral-motif, which is not used in Lapita designs, is present on these Sulawesian wares and in Lake Sentani designs. Since contacts between Sulawesi and West New Guinea are not unlikely, complex relations and (direct and indirect) contacts between Southeast Asian, Lapita (Austronesians) and Papuans cannot be excluded.

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40 Apart from this first stage of Austronesian expansion, a second stage has been discerned as well, starting around 2,000 BC. Both the first and second stages are supposed to have originated in the southern islands Philippines- eastern Indonesian area (for example Kirch 1997: 52). However, another hypothesis regarding the Austronesian expansion is formulated also. This scenario encompasses two separated colonisations of Taiwan and favours southern China and northern Vietnam as the Austronesian home-lands (Solheim 1984: 42-43). In both scenarios the Taiwanese Austronesians would have come from southern China (Solheim 1984: 43).
Apart from the possible relations or influences stated above, it is argued that Lapita and Dongson 'cultures', could be related as well. If this is the case, it is fairly impossible, or maybe even totally arbitrary, to determine whether contemporary Melanesian designs are related to Lapita or to Dongson! This relation would certainly explain why different scholars, like Newton (1988) and Badner (1972), use the same Melanesian motifs as evidence for respectively Lapita (Newton) and Dongson (Badner) influences.

A possible relationship between Lapita and Dongson cultures, is implicitly indicated by the assumption of a relationship between Lapita pottery and the western and central Indonesian Sa-hu'ynh-Kalanay pottery complex. Next to the rectangular, polished stone-adze and Lapita pottery, the Sa-hu'ynh-Kalanay pottery has namely also been associated with early-Austronesian-speakers (Solheim 1984: 37). This pottery complex has amongst others been found in scattered sites in the Philippines, from west Irian Jaya to Java, and in lowland and coastal Vietnam (Solheim 1984: 37). The earliest C-14 dates for the Sa-hu'ynh-Kalanay pottery are around 1,200 to 1,500 BC (Solheim 1984: 37). The Lapita and Sa-hu'ynh-Kalanay pottery show many similarities in designs; however, little is known about the relationship between the two complexes. It has been argued that Lapita pottery has evolved out of the Sa-hu'ynh-Kalanay pottery (Solheim 1984: 37). However, Sa-hu'ynh-Kalanay pottery has not (yet?) been found in South China, but in North and South Vietnam sites are well known (Solheim 1984: 37).

In the southeastern parts of New Guinea, decorated pottery with motifs having a general resemblance to the Sa-hu'ynh-Kalanay tradition are known (Golson 1972: 581). Comparisons have been made between these ceramics and modern Mailu pottery. Among the motifs concerned is the curvilinear scroll under various guises, a design common in the Sa-hu'ynh-Kalanay complex but unknown in the decorative repertoire of island Melanesian pottery (Golson 1972: 582). The scroll or spiral is one of a number of Sa-hu'ynh-Kalanay motifs that also appear on Dongson bronzes (Golson 1972: 582). However, despite the sharing of many geometrical patterns, the archaeological correlation between Sa-hu'ynh-Kalanay pottery and Dongson bronzes is zero (Solheim 1972: 528). In order to account for the similarities in design, Solheim (1972: 529) argues for an ancient Southeast Asian artistic tradition, establishing a common origin of Sa-hu'ynh-Kalanay and Dongson designs. Derived from this relation and the supposed relation between Lapita and Sa-hu'ynh-Kalanay pottery, an (indirect) relation between Lapita and Dongson exists as well.

Another feature that may indicate a possible transfer of motifs and designs between Lapita and Dongson or other 'Bronze Age' cultures, is the similarity between Lapita designs and designs engraved on blades of bronze ceremonial axes, originating from Roti Island (Newton 1988: 15). Since these Lapita designs predate the axes, a simple Dongson-Lapita chronology is impossible (Newton 1988: 22). So it could be possible that the designs on these bronze axes derived from Lapita designs on pottery.

It is clear that these relations are vague and cannot (yet) be proved by archaeological data. They are, therefore, only an indication of the complex relations that may exist between material culture traditions and human societies. The linguistic traces of the Austronesian expansion can be tied down with
date-estimates from archaeology (Solheim 1984; Bellwood 1985: 120; Kirch 1997: 48). However, is it also possible to trace it down with comparison of recent material culture? To prove processes of diffusion or transposition involving motifs or designs is a difficult task when one does not want to slide into diffusionists arguments and ignore local developments and changes. Formal analogies based on congruence in a limited amount of motifs cannot be a measure of cultural contact or even diffusion of motifs, since formal analogies can be made between all human cultures and their decorative designs. Apart from the previous formal analogies with Taiwanese, Sulawesian and Dongson designs, many other formal analogies between the northcoast of New Guinea, Southeast Asia and even America and Europe can be made as well.41 Like the analogies just mentioned, they ignore one aspect that all cultures and people share, namely their humanity. This implies that similarities in different aspects of different people may occur. Thereby, most of the formal comparisons do not contribute to our understanding of past processes because they not only ignore the possibilities of independent local developments that can result in similar motifs, they also ignore the fact that people and their design systems change and are in no sense static entities. Finally, these diffusionist scholars ignore the complex situations and relations that may exist between different groups of people, by focusing on design aspects only.

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41 See for example the three volumes edited by N. Barnard (1972) that are the result of a symposium regarding 'Early Chinese art and its possible influence in the Pacific Basin', held in 1967. Most of the contributors decline into the comparing of designs, derived from different objects, explaining similarities by processes of diffusion.