

FURTHER STUDIES OF OLD THAI COINS.

by

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A. INTRODUCTION.

The mystery that surrounds all old Thai coins has always puzzled me. At the same time, during my years of collecting Thai coins, I felt that it would be in the interest of further research to bring to the knowledge of a wider circle all the material and facts which I had been able to gather. Collecting old coins is a fascinating occupation for the antiquarian; collecting old Thai coins is fascinating and disappointing at the same time, because so many important questions cannot be solved and will—in my opinion—never be solved. Every student of Thai coinage will naturally base his research on le May's book *The Coinage of Siam*, published by the Thailand Research Society in 1932. Only the student of numismatics can fully realize the high merits of this book, which incorporated all our knowledge about Thai coins at the author's time of writing.

In the introduction of his book, le May underlines the difficulties which every student of Thai coinage has to encounter during his research. And, indeed, those difficulties are almost unsurmountable. Mr. le May—as a true scholar—seems almost to have exhausted the search, and I agree with him in the opinion that the principal question with regard to the early coinage of this country, namely to which reigns of the Sukhothai and Ayuthia dynasties the various coins may be ascribed, will probably for all time remain unsolved. No further documentary evidence has to my knowledge come to light, since le May completed his work about ten years ago, and I am unable to add anything new to what he has stated. This author based his book on the experience of twenty years of study and collecting and, as his works prove, with excellent results. But, *ultra posse nemo obligatur*, even by his true research-work, although

attacking the problem from every possible angle, he was not able to solve the mystery which still covers the history of Thai coinage during the time before the Chakri Dynasty. On the other hand twelve years have passed since then, and in the meantime I have ardently endeavoured to gather any additional information, at the same time collecting old Thai coins, wherever I could find them. I therefore propose to publish now the results of my researches and to describe those coins which are not published in le May's book. I shall deal mainly with the so-called "bullet" coins of Thailand, the last set of which was issued by King Chulalongkorn in 1880.

Le May, after twenty years of collecting, was inclined to believe that he had "exhausted the possibilities of the chase", and—with regard to the small coinage of Ayuthia—he says, *I would like to think that numbers of the small coinage with well-known Ayuthian marks still remain to be discovered, but I must have examined literally tens of thousands . . . and I feel that the hope is a forlorn one.* But, as these studies will prove, he was apparently too pessimistic. Quite a number of undescribed coins have come to light, which I shall describe hereafter.

The few sources at my disposal, in addition to le May's book, were:

the article written by Nai Kulab in 1908, to which le May refers on page 24/25;

the collection of Photographs, compiled by Colonel Gerini for the Ministry of Interior and now at the National Museum;

the article by W. Harding Kneedler

(*Journal of the Siam Society* Vol. XXIX Part 1).

I have described only coins which I have seen. The greater part is in my own collection. In addition to the collection of the National Museum, I have seen the collections of Mr. M. C. Noirot, Nai Kroen Silapet, the Reverend Phra Sri Sachayamuni and several smaller collections, all in Bangkok.

The curator of the National Museum, Nai Boriban, has kindly informed me that since 1932 the Museum has acquired quite a number of additional coins to complete its collection. Among them is the collection of the late Prince Piya. The latter is said to contain several so far undescribed coins especially from the earlier periods (Sukhothai).

As the collection of the National Museum is at present kept at a safe place and not accessible, I am unable to consider in these notes any undescribed coins of this collection. But it surprises me that the collection of the late Prince Piya should have contained coins not yet described by le May, as the latter—according to his own statement—had during his research been in constant touch with the late Prince.

I have tried to arrange the coins in certain groups. But the grouping and the running numbers cannot be considered as indications of the age of the coins, because the age of almost all coins of the pre-Bangkok period is doubtful. The Baht-coins marked with * have not been described before. The weights are stated in grammes.

B. DESCRIPTION OF COINS RECENTLY DISCOVERED OR NOT YET DESCRIBED.

a) Presumably *Pré-Ayuthia* Period.

- 1)* *Bunch of Lotus* below and *Conch-Shell* above, *Plate I, 1, Blocks 11, 12.*

Broad with rounded sides, long oval hammer-marks, ends of coin meet, two deep cuts, triangular large hole in centre, weight 14.55 gr.

- 2)* *Bunch of Lotus* below and *Wheel of Law* (6 spokes) above. *Plate I, 2.*

Broad with marked shoulders, long oval hammer-marks, ends meet, two deep cuts, longish hole, weight 14.5 gr.

The side-mark is not clear, but certainly different from all other known marks.

- 3)* *Bunch of Lotus* below and *Elephant* above. *Plate I, 3.*

Broad with round sides, with long narrow hammer-marks, ends meet, two small cuts, large triangular hole, weight 14.5 gr.

- 4) *Bunch of Lotus* below and *Wheel of Law* (6 spokes) above, *Plate I, 4a/b, Block 1.*

Broad with rounded sides, with long oval hammer-marks, ends almost meet, two fairly large cuts and 1 nick, small hole, weight 14.4 gr.

N. B. This coin would be similar to le May *Plate VII/4, Marks 6 and 8*, but for the connecting line between the 2 outer Lotus blossoms; it would be similar to le May *VIII/5* but a) the top-blossom is not pointed, b) there are connecting lines between the three blossoms in the centre and the lower ribbon.

- 5) *Rachawat* below, *Elephant* above, *Plate I, 5*.

Broad with long hammer-marks, ends of coin part, two medium sized cuts and two small additional cuts, no hole, weight 14.7 gr.

The coin is similar to le May *Plate VIII/4 Marks 15/16*, but the *Elephant walks to the right*, and the mark is placed the other way round.

- 6) *Rachasi* in centre and 2 *conch shells* on both sides. *Plate I, 6a/d*.

The mark on this coin is similar to le May *Mark 1*. Its weight is 9 gr. But there is an additional mark on the opposite side and on both ends, where they meet, as shown on the photograph. I cannot give an opinion about the meaning of this mark. This coin is very rare.

- 7)* *Conch-Shell* and *Wheel of Law* (6 spokes). *Plate II, 1*.

Broad coin with rounded sides, no hammer-marks, ends meet, no cuts, triangular hole, weight 13 gr., cf. le May *Plate VI and VII/1* as for shape. Presumably a very old and certainly a rare coin.

- 8)* *Bunch of Lotus* and *Wheel with dots*, *Plate II, 3*.

A high coin with round shoulders and long ends, which meet, two cuts and a round hole. Long oval hammer-marks. Similar in shape to le May *Plate V/5*, weight 14 gr.

- 9)* This coin, *Plate II, 4a/b*, weight 48 gr., is of good silver and has clear hammer-marks at the ends. There are 5 marks, of which the centre-mark on top is a *circle of dots and one side-Mark, an Elephant*. I consider it a very old coin (pre-Sukhothai?) of Northern origin. There are several cuts.

b) *Presumably Ayuthia Period.*

- 10)* The coin depicted on *Plate II, 5a/b, Blocks 6/7*, with a *Conch-Shell* and *Wheel* (6 spokes) is undoubtedly genuine, but at present only one specimen is known. It weighs 14.95 gr. Clear shape, clear single hammer-marks, no cuts or nicks. The side-mark does not correspond to *le May Mark 45*, but the shell is shown the other way round and corresponds to *Nai Kulab's* drawing No. 1.
- 11)* *Elephant in frame* and *Wheel* (6 spokes), *Plate II, 6*.
Clear shoulders and single hammer-marks, no cuts or nicks, no hole, weight 14.5 gr.
- 12)* *Elephant without frame, Circle of dots around centre-dot*, *Plate II, 7*.
Clear shape, many marks of old age, no cuts or nicks. Two additional *Elephant*-marks at both ends. Weight 15 gr. Single hammer-marks.
- 13)* *Rachawat (in frame)* and *Wheel* (6 spokes), *Plate III, 1*.
Clear shape, no cuts or nicks. Weight 15.7 gr.
The *Rachawat* has 10 dots. Similar to *Nai Kulab's* drawing No. 3.
- 14)* *Large Rachawat (without frame)* and *Circle of 8 dots around centre-dot*, *Plate III, 1a/b*.
Clear shape, no cuts or nicks. Weight 14.6 gr. Clear round hammer-marks.
- 15)* *Open Conch-Shell* and *Circle of 7 dots around centre-dot*, (*Plate III, 3*).
Similar to *le May Plate IX/9-10*, but there are no dots at the left side and no stroke inside the *Conch-Shell*. This mark is called *Bet* by the Thai.
- 16)* *Elephant* and *Open Conch-Shell* as side-marks, *Wheel* (6 spokes), as top-mark. *Plate III, 4a/b*.
A very old specimen, much worn. Shoulders somewhat rounded, but hammer-marks clear. 2 cuts below elephant, weight 13 gr.

- 17)* 5-marks-Coin *Elephant* (le May Mark 24) and
Bunch of Lotus (le May Mark 17) on both
sides.

Wheel (le May Mark 18) on top.

Circle of Dots (le May Mark 40) on both
shoulders.

weight 14.85 gr. *Plate III, 5a/b.*

- 18)* 11-marks-Coin *Anchor* on one side.

Bunch of Lotus on the other side.

Wheel with dots on top.

Circle of dots (le May Mark 40) on both
shoulders.

4 additional marks (6-spoked wheel) on the
four corners.

and 2 additional marks (6-spoked wheel) on
the ends.

Weight 14.75 gr. *Plate III, 6a/b.*

- 19) *Anchor* and 5 spoked-wheel with dots same as le May's *Plate XVIII/7*, who "does not like this coin". I have seen six specimens of it and am satisfied of its genuineness. The weights varied between 14.3 and 14.9 gr. But the shape of the *Anchor* is not identical with le May's Mark. I conclude therefrom that there must have been at least two different coins of the *Anchor* mark. See *Plate IV, 1.*

- 19a)* The same coin, but with 2 additional marks as shown on *Plate IV, 2a/b.* Weight 14.4 gr.

- 20) The coin depicted on *Plate IV, 3* is the *Yantra* mark and the *Circle of Dots* as shown by le May on *Plate XII/1-2.* But on the other side there is an additional mark of a *Namo* as shown. Weight 14.8 gr.

- 21) The coin shown on *Plate IV, 4* weighs only 12.5 gr. The shoulders are high and there are two single hammer-marks. The side mark can be seen on the photograph. A similar coin is depicted in the Album of the National Museum. Between the ends is a round hole, which may have been bored later, thereby causing the underweight. It may be a coin from the North.

- 22)* The coin with marks shown on *Blocks 8 and 9* and *Plate IV, 5* is in the possession of Mr. Noirot. Its weight is 14.55 gr. I consider this coin as genuine. The shape is clearly Ayuthia with 1 clear hammer-mark on each side, and the weight is plausible.
- 23)* The coin on *Plate IV, 6a/b* has 2 circles with 5 dots as top-mark. The shape is clear with 2 perfect round hammer-marks. One nick, no cuts. Weight 14.48 gr. The side-mark is not quite clear. It may be a *Bunch of Lotus-flowers* in a frame or the *Yantra* mark (le May *Mark 39*).
- 24)* The next coin, *Plate V, 1*. Weight 14 gr. The top-mark is 6 dots surrounding a centre-dot, the side mark a *rectangular cross with 4 dots*. The same mark can be seen as top-mark on a coin in the Album of the National Museum. Two hammer-marks on each side.
- 25)* Another newly-described coin, (*Plate V, 2*), weighing only 13.5 gr. Top-mark 8 dots with a centre dot, side-mark an open *conch-shell*. Clear shape with one hammer-mark on each side. 2 cuts. The side mark is similar to Kulab's drawing No. 21, but turned by an angle of 90°.
- 26)* *Plate V, 3a/b* shows a very interesting coin, weighing 14.4 gr. Clear shape with two round hammer-marks. On top 8 dots around a centre-dot; the side-mark is a *water pot (Kontho)* in a frame similar to that depicted by Nai Kulab in drawing No. 5. No cuts or nicks.
- 27)* This coin (*Plate V, 4*) is depicted by le May on *Plate XVIII/3*. On top is a *Rachasi*, on one side a *bunch of lotus-flowers*, on the other side a *wheel with 6 spokes*. Weight 14.85 gr. 2 cuts. The shape is not clear. I consider this coin as genuine, because I have seen three specimens, all alike.
- 28)* This coin (*Plate V, 5*) weighs only 12.5 gr. The shape is clear. No cuts, but a hole between the ends. On top 10 dots surrounding a centre-dot. The side-mark is somewhat similar to *Bua Yantra* (le May *Mark 39*)

29) The next coin (*Plate V, 6*) weighs 13.75 gr. The shape is clear. On top 6 dots around a centre-dot. The side-mark is similar to Nai Kulab's drawing No. 7. The Album of the National Museum shows a similar coin. The mark is there called *Bua Ban Laos*.

30) *Mark No. 27 (1e May), Bunch of lotus-flowers.*

There are two varieties of this coin distinctly different. One is like *Mark 27 (1e May)*, but the other one is like *Block 3*, of which the top-mark is also somewhat different from *Mark 28* of 1e May. There were probably two editions of this coin during the respective reign.

31) I have also found some varieties to *Marks 37 and 38 (1e May)*, the coins of Phra Narai's reign. They probably represent new editions of the same mark, which are likely to have been issued during a long reign of 32 years. The variety of *Mark 37 (1e May)* is shown in *Block 4*. The lower part of the frame is clearly interrupted. *Block 5* shows a variety of *Mark 38 (1e May)*. The lower part of the frame is likewise interrupted and the dot in the middle of the lowest line of flowers has been placed in the middle of the frame.

32) *Mark 39 (1e May), Yantra.*

I have a specimen with 4 marks in addition to the top-mark, which latter corresponds to *Mark 38 (1e May)*. 2 marks are in front and at the back, 2 on the hammer-marks. The meaning of stamping the coins with more than one mark of the same or other kind is unknown to me.

33) *Block 10 and Plate V, 7* show a coin, which weighs only 9.6 gr. The shape is clear and both ends are perfectly cut and round. There is a hole between the ends. The top mark is somewhat blurred and shows a *Chakra-wheel with 9 spokes*. The metal (apparently not pure silver) is of slight yellowish colour. I believe that the coin is pre-Ayuthia, a specimen from the North, or a forgery of the *Unalom* mark.

- 34)* *Blocks 13 and 14.* This is a strange coin, weighing 13.8 gr. Although I do not like the general appearance of it, it might be a genuine coin, and I believe it worthwhile to describe it. 2 single clear hammer-marks. The top-mark is a *conch-shell*. The side-mark is an animal (*Rachasi*?) with an erect bushy tail (*cf. le May Plate XVIII No. 2 and 3*). Both marks seem to be engraved, not applied by means of a die. I consider it a doubtful coin.
- 35) *Block 15* shows the side-mark of a coin of 14.6 gr. weight. I was inclined to believe that it represented *mark 43* (le May). But the arrangement of dots is very different, as may be seen from the block. The top-mark is blurred, but seems to represent a *wheel* with 6 (?) spokes.

c). *Coins of lesser weight of Pre-Bangkok period.*

About what le May has said with regard to the small coinage of Ayuthia I have no remarks to make. I can only confirm that it is very puzzling and difficult to place. In spite of his pessimism I have been able to discover quite a number of coins so far undescribed, and it strikes me as strange that these coins should not have been known ten or fifteen years ago. Before describing the coins I would like to make the following remarks:

It must be noted that the large marks found on the Ayuthian baht-coins could not be reproduced on coins of smaller value. Therefore the marks on the lesser coins, reduced in size, will often not show the similar number of, for instance, lotus blossoms or dots. If we take *Mark 43* (le May), the mark shows 9 dots. The quarter-baht-piece with apparently the same mark, which I describe below, has not 9 dots, but only 3 dots. Nevertheless I consider this quarter-baht piece as belonging to the same reign. Le May has given examples of this on *Plate XIV*, coins No. 4 and 5. He also assumes that No. 4 with only 3 lotus-blossoms belongs to *Mark 27* of the baht-coin with 8 blossoms, and No. 5 with only 6 blossoms to *Mark 17* with 10 blossoms. The same can be observed on coins with conch-shells, where the smaller values have often less dots at the base of the shell than the baht-coin. This was due apparently to the im-

possibility of manufacturing dies for the smaller coins which would produce a mark smaller but otherwise the exact replica of the baht-mark.

The coins which are shown on *Blocks 16 and 17* are still easily found in Bangkok silver-shops. It is all the more surprising that they were not mentioned by le May. He mentions the elephant-mark only in connection with another mark, but has apparently never seen this coin with the elephant alone.

- 36) *Block 16*—Coin with an elephant as side-mark.

A high and narrow coin. Two clear hammer-marks. Ends do not meet. I believe it to belong to le May *Plate XIII* No. 9 ($\frac{1}{4}$ Baht). The weight of this coin is 1.7 gr. ($=\frac{1}{8}$ Baht).

- 37) *Block 17*—Elephant as top-mark.

This is similar in shape to le May *Plate XIV*, No. 1 but has no side-mark. The weight of this coin is 3.4 gr. ($=\frac{1}{4}$ Baht).

- 38) *Block 18* shows the side view of another coin, with an elephant as top mark. There is no side-mark. The shoulders are rounded and between the ends is a clear hole.

- 39) *Block 19* represents the side-view of a coin which is high and narrow. The ends are wide apart, the hammer-marks long and oval. The mark does not convey anything to me. Weight 3.1 gr.

- 40) *Block 20 Plate VI, 1* shows the side-view of a coin with the only mark of an open conch-shell of a type not depicted by le May. Weight 3.7 gr. ($\frac{1}{4}$ Baht).

- 41) *Block 21* is another coin with a conch-shell of a so far undescribed design. Weight 1.8 gr. ($\frac{1}{8}$ Baht).

- 42) *Block 22 and Plate VI, 2* show a low and flat coin of 3.2 gr. weight. The side-mark shows 2 lines of dots (*Rachawat*). There are 2 medium-deep cuts. The top-mark is a vertical conch-shell resting on a base. This might be the lesser value of the coin shown on *Block 6*. This coin is also shown in the Album of the National Museum.

- 43) *Block 23* and *Plate VI, 3* show a coin with a peculiar top-mark. It looks like an *elephant*, but there is a hump on the shoulder. The side mark is a *conch-shell*. There are 2 deep and 2 additional small cuts. The weight is 3.5 gr. ($\frac{1}{4}$ Baht).
- 44) *Block 24* is the top mark of a small and flattish coin of only 1.45 gr. weight. The mark looks to me like a *hare*.
- 45) *Block 25* represents the only mark of a coin of 3.85 gr. weight. It is probably the *inside of a shell*. The edges of this coin are not clearly cut and show traces of two hammer-marks.
- 46) *Block 26* is the side-mark of a coin of 1.8 gr. weight. The top-mark is a *wheel with 6 spokes*. I believe it belongs to *Mark 43* (1e May). It is also shown in the Collection of Photos of the National Museum.
- 47) *Block 27* shows the side-mark of a coin of 1.7 gr. weight. The *conch-shell* is of the same design as that on *Block 25* (1e May) and I believe it to be the $\frac{1}{2}$ Baht coin belonging to that. The shoulders are completely rounded. But I have another specimen with the same mark with two long oval hammer marks.

In addition I have collected the following coins, not yet mentioned by 1e May:

- 48) $\frac{1}{8}$ -Baht of *Mark 55* (1e May), *Conch-Shell*.
 49) $\frac{1}{8}$ -Baht of *Mark 56* (1e May), *Conch-Shell*.
 50) $\frac{1}{4}$ -Baht of *Mark 57* (1e May), *Conch-Shell*.
 51) $\frac{1}{8}$ -Baht of *Plate XIV, No. 12* (1e May), *Conch-Shell*.
 52) $\frac{1}{8}$ -Baht of *Plate XIV, No. 11* (1e May), *Conch-shell*.

The coins with marks depicted on *Blocks 28-31* are from Mr. Noirot's collection:

- 53) *Block 28*, a *Conch-Shell*, weight 1.8 gr.
 54) *Block 29*, also a *Conch-Shell*, weight 2.85 gr.
 55) *Block 30*, weight 1.8 gr.
 56) *Block 31*, again a *Conch-Shell*, weight 3 gr.

I add three more coins, which came into my possession during the writing of these studies.

- 57) Clear shape with round hammer-marks. On top *dots*; side-mark: 4 dots separated by lines. Weight 6.9 gr. ($\frac{1}{2}$ Baht).
- 58) Clear shape with round hammer-marks. On top *dots*; side-mark: *Rachawat* with 10 dots. Weight 7.2 gr. ($\frac{1}{2}$ Baht). Plate VI, 4.
- 59) This coin weighs 3.2 gr. ($\frac{1}{4}$ Baht). Rounded shoulders. Only one mark: The *conch-shell* shown on Plate VI, 5, 2 cuts. Probably a rather old coin.

I repeat, it seems strange that none of the many coins described above should have been known during le May's time and I am sure that of the small coinage of Ayuthia still many more will come to light.

- 60/61) Before adding a few coins, apparently belonging to the Bangkok period, I give the photos of two coins on Plate VI 6/7, showing the famous *Fork-Mark*. In both cases the mark is applied to the coin at an angle, the points of the fork pointing downwards, not upwards, as shown on le May Plate XVIII/8. One coin has as top-mark a wheel of 5 spokes with dots between the spokes, the other the *Chakra-Wheel*. The latter, strange to say, although indicating the Bangkok period, has two clear round hammer-marks, whereas the former has one clear round hammer-mark on one side and two hammer marks on the other. Plate VI, 7 weighs 15.1 gr., and Plate VI/6 weighs 14.85 gr.

The question whether the coins with the fork-mark are genuine or not has been dealt with by le May, who believes that they are forgeries. I am, after having seen so many of them, unable to share his opinion. A coin with the fork-mark doubtless exists, but I cannot say whether it is the mark of Phya Tak or not.

d) *Bullet coins of Bangkok Period.*

I shall first describe a few coins, which have the *Chakra-wheel* as top mark and seem therefore to belong to the Bangkok period, although I am not quite sure about it. It might be possible that the *Chakra-Wheel* was also used before the Chakri Dynasty's coming to power.

- 62) *Plate VI, 8. Chakra-wheel on top, Rachawat (10 dots) as side-mark. Weight 15.15 gr. Strange as it seems this coin has clearly Ayuthian shape with one clear round hammer-mark on each side.*

- 63) *Plate VI, 9. Chakra-wheel on top and some flowers (?) in a frame as side mark. Weight 15.15 gr. This coin has 2 hammer-marks on each side. A similar coin is depicted in the Album of the National Museum. It is genuine beyond doubt.*

In this connection I would like to add the following note:

- a) Le May, in describing the bullet coins of the Bangkok Period, mentions the one-Baht and the $\frac{1}{2}$ -Baht values of the "Flower" mark and the *Bai Matum* mark. In many years of collecting I have never come across one of them. This of course does not mean that they do not exist. But they must be extremely rare. Apparently le May had none at his disposal for making his plates, as the representatives of these two marks in his book are photographs of lesser values ($\frac{1}{2}$ -Baht and $\frac{1}{8}$ -Baht). But I am fairly sure that the coin described above under No. 63 represents the One-Baht-coin of the "Flower" mark, on which, as may be seen from the reproduction, the mark, as compared with the $\frac{1}{2}$ -Baht coin, has been repeated four times, the whole surrounded by a frame. It seems, that the 1-Baht and the $\frac{1}{2}$ -Baht values of both, the "Flower" mark and the *Bai Matum*-mark are very rare, whereas the lesser values of $\frac{1}{2}$ -Baht and $\frac{1}{8}$ -Baht are fairly common.
- b) Le May distinguishes two marks, i. e. the "Flower" mark and the mark of "Arrow-head". Although he mentions that Prince Piya considers these two marks as variations of one and the same mark, he is himself not prepared to accept this suggestion, because, as he says, "the "Flower"-mark has no frame". I have however found many coins of the salueng value of the "Flower" mark with three dots and a complete frame around. I therefore believe that Prince Piya is right, and that both marks of le May are simply variations of one and the same coin.
- 64) *Plate VII, 1. This coin weighs 15.25 gr. Top-mark: Chakra-wheel, side-mark: An upright open shell in a frame. The shape is not clear.*

I have included in the Plates photographs of two very rare specimens.

- 65) The *Chaleo-mark* of the third reign (*Plate VII, 2*).
- 66) The *Phra Kio-mark* of the fifth reign. (*Plate VII, 3*).
Although these coins are known, it might interest collectors to see some clear photos of these very rare coins, of which I have seen only one specimen each.
- 67) I have a Baht-Coin with the *Krut-mark* on one side and the *Palace-mark* on the other. The weight is normal. Two hammer-marks on each end. (See No. 76).
- 68) In my collection have a $\frac{1}{2}$ -Baht-coin with the *Mongkut-mark* repeated on all four sides. This curiosity is mentioned already by le May.

I have recently searched a collection of more than 600 Baht-coins, which a Chinese dealer had bought from a Thai. Before sending the lot to the melting pot, the dealer allowed me to search it. It must have been a collection of the third reign, because about 500 coins were of the *Prasat* mark and the rest were coins of the first, second and fourth reigns. There were only three coins of the Ayuthia period.

- 69) Among these coins I found a Baht-coin with the *Tri-mark*, which apparently had not been used at all, but had been kept after it came from the mint. As the mark is very distinct and clear, I have made *Block 32* of it, to show how it differs from the representative mark given by le May.
- 70) I have seen hundreds of Baht-coins with the *Tri-mark*. On all of them the points of the blades of the *Chakra* run to the left, when seen from above. But I possess one specimen on which the points of the *Chakra* blades run to the right, i. e. in clockwise direction. This I would like to mention as a curiosity. See *Plate VII., 4*.

The facts that, on the one hand very many of the small Ayuthian coins are still obtainable in Bangkok, whereas on the other hand the lesser values of the first coins of the Bangkok period (*Tri-Unalom* mark etc.) are decidedly rare, lead me to the assumption that the small coinage of Ayuthia may have remained legal tender for a long time after the beginning of the Chakri Dynasty.

It has never been mentioned by le May that the small coins ($\frac{1}{4}$ and $\frac{1}{8}$ Baht) of the *Bai Matum* and *Ruang Bueng* marks have no *Chakra wheel* on top, whereas coins with the *Arrow-head* mark have a *Chakra wheel* as mark of the dynasty. Could this fact give an indication of the prospective age of the respective coins, about which le May seems to be still in doubt?

- 71) The coin shown on *Block 33* (perhaps a conch-shell) is so frequently found in Bangkok shops, in the size of $\frac{1}{4}$ Baht, that I wonder why le May did not mention it, or how it could escape his notice. In a collection of small coins, comprising 400 pieces odd, I found not less than 26 specimens and two of the smaller value of $\frac{1}{8}$ Baht. In the Album of the National Museum this coin is called *Hang-hong stamp*, the meaning of which I do not understand. I presume it is a coin from the first reigns of the Bangkok dynasty, as it was among numerous coins of the *Bai Matum* and the *Ruang Bueng* marks. The hammer-marks are partly double, partly single. This suggests a still existing connection with Ayuthia, similar to the *Tri-mark* coins.

Further, the following coins of the Bangkok period, which show different or repeated side-marks on each particular specimen, have been found:

- 72) 1-Baht coin. *Unalom* on one side, *Prasat* on the other.
 73) *Prasat* on two sides.
 74) *Prasat* four times repeated.
 75) *Krut* on two sides.
 76) *Krut* on one side, *Prasat* on the other.
 77) $\frac{1}{2}$ -Baht, *Prasat*, repeated four times.
 78) $\frac{1}{4}$ -Baht. *Water-pot*, repeated four times.
 79) $\frac{1}{8}$ -Baht. *Unalom*, repeated four times.

These coins, from 72 to 79, are likewise from Mr. Noirot's collection.

- 80) Le May mentions the 80-Baht coin issued at the beginning of the reign of King Mongkut together with the well-known series of the *Mongkut* mark.

This was the first coin issued of such an enormous weight, to be followed only by another one under King Chulalongkorn, when a series of six bullet coins was issued of 80, 40, 20, 10, 4 and 2 Bahts in memory of the King's mother.

Although the 80-Baht coin of King Mongkut is rather rare, I have been able to collect three pieces, which are all shown on *Plate VII, 5/7*. The weight of these pieces is 1216, 1195 and 1185 gr. As may be seen from the photos, the marks on these coins are all *engraved*, not stamped by dies. Therefore the designs are not quite alike. It is strange that the Chakra-wheel in one case turns to the left, whereas in the two other cases it turns clockwise. *Plate VIII 1/2* shows the 80-Baht coin in its natural size and also one of the smallest bullet coins minted, of 1/64 Baht. This will give an impression of the large size of the 80-Baht coin, which is 5120 times heavier than the small coin.

On *Plate VIII, 3/4* I show 2 coins, approximately natural size, the larger one

- 81a) has a *Yantra-mark* as top-mark and four marks with a *Rachasi* on the four sides. This coin weighs 444 gr. The other coin
81b) has the same top-mark and *four elephants* on the four sides. This coin weighs 244 gr.

I do not know the history of these two coins, which are from the collection of Nai Kroen Silapet, but I have been told that they were purchased from the palace of H. R. H. Prince Bhanurangsi. I presume that they were issued privately on some special occasion, but not by the government.

e). *Various other coins.*

Finally I propose to deal briefly with some other coins, which I believe to be interesting for those interested in Thai Coins.

Firstly I would like to add some notes on coins, which owing to their peculiar marks and weights I have been unable to place. Possibly these notes might elicit further information.

There is a collection of small coins in my possession, which I bought at Chiangmai 5 years ago. They are all very

similar in shape, although varying in weight. The material is of very good silver, the shapes uniform, *i. e.* flat in front and at the back and almost rounded at the sides. The ends close and there is a hole in each coin between the ends, to carry the coins on strings. The weight varies between a little over 1 gr. and 1.75 gr. The average weight of 20 pieces is 1.5 gr. which might correspond to one-eighth-baht of the Northern Baht of about 12 gr. The coins have no cuts and bear marks as shown on

- 82/83) *Blocks 34/35.* I must admit that I do not know where to place these coins. In the Bangkok shops they are rare.
- 84) *Block 36.* A coin of 2.7 gr. weight. Both ends meet, 2 hammer-marks, a clear hole between the ends. On top a mark with 7 dots around a centre-dot.
- 85) *Block 37.* A coin of 3.15 gr. weight. Only one mark, 2 hammer-marks, ends do not meet.
- 86) *Block 38.* A coin of $\frac{1}{4}$ -Baht with only one side-mark as shown. Ends with double hammer-marks do not meet.
- 87) *Block 39.* A very small round or oblong coin of 1.3 gr. weight. Double hammer-marks. The mark is known as *Namo*. Both types are in the Album of the National Museum.
- 88/91) *Blocks 40 to 43* are likewise small coins, with marks so far undescribed, from the collection of Mr. Noirot. They all have rounded edges, the ends meet and there is a hole between the ends.
- 92) *Block 40* weighs 3.0 gr.
- 93) *Block 41* „ 2.15 gr.
- 94) *Block 42* „ 2.3 gr.
- 95) *Block 43* „ 2.7 gr.
- 96) *Block 44* is the only (top)-mark of 2 little coins, perfectly shaped, which weigh only 0.65 and 0.126 gr. respectively.

Secondly I shall describe some coins, not of the bullet-type, which I collected and which have not yet been described before:

- 97) On *Plate IV*, I give a picture of the famous Mexican Dollar stamped with the *Mongkut-mark* and the *Chakra-wheel*. A similar piece is shown by le May on *Plate XXII*, 5 dated 1856.

My specimen dates from 1857. This piece is so rare, that le May knew of only three, and the one shown here is the only one I have seen.

- 98) The largest flat gold-piece issued under King Mongkut is of 2-Baht weight, as shown on le May's *Plate XXI*. 7. The series of silver-coins of the same design is headed by a 4-Baht-piece, as shown on le May *Plate XXII*, 1/1. I have acquired recently a piece of gold, weighing 61 gr., which is a replica of the 4-Baht-piece of the silver issue. See *Plate IX*, 2a/b. It can be seen that this beautiful coin must have been made by the same dies as the silver 4-Baht piece, because the design on the obverse is exactly identical. On the reverse however there are slight deviations, i. e. the inner frame around the words *Krung Siam* consists of 2 lines on the silver-coin, of only 1 line on the gold-coin, and all the dots and strokes at the edge, which are shown on the silver coin, are missing on the gold-coin.

I presume that this gold-coin of 4-Baht weight was minted from the old dies and issued on some special occasion, but has never been legal tender at any time. The beautiful execution of the design together with the precious metal (99.9% gold) makes it an outstanding piece.

- 99) On *Plate XXI*, 6 le May gives a picture of a copper-token, which was brought to Thailand by English merchants during the reign of King Mongkut, probably as sample for a prospective order for coins from abroad. This coin has on the reverse a large lotus bloom with the date 1197 (= 1835).

I have collected a similar coin identical on the obverse with that one described by le May, but showing on the reverse not a lotus bloom, but an Elephant as depicted on *Plate IX*, 3.

This is probably likewise a sample of an alternative design, but apparently was also rejected.

- 100) The coin on *Plate IX*, 4a/b is a copper coin, bearing on the obverse in Thai the word "Songkhla" and the year 1241 (1879) as well as an inscription in the Malay language (Arabic). On the reverse a Chinese inscription (*Chin Heng Tong Pao*). No value is indicated. This seems to be a coin, perhaps privately minted, for local use in Songkhla.

- 101) On *Plate XXV*, $3/4$ le May depicts and describes the paper money issued by King Mongkut and showing the value in 11 different languages. To le May only 5 values were known, i. e. 1, $1/2$, $3/8$, $1/4$, and $1/8$ Baht. I supply one of the missing values of $3/4$ Baht, as shown on *Plate X*, 1. This paper-money is very rare.

On the same Plate I show some odd coins, i. e.

- 102) The old Indian Coin, already published and described by le May *Plate I*, 4 and Kneedler *Plate X*, 2/8.

This specimen was dug up at Prachinburi *Plate X*, 2a/b.

- 103) Another Indian Coin with the *Conch-shell* also already known and described. *Plate X*, 3a/b.

Both coins are very rare nowadays.

- 104) *Plate X*, 4 A heavy lump of Chinese "Syce-money" weighing 1747 gr. The Chinese characters give the name of the firm, which issued the coin, the year and the month of issue. There are two additional Chinese names. It seems as if each holder had to have his name stamped on the coin before passing it, in a similar way as at present checks or drafts are endorsed.

- 105) *Plate X*, 5 A small piece of the same shape, weighing only 110 gr.

- 106) *Plate X*, 6 A piece of Chinese "Saddle" money cut to make change. Weight 135 gr.

To fill the space on this plate:

- 107/108) *Plate X*, 7/8 two old coins, one (X 8) of tin-alloy, the other (X 7) of silver, found in the Malay Peninsula.

f) I shall now briefly deal with what le May calls—

Large Type of Base Metal.

- 109/116) The representative specimens are shown on *Plates XI*, 1/8

They all bear several marks, mostly five, among which the *Elephant*, the *Rachawat*, the *Yantra Circle of Dots*, the *Wheel of the Law* are predominant. The material is of different alloys, a composition of silver lead, tin, copper. The weights are indicated on the plates and vary considerably. Le May, in his first article on *The Coins of the Bangkok Dynasty*

(*Journal of the Siam Society Vol. XVIII Part 3*), considered these lumps of base metal as coins, whereas in his book, issued 8 years later, he was "inclined to think that these lumps of non-precious metal were issued as weights and not as currency at all."

I am however inclined to share his former opinion, and think it probable that the lumps were used as money, either at a time when silver-coins were not yet in general use, or in addition to the silver for smaller change as in European countries. Of course they are not handy, but rather bulky and the weight is a disturbing factor for this theory. But I have weighed about 100 pieces of such lumps of non-precious metal and have found, that in nearly all cases a round figure of Bahts can be obtained, when dividing the total weight by 12 or 13. Assuming that the Northern Baht weighed about 12—13 gr., nearly all these pieces give full Baht-weights with a little allowance more or less. If we look at the Plates, we have as weights 26, 52, 122, 60, 63, 61 and 40 gr. The pieces weighing 52 gr. would be equal to 4 Baht (divided by 13), the piece of 122 gr. about 10 Baht (at 12 gr.), the piece of 60 and 63 gr. equal to 5 Baht and the pieces of 40 gr. equal to about 3 Baht (at 13 gr.) In this manner I have ascertained that nearly all the weights of the 100 coins under examination show a full Baht-weight from 2 Bahts to 3, 4, 5, 6, 7, 8 and 10 Bahts. I did not find a piece weighing 9 Bahts, nor any piece heavier than 10 Bahts. This leads me to the assumption that these pieces were used as money, not as weights, all the more as pieces larger than only 10 Baht-pieces would have been required for use as weights. I just think it possible, as I said before, that all these pieces, which in most cases look very old, have been used as money at a much earlier date than up to now anticipated. More I cannot say.

Note :

The possibilities of good reproductions of coins by photography are greatly restricted during the war, owing to the lack of good photographic plates, paper, etc. The plates are therefore not perfect. As it was sometimes difficult to obtain photo-

graphs at all, the pictures could not be made so as to reproduce all coins in the same proportion of size, but most of them are reproduced in natural size. To facilitate the reading of the Plates I have added the weight to each particular coin and sometimes given several pictures of the same coin which I however could not afford in every case. I hope therefore that the reproductions together with the description are clear enough to give the reader an impression of the respective coin, and that in spite of deficiencies the plates will sufficiently serve as a kind of record to which later references can be made.

C. CONCLUSIONS.

What conclusions can we draw from the long list of coins of the pre-Bangkok period?

a) I believe that le May has been a little too scrupulous and suspicious with regard to the authenticity of old coins. He was apparently inclined to reject each coin as a forgery, which aroused his suspicion by its particular shape or weight. This attitude may be justified when only one specimen is known. But if there are many pieces of similar shape and weight it seems unlikely that they should all be forgeries and all be forged in the same way. As an instance I mention the peculiarly shaped coins on le May's *Plate XVIII*, 1, 2, 4. Of No. 1 have seen 5 pieces, of No. 2 and 4 two pieces each, which were all corresponding in shape with those depicted by le May, although their weights were less than le May's examples. In addition the coins which I have seen have been in the possession of Thais for a long time and it seems very unlikely that they should be forgeries. I consider these three coins as genuine and of considerable antiquity. The same is the case with *Plate XVIII* 3, of which I have a similar specimen (*Plate V*, 4). The top mark is a *Rachasi*. There is in addition quite a number of other coins, the shape of which is not quite clear (neither Ayuthia with one clear hammer-mark, nor Bangkok, with 2 hammer-marks) but which I consider nevertheless to be genuine coins. There may have been a period of minting coins, during which none of the clear shapes was adopted, especially in the North. Therefore in my opinion the shape alone is not sufficient reason for rejecting a coin. This touches on the question of manufacturing the bullet coins, in particular the question how the marks were applied. Before the intro-

duction of dies and punches the marks were probably engraved by hand. I believe that most marks on very old coins have been made by hand, more or less skillfully, sometimes rather crudely. For instance, the two conch-shells (le May *Plate IX 7/10*) appear to be engraved as well as all the specimens which I have seen of le May *Plate XVIII, 1, 2, 4*. (See *Plate II, 2*).

Also a small overweight seems not sufficient reason to reject a coin *a priori*, because "a little weight may have been thrown in for luck", as le May says. I agree however with le May when he says that *all specimens of rare coins should be subjected to very careful examination, as the likelihood of their being forgeries is much greater than with ordinary coins*.

b) I presume that the material at my disposal was far greater than that of le May. This is partly due to the extraordinary circumstances during the war.

In proportion to the small number of known Ayuthian and pre-Ayuthian coins, a considerable number has recently come to light, which in le May's time could not be found or were known only from photographs. This fact may be explained partly by the present troublesome times, when collectors are forced to part with their treasures. On the other hand the continuous rise in the prices of gold and silver—at the moment of writing the price per Baht (15.25 gr.) weight of gold is 250.-Tcs. and for silver 2.40 Tcs—has certainly stimulated sales. The coins sold have—I am afraid—for the greater part found an obscure end in the melting pots of gold and silver dealers and only a small number were saved from destruction by collectors. I believe that the number of old coins still in existence is a limited one. This is no time for collecting antiques and curios. And I fear that, the number of serious collectors being still on the decline, it will become more and more difficult to increase our knowledge and information about this interesting subject. I mention the fact that genuine gold coins from the reign of King Mongkut are extremely rare today and hardly obtainable at all. There is however a new demand for ancient bullet-coins caused by the war. Many people buy such coins to have them melted and cast into small figures of the Buddha. (*see Plate X 9*) I am told that they are used as amulets to render the bearer safe against bullets and other bodily harm during the war.

c) Nai Kularb, who published his list of marks on Ayuthia coins in 1908 and who attempted to ascribe each mark to a particular reign, is severely taken to task by le May. Now, my list of coins shows that several marks drawn by Nai Kularb in his book have actually been found on coins as I have mentioned in the description. I therefore think this an occasion to exonerate this gentleman at least partly from the shame to which le May has put him. Although the various reigns and marks on coins may have been brought together by Nai Kularb mainly on hear-say, there might be some truth in oral tradition carried on for centuries in spite of the lack of written evidence. I am not prepared to accept Nai Kularb's statements at their face-value, but even Gerini has in his time dated some marks, and some of Gerini's and Nai Kularb's suggestions may be correct. But we are still in the dark and I fear we always will remain so.

d) Le May says: "The only indication I can give to its (each coin of the Ayuthia period) probable date, is the *frequency with which each is found today*." This is to my opinion an erroneous conclusion. The frequency with which each coin was found in le May's time and now a-days is according to my experience *entirely different*. And such a variable frequency seems to me a very doubtful and uncertain indication as to the respective age, because any edition of coins may have, or almost certainly has, varied in the quantity of its total issue. In addition: During the same reign several marks have apparently been issued in more than one edition, slightly varying from one another. Therefore a coin issued in small numbers during a short reign is probably more rare now than a coin issued in large numbers during an earlier and longer reign.

e) *Origin of the bullet-coin.*

There is however another important question, in which I entirely agree with the suggestions brought forward by le May, *i. e.* the origin of the bullet-coin. It is admitted that the mystery, why the Thais came to adopt such a peculiar shape for their money has not yet been solved. But there are strong reasons to assume that the bullet coinage was introduced before the Sukothai period and may date from the XIth or XIIth century. It is probable that the Thai of Nanchao, before their emigration to the South, through their contact with Burma, created a coinage of their own in the shape of bracelet-money, in order to do away with the Chinese sycee-money. The marks on these bracelet coins suggest Indian in-

fluence. Now the examples of bracelet money as depicted in le May's book on *Plate III*, 5, 6, 7 weigh 4 Baht, $4\frac{1}{2}$ and $8\frac{1}{2}$ Baht respectively, *i. e.* they are equal to the Thai Tamlung or 2 Tamlungs. Bracelet money seems to me the fore-runner of the *Kha-khim* money as well as of the bullet-coins. In the first case the two halves of the bracelet were bent outwards to result in the *Kha-khim*, in the second case the two halves were pressed together to form the shape of the coin which I show on *Plate II*, 4. The latter therefore seems to me a remarkable kind of a missing link, as it seems to indicate the transition from the bracelet-coin to the northern Bullet-coin. The weight of this coin is 48 grams, *i. e.* about 4 times the weight of the later Northern Baht. The marks are similar to those on bracelet-coins, but there are clear hammer-marks at both ends. The quality seems to be of good silver.

If the reader will look at le May *Plate III*, 6 then at *Plate II*, 4 and then at le May *Plate V*, the evolution of the Baht from the bracelet-coin into the standardized shape of the Ayuthia Baht will appear plausible, although the thickness of the bracelet-coin was less, because it was probably worn actually as a bracelet, whereas the coin on *Plate II*, 3 is obviously made from a much thicker bar of silver, by bending the ends together. But as the latter was no longer carried around the wrists, but presumably on a string, it was not necessary to take a very thin bar of silver in order to obtain the weight of one tamlung. Obviously there soon arose a demand for smaller coins in the North, which led to the division of the tamlung into 4 parts of about 12 gram-weight each. In the same way the Ayuthia Baht was divided into 4 salungs. And such a northern Baht of the earliest time must have looked like le May *Plate V*, 1 or *Plate II*, 1. The former weighs 12.6 gr., the latter 13 gr. It seems that only much later after the existence of the bracelet coin the principalities of the North developed the *Kha-khim* coin, whereas the South (Sukhothai and Ayuthia) gradually adopted the Northern Baht improving the marks and changing its weight to the later standard of about 15 gr. So to me the shape of the Ayuthia Baht seems to be the outcome of a gradual development, not the idea of any particular King. I prefer this theory of transition and evolution to that of Major Seidenfaden, who suggests that the Thai in making their bullet coins meant to imitate the shape of a cowrie-shell.

f) Le May has made an interesting attempt to classify and date the Standard Baht coinage of Ayuthia and Sukhothai by comparing the

number of different marks which he had compiled with the number of the Kings of the Ayuthia and Sukhothai dynasties. After eliminating those Kings who in his opinion were unlikely to have issued new coins owing to the shortness of their reign, he arrives at the figure of 27 Kings, which nearly corresponds to the number of 24—26 marks known to and considered as genuine by him. But if, as I hope to have proved, the number of marks on genuine Sukhothai and Ayuthia coins is actually much higher than anticipated by le May, the two figures do not correspond any more and the assumption of le May is wrong. Apparently le May could not withstand the temptation of a certain speculation, and I am the last one to blame him for that. But it is obvious that his whole attempt to make the number of Kings tally with the number of marks must be futile and his theory overthrown, as soon as additional discoveries are made and the existence of so many more marks on genuine coins is established. It might likewise be tempting for me to say: Now including the coins newly discovered and described by me, and these are at least 19 different coins of the Baht weight, we have so many more coins probably of the Sukhothai period and so many more coins of the Ayuthia period. Let us reinstate some of the Kings which le May eliminated and make the two figures tally again. But I am not going to give way to this temptation, because any day new coins with unknown marks may and will probably be discovered, and I firmly believe that it is not possible to make both ends meet. Besides I am of the opinion that this juggling with figures is entirely useless from a scientific point of view and does not bring us nearer to the solution of the problem.

There is another reason why any attempt in this direction seems futile to me. Le May quotes the opinion of His late Royal Highness Prince Damrong, *that a particular King may have changed his personal mark during his reign for some special occasion, or that the change of mark may not represent a change of King at all, but a period of minting, irrespective of the change of reign.* I am inclined to share the opinion of H. R. H. Prince Damrong, especially with regard to the last quotation, all the more as we know that during various reigns of the Bangkok Dynasty, several bullet-coins with different marks were issued on special occasions.

I repeat that with our present knowledge it is impossible to classify the pre-Bangkok bullet-coins and to ascribe them to a particular reign, with the exception of the coin on le May Block 37 (*Plate XI 5/7*) which

according to de la Loubère's book was legal tender during the reign of Phra Narai (1688).

d) The purpose of the publication of these studies is two-fold: I wanted to bring to the knowledge of a wider circle—especially to the knowledge of the Thai—all the material which has not yet been published. But in addition I would be glad, if by these notes the fascinating hobby of collecting coins should be propagated and stimulated. It deepens the knowledge of the history of this country and—after all—is perhaps not a bad investment in times of uncertainty. Numerous old coins have, I am afraid, already disappeared. I hope I have been able to save some others. Far from believing myself unassailable in my conclusions or assumptions, I shall at any time welcome all criticisms or additions, which might be elicited by these notes. The subject is a difficult one. There is very little firm ground to stand on, and everybody who attacks this subject of old Thai Coins is bound to make mistakes sometimes or to arrive at wrong conclusions.

In concluding this paper I wish to extend my thanks to Mr. M. C. Noiroi for his help and advice, as well as to the Reverend Phra Sri Sachyamuni and to Nai Kroen Silapet, who have all placed their collections at my disposal and given me many useful suggestions.

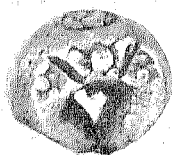
Plate I



1 (14.5 g)



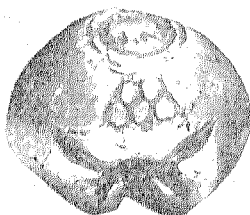
2 (14.5 g)



3 (14.5 g)



4 a (14.4 g)



5 (14.7 g)



4 b (14.4 g)



6 a

(9 g)

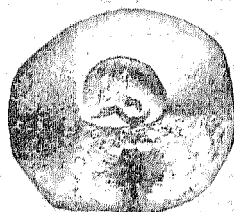


6 b



6 c

(9 g)

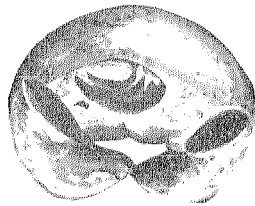


6 d

Plate II



1 (13 g)



2 (14.9 g)



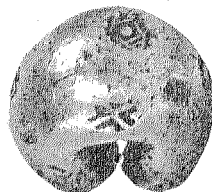
3 (14 g)



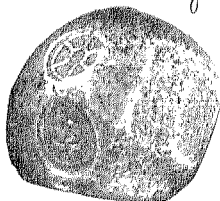
4a (48 g)



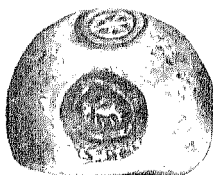
5a (14.95 g)



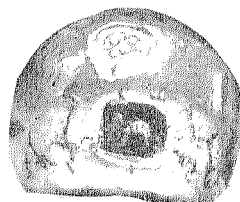
4b (48 g)



5b (14.95 g)

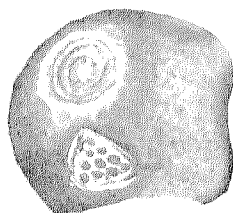


6 (14.5 g)

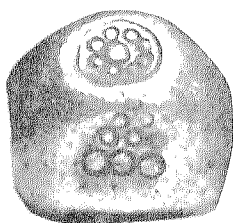


7 (15 g)

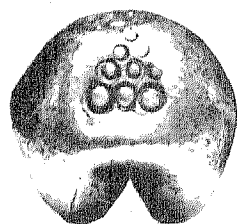
Plate III



1 (15.7 g)



2a (14.6 g)



2b (14.6 g)



3 (14.55 g)



4a (13 g)



4b (13 g)



5a (14.85 g)



5b

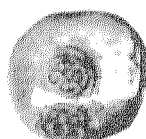


6a (14.75 g)

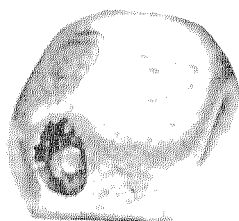


6b

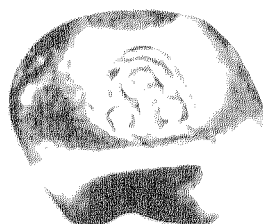
Plate IV



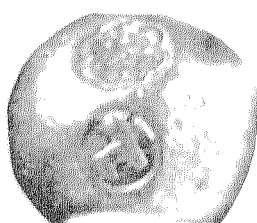
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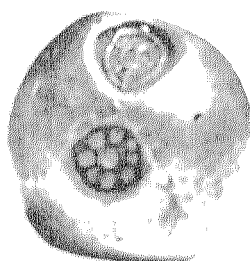
2a (14.4 g)



2b (14.4 g)



3 (14.8 g)



4 (12.5 g)



5 (14.55 g)



6a (14.48 g)

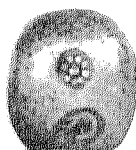


6b (14.48 g)

Plate V



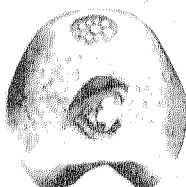
1 (1.4 g)



2 (13.5 g)



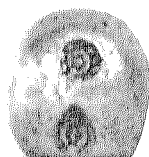
3a (14.4 g)



3b (14.4 g)



4 (14.85 g)



5 (12.5 g)



6 (13.75 g)



7 (9.5 g)

Plate VI



1 (3.7 g)



2 (3.2 g)



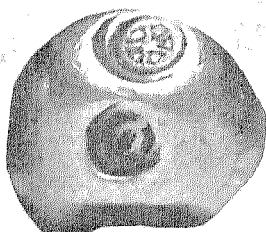
3 (3.5 g)



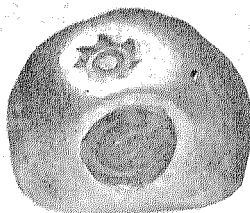
4 (7.2 g)



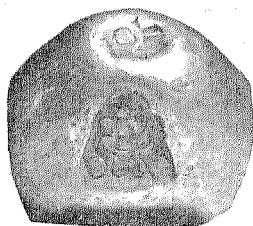
5 (3.2 g)



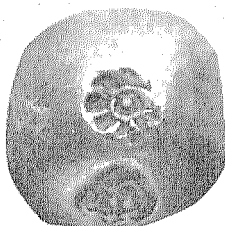
6 (14.85 g)



7 (15.1 g)



8 (15.15 g)

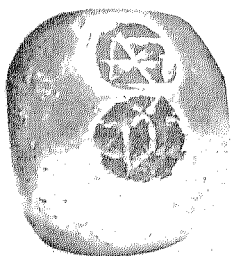


9 (15.15 g)

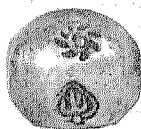
Plate VII



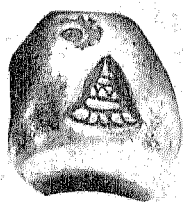
1 (15.25 g)



2 (15.2 g)



4 (15 g)



3 (15.1 g)

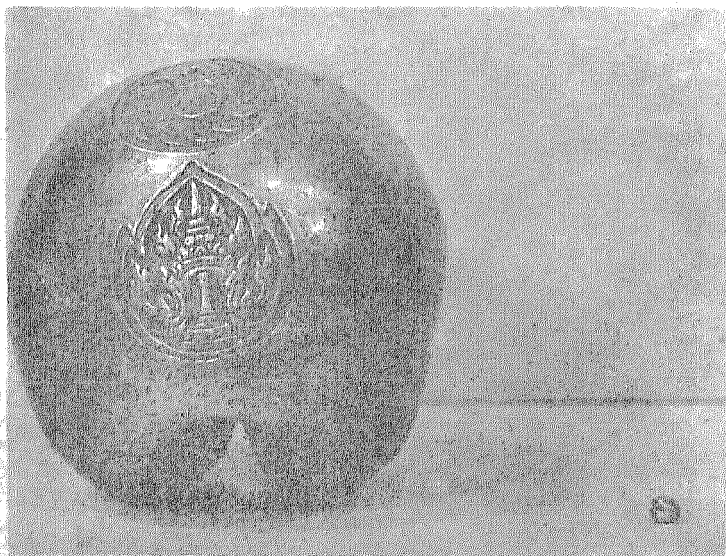


5 (1195 g)

6 (1216 g)

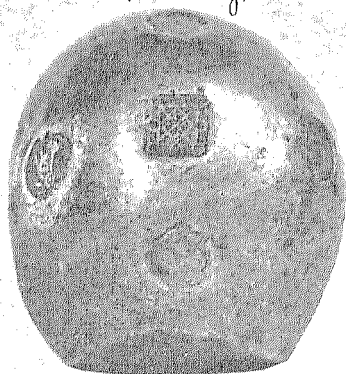
7 (1185 g)

Plate VIII

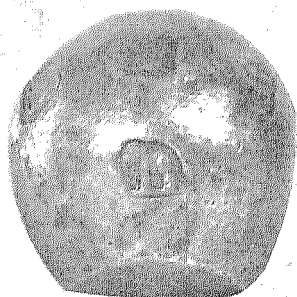


1 (1216 g)

2 (0.23 g)



3 (444 g)



4 (244 g)

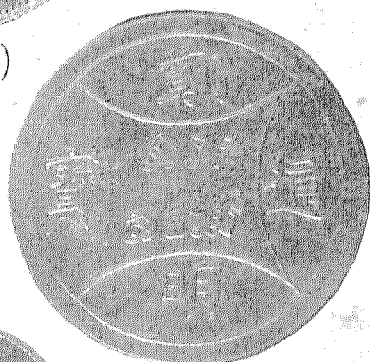
Plate IX



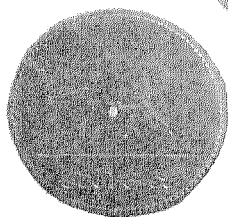
1 (27 g)



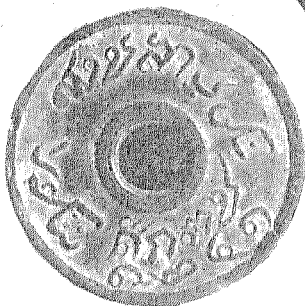
2a (61 g)



2b (61 g)



3 (4 g)



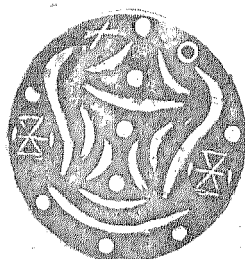
4a (12 g)



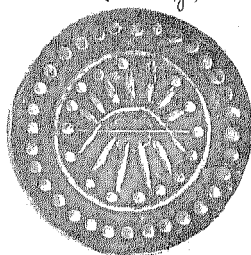
4b (12 g)

Plate X

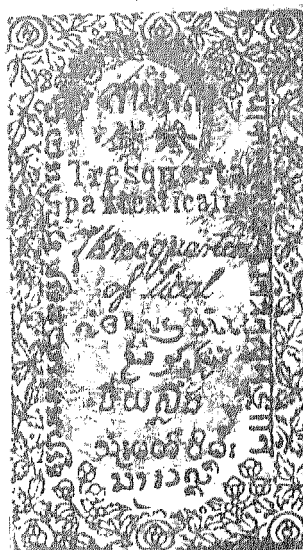
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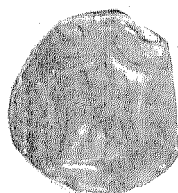
2a (7.5 g)



2b (7.5 g)



3a (8.8 g)



3b (8.8 g)



4 (1747 g)



5 (135 g)

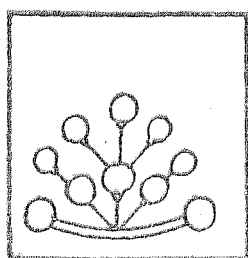


7 (3 g)

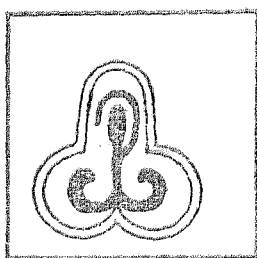


8 (13 g)

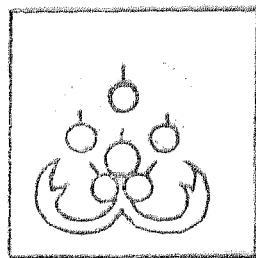
6 (135 g)



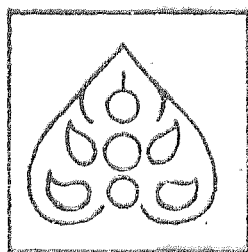
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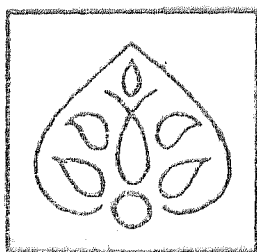
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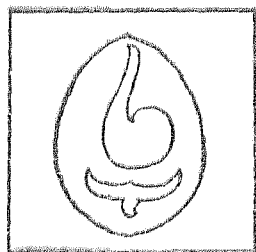
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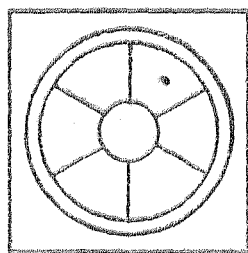
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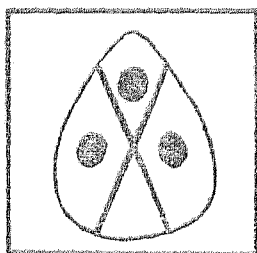
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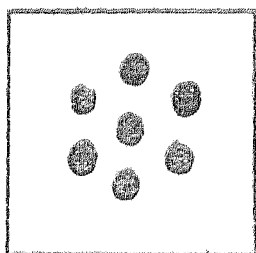
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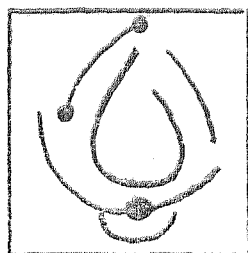
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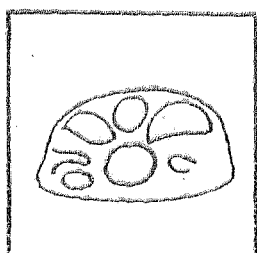
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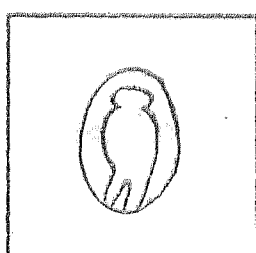
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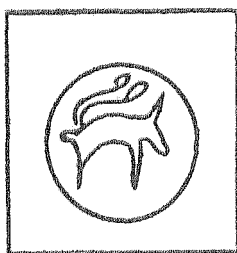
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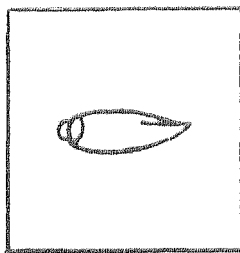
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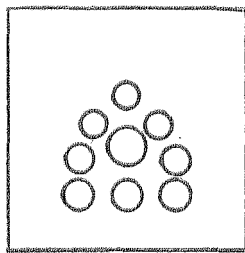
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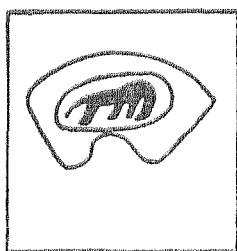
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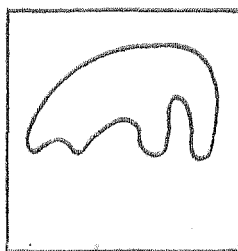
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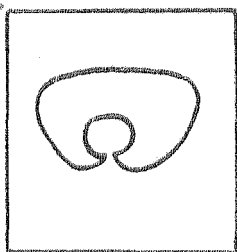
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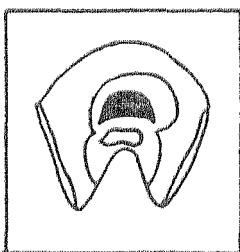
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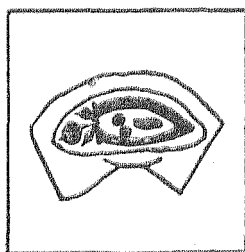
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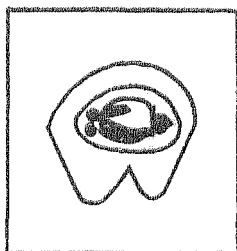
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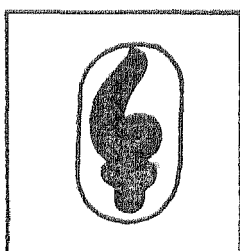
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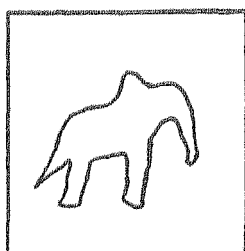
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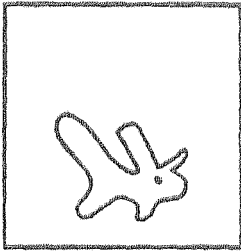
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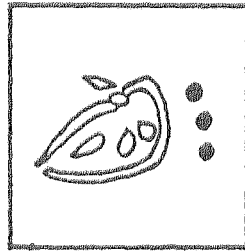
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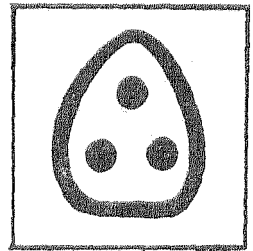
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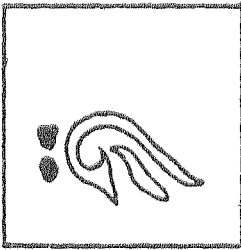
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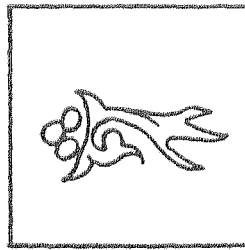
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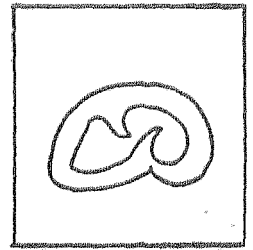
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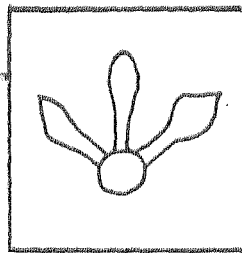
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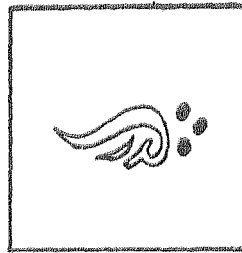
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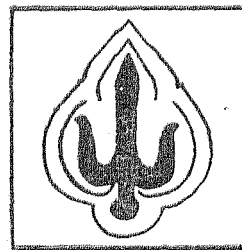
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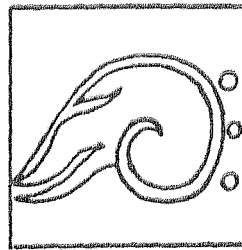
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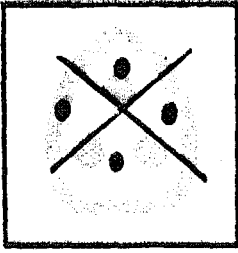
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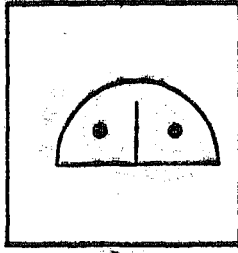
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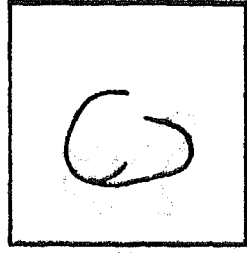
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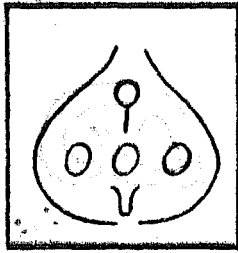
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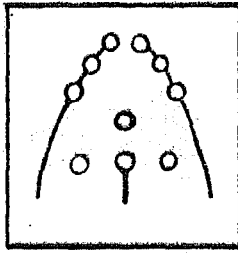
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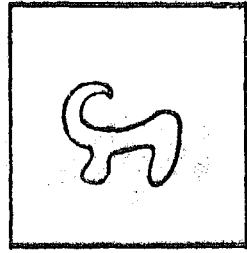
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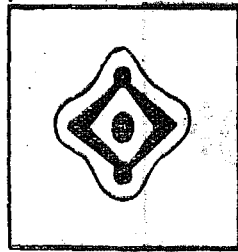
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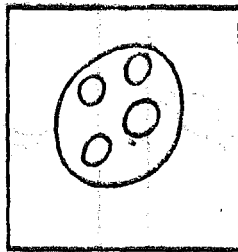
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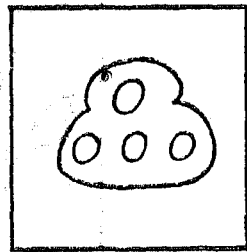
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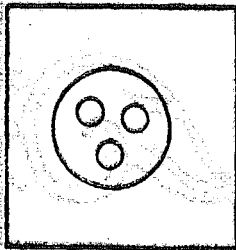
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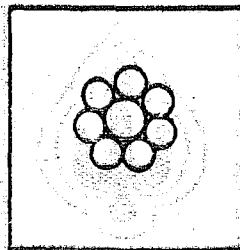
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