



Fig. 1. Lacquerware decorated with mother-of-pearl, dated about 18–19th century A.D.

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The Techniques of Producing Ancient Thai Lacquerware

Introduction

Lacquerware is a general term for an utensil made of a woven bamboo substructure or a wooden substructure coated with lacquer derived from the tree of the family *Anacardiaceae*. Lacquerware was probably first made in China.¹ An early technique of making lacquerware was to apply lacquer directly on the substructure. The technique was gradually developed with multi-layer lacquer coatings and the use of fabric to reinforce and strengthen the substructure. The surface decoration on lacquerware was later embellished by using colored lacquer, gold and silver ornament or mother-of-pearl inlay (fig. 1). Gradually the technique used by the Chinese to produce lacquerware spread to other countries in East and Southeast Asia. The manufacturing of lacquerware in most of the countries of Southeast Asia, including Burma, Vietnam, and Thailand is well established at the present time, but the origins of the production process are quite obscure.

There is no reliable evidence on how and when lacquerware was first made in Thailand. It is believed that the technique of making lacquerware was brought to Thailand by the tribe 'Thai

Kern'.² The 'Thai Kern' originally lived in Chiang Tung in the southern part of China and later migrated to northern Thailand, Chiang Mai. They made and used lacquerware as household utensils and the Thai natives learnt how to produce lacquerware from them. This is the reason why we use the term 'Kreung Kern' for Thai lacquerware. Lacquerware became popular throughout this region. It declined in popularity after ceramics, aluminium wares and plastic wares were introduced.

The techniques of producing lacquerware was passed from generation to generation. There was no record of the extraction process and the technique was gradually changed due to the limited raw materials, the influences of new technologies and commercialization. The technique of producing lacquerware is still practised in Chiang Mai, but now it has lost its own traditional character. The objective of the present work is to investigate the manufacturing techniques of ancient Thai lacquerware by interviewing craftsmen in the lacquerware manufactories in Chiang Mai and the examination of a number of chosen pieces of ancient lacquerware found in the province Chiang Mai by scientific methods using X-ray radiography and microscopic analysis.

Experimental Materials

Wat Chiangmun is the first temple in Chiang Mai. It is located on Rachapakinai road inside the old city near Chang Phuak Gate. In former times it used to be the palace of King Mengrai the great, who ruled Lanna Thai in 1296 A.D. After he established the city of Chiang Mai, he turned the palace into a temple. This temple has a large collection of antiquities and art objects donated by the local people and a monastery museum open to the public. Seventeen ancient pieces of lacquerware in various shapes were selected from Wat Chiangmun for this study.

Equipment and Experimental Conditions

X-ray radiography was carried out using an Andrex CMC 402 X-ray instrument operating condition 60–200 kVp and 0–8 mA with Fuji X-ray films 100x, 10 x 12 inch and developed with Fuji Hi-Rendol 1 and Hi-Renfix 1. Microscopic analysis was performed using a Nikon Labophot-2 microscope equipped with a Nikon Photomicrographic equipment Model H-III. Small samples were taken from the ancient lacquerware for the preparation of cross sections.

Results and Discussion

Two lacquer masters, Mrs. Peeya Piyasak, aged 78, and Mrs. Chumjai Chantawong, 85 years old, were interviewed. Both of them live in Ban Kern village, Tambol Hai Ya, in the province of Chiang Mai, and know well about the traditional process of making lacquerware. They explained, that in former times woven and coiled bamboo strips were mainly used for lacquerware substructures. Wooden substructures were only used more recently.

The lacquering process consists of four steps: The first step, the residue of raw lacquer, is applied on the substructure and then it is placed in a humid underground chamber, which is built by digging into the ground to make a room with a dimension of about 2 x 2 x 2 metres covered with a roof. When lacquer is cured, it is polished with an abrasive stone followed by the second coating of *smook* (a coarse undercoat) made by mixing clay, paddy ash and lacquer. The object is again placed in the humid underground chamber. After it has dried, it is polished again with an abrasive stone and *bai nod* (streblus asper) a leave of plant. The third step, *smook oon* (a fine undercoat) made by mixing grinded paddy ash with lacquer is applied layer after layer at least three times on the object. When it is dried, it is carefully polished with *bai nod*, followed by the final coat of clear lacquer (a filtrated lacquer). In the case of colored lacquerware, a pigment such as cinnabar is mixed with lacquer and is applied on the lacquerware before adding the final coat of clear lacquer.

There are two traditional techniques for the decoration of ancient Thai lacquerware known as *lai kud* and *lai rod nam*. The process of making *lai kud* or incised design, is starting from the engraving of the design with the free hand on the lacquerware using a sharp iron stylus. Then, grinded pigment mixed with lacquer is applied. After rubbing gently, the color remains in the engraved designs. Then, a final coating of clear lacquer is applied. On the other hand, the process of making *lai rod nam* consists of drawing the design and covering all their smallest details which have to remain black with a yellow gummy paint made by mix-

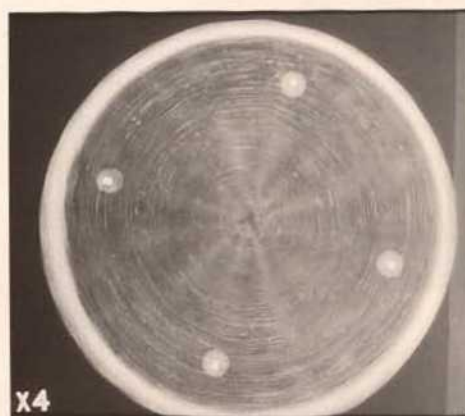


Fig. 2 a–c. Red shallow tray, *lai kud* design

ing Mongosa sap with *ho radan* (Orpiment) and a solution made by soaking a fruit of *Acacia concina* in water. Subsequently, a thin coat of lacquer is applied onto the surface. When it is half way dried, gold leaves are applied on the whole surface. After twenty-four hours the object is washed with water. Water detaches the gold leaves adhering to the yellow gummy paint. This will allow the design to appear in all details. The technique is therefore called *lai rod nam*, which means ornaments washed with water.

X-ray radiography has proved to be useful for the study of lacquerware substructures³, as well as microscopic analysis showed useful for the study of the composition and the layer structure of the lacquered objects⁴. We now employ the same techniques for the study of seventeen pieces of ancient Thai lacquerware from the museum of Wat Chiangmun. Some examples showed significant features and characteristic results.

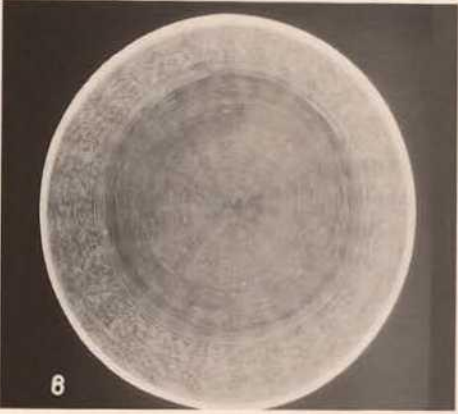


Fig. 3 a, b. Red shallow bowl, *lai kud* design

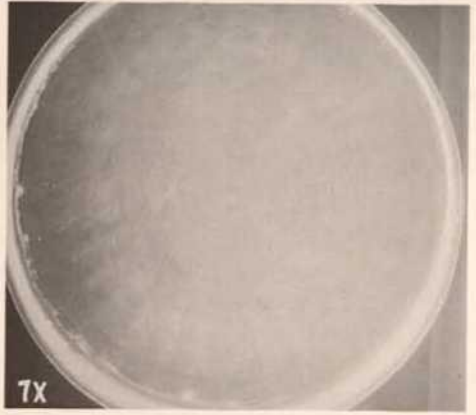


Fig. 4 a-c. Red shallow tray, *lai kud* design

Sample 1

Red shallow bowl, *lai kud* design, width 20.5 cm, height 3 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 20 seconds, distance from tube 74 cm. Result: The substructure is made from woven bamboo strips in twill style at the bottom of the bowl. Bamboo strips are coiled to form the shape of the vessel. There are thick coiled bamboo strips to strengthen the vessel at the top, middle and bottom of the vessel. Under the microscope 3 significant layers become visible: a coarse layer, a fine layer, and a red colored layer (colour plate VIII.1, 4, 7).

Sample 2

Red shallow tray, *lai kud* design, dimension 22.2 cm, height 5 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 20 seconds, distance from tube 74 cm. Result: The substructure uses bamboo strips as the warp and bamboo in a wire shape as the weft. It has four hard wood legs at the bottom. Under the microscope 4 lacquer layers become visible: a coarse layer, a fine layer, a red colored layer and a clear lacquer finish at the top (fig. 2 a-c).

Sample 3

Red shallow bowl, *lai kud* design, dimension 20.5 cm, height 6.8 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 15 seconds, distance from tube 74 cm. Result: The substructure uses bamboo strips as the warp and wired bamboo as the weft to shape the bowl. The incised design is very sharp (fig. 3 a, b).

Sample 4

Red shallow tray, *lai kud* design, dimension 20.5 cm, height 4.5 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 3.0 mA, 10 seconds, distance from tube 74 cm. Result: The substructure consists of bamboo strips as the warp and wired bamboo as the weft of the bottom. The coiled bamboo strips are used to shape the vessel. Hard wood is used to strengthen the rim of the vessel. Under the microscope the structure of the cell wall of the wood becomes visible. The coating consists of 4 layers: a coarse layer, a fine layer, a red colored layer and a clear lacquer finish (fig. 4 a-c).

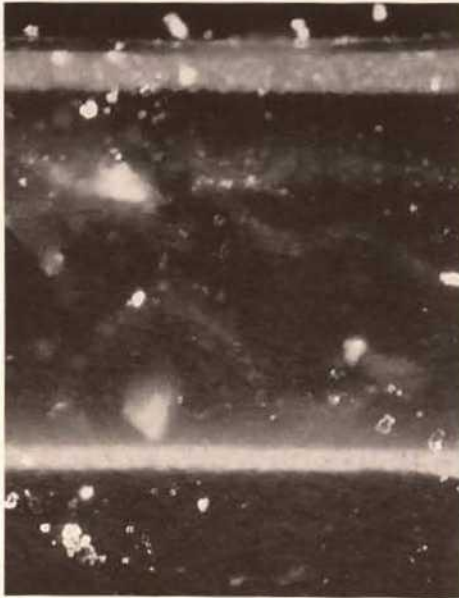
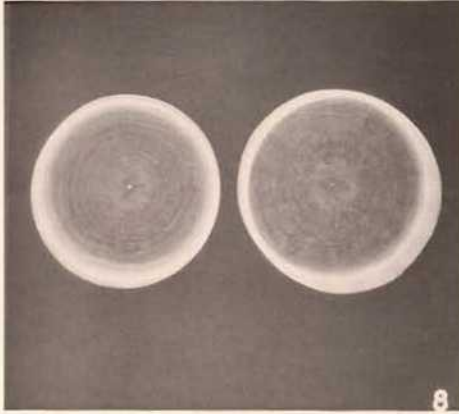


Fig. 5 a-c. Cylindrical box with cover, *lai kud* design

Sample 5

Cylindrical box with cover, *lai kud* design, dimension 10.0 cm, height 5.7 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 15 seconds, distance from tube 74 cm. Result: The substructure consists of bamboo strips as the warp and weft of the body and the lid of the box. This example has several lacquer layers. There is a coarse layer, a fine and a colored layer, followed by the same layer sequence and a clear lacquer finish. The final layer is heightened with gold (fig. 5 a-c).

Sample 6

Cylindrical box with cover, *lai kud* design, dimension 12.0 cm, height 7.3 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 15 seconds, distance from tube 74 cm. Result: For the substructure bamboo strips are used as a warp and wired bamboo as the weft to shape the cover and the body of the box. Both apply the same technique, but some thick bamboo is used for strengthening the bottom and the rim of the box. This sample has 4 layers: a coarse layer, a fine layer, a yellow colored layer and a clear lacquer layer (colour plate VIII.2, 5, 8).

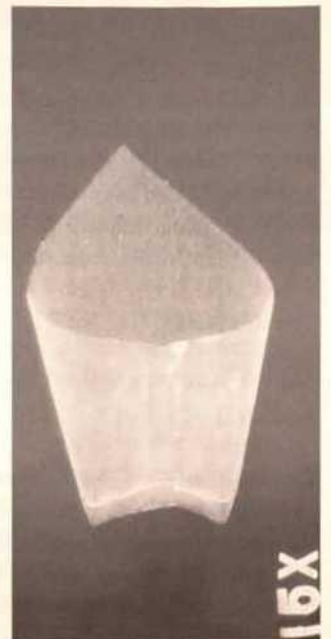
Sample 7

Pedestal vessel, *lai rod nam* design, width 17.5 cm, height 36.3 cm, Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 20.0 seconds, distance from tube 47.0 cm. Result: The substructure is made of lathed wood. The microscope shows 7 layers: one coarse layer, one red colored layer, followed by a coarse layer, a fine layer, a red colored layer, a clear lacquer layer and a gilded layer (colour plate VIII.3, 6, 9).

Sample 8

Betel case, *lai kud* design, width 7.0 cm, height 10.5 cm, Wat Chiangmun museum collection. Technical data: 100 kV, 2.4 mA, 15 seconds, distance from tube 74.0 cm. Result: The substructure is made from a thin sheet of zinc and coated with red lacquer and decorated with incised design (fig. 6 a, b).

Fig. 6 a, b. Betel case, *lai kud* design





1 Red shallow bowl, *lai kud* design

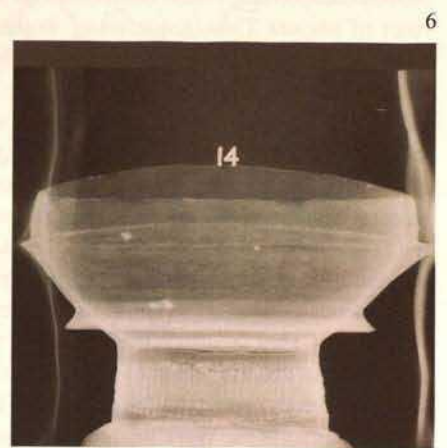
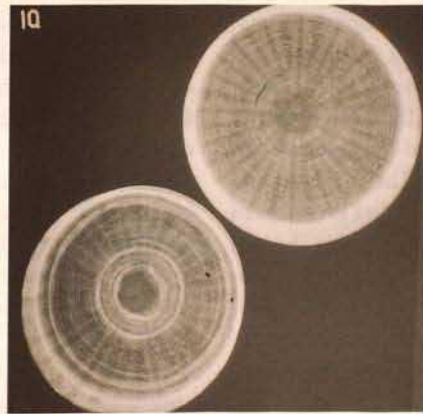
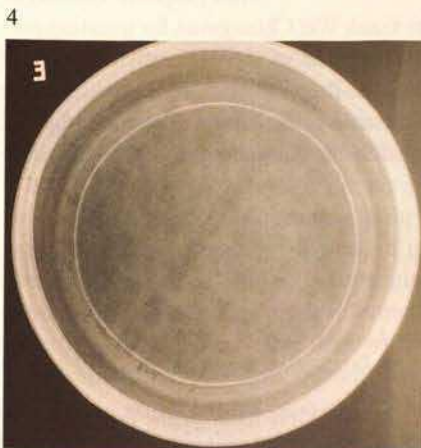


2 Cylindrical box with cover, *lai kud* design



3 Pedestal vessel, *lai rod nam* design

4-6 Substructures of objects 1-3 (x-ray-radiography)



7-9 Cross sections of objects 1-3





Fig. 7 a-c. Cups, *lai kud* design

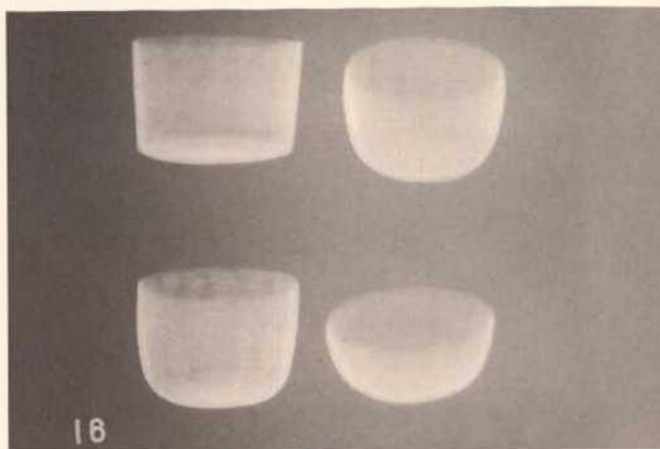
Sample 9

Cups, *lai kud* design, width 7.2, 7.0, 7.5 and 7.1 cm, height 5.1, 5.0, 5.6 and 4.0 cm, (from right to left), Wat Chiangmun museum collection. Technical data: 64 kV, 2.4 mA, 7 seconds, distance from tube 74.0 cm. Result: The substructures are made in two techniques: Bamboo strips are used to coil the cups or as warps and wired bamboo to shape the cups. Test samples have been taken out from the cup at the right top for microscopic analysis. The microscope reveals 4 layers: two large bands show the coarse and the fine final layers. On top are a colored layer and clear lacquer finish (figs. 7 a-c).

Conclusion

Woven bamboo and coiled bamboo strips were used as substructures of ancient Thai lacquerware; wooden substructures were only used more recently. The traditional Thai lacquering processes basically consist of at least four steps: first a residue of raw lacquer, followed by a coarse undercoat (*smook*), then several layers of fine undercoat (*smook oon*) and, finally, a clear lacquer finish. The coarse layer is mostly composed of clay, particles of mineral become visible under the microscope. The fine layer and the coarse layer become visible as a large band, but it could not be identified how many times the lacquer was applied. There is no evidence for the use of fabric for the strengthening of the substructure of Thai lacquerware. There are two traditional techniques used to decorate ancient Thai lacquerware: *lai kud* and *lai rod nam*. Seventeen examples of ancient Thai lacquerware from the collections at the Wat Chiangmun museum in the Chiang Mai province were examined for this study. The results show twelve pieces of ancient lacquerware made of a woven bamboo substructure, four samples made of wooden substructures and one made of a metal substructure. Different layers of lacquer coating were found. Coarse and fine *smook* layers, colored lacquer and clear lacquer.

The result of this study suggests that the techniques of producing Thai lacquerware have changed considerably during the centuries. Woven bamboo substructures, which were used in the past, have been replaced by coiled bamboo strips and wood in recent times. The lacquering process employs a similar technique to the past but the number of coats of lacquer is less than in the past. In former times lacquerware with mother-of-pearl inlay was not to be found in the north of Thailand, but exclusively in the central part of Thailand, especially in Ayuthaya.



7b Δ

7c ▽



Acknowledgements

The author would like to thank Wat Chiangmun for granting permission to examine the collection of the ancient Thai lacquerware. Thanks are due to Mrs. Peeya Piyasak and Mrs. Chumjai Chantawong for their valuable information. Financial support from the Thailand Research Fund is also gratefully acknowledged.

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