

LAO WEIGHTS AND THE LUANG SYMBOL

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Abstract

This investigation reveals that a weight system reform in the middle of the fourteenth century in Laos introduced a basic mass unit of 1.23g, which was unchanged until the nineteenth century. For weighing small quantities of precious goods, two classes of compatible weights were in use – one pot-shaped and one geometric. While the shape of the former probably owes its origin to a Buddhist background, the design of the latter is more obscure, but the few facts point to an influence from the Roman/Byzantine Mediterranean world via the ancient port Oc Eo and the Khmer empire. Also examined is a snake symbol called *luang*, appearing on certain geometric weights and having a particular significance regarding Lao royalty and mythology.

Old Scale Weights from Laos

The present paper is an attempt to summarize, categorize and interpret the available data of the old Lao scale weights. These weights appear to have escaped the attention of scholarly research, and are thus mentioned only incidentally, usually in connection with means of payment, and illustrated rarely.¹ This is in contrast to the more attractive Burmese animal-shaped weights, which were thoroughly studied by Gear (1992) and have been appreciated by collectors for a long time. The reference material for this study consists of a collection of 140 pieces of Lao weights acquired by the author during the last 13 years (see Appendix 1 for details). Although they were used over a considerable period of time, the weights are in good condition, with details and markings still visible. With few exceptions, badly worn-out or damaged weights were not taken into consideration in order to obtain mass units as accurate as possible.

The Lao weights are predominantly found in the northern part of present-day Laos, above all in Luang Phrabang, in Northern Thailand, and in some parts of the Shan Plateau in Burma.

¹ See Kneedler (1936, 11) who writes ‘No. 11. is merely a bronze weight, included only because of the ‘na’ mark on it (see similar marks on bar, c’ieng and tok money).’

The core region, however, is Luang Phrabang, the old political and later religious capital of Lan Xang, where the weights were issued under royal supervision. Lao weights were apparently widely used in neighbouring Lan Na, as well as the former Shan principalities, where they were used alongside Burmese weights. Employed in the markets for weighing small quantities of valuable goods and precious items like gold, silver, jewellery, opium and especially medicines, they are also referred to as apothecaries' weights.

The Lao weights show an abundance of regular geometric as well as pot-shaped solids and therefore are divided into two classes. The former will be referred to as geometric weights, whereas the latter were termed pot-shaped weights by Braun (1983, 97). Although used commercially, they seem to derive from two different traditions. See Appendix 1 for details of the study collection.

In all, one can define six groups of 16 different geometric weight shapes, though possibly more exist. At present it is impossible to say whether the different groups were used in different periods.

Probably the shapes of the geometric weights are not indigenous conceptions, but were influenced by imported gold beads and other objects, originating in the Roman/Byzantine Mediterranean world.

Braun (1983, 97) considers as an unfounded supposition the derivation of the pot-shaped weights from the Burmese *nat* headdress and their origin in Burma. In fact, the weights are closer to miniature models of Buddhist reliquaries (see, for example, LeMay 1927, plate opposite p. 202) or the food containers used by monks that can be found throughout mainland Southeast Asia, but especially in Laos, Thailand, Burma and Cambodia, namely, the Theravada Buddhist countries. In the Palace Museum in Luang Phrabang is a sitting Lan Na style Buddha image on a silver base, in exactly the shape of a sturdy pot-shaped weight. Consequently, there is clear evidence of a strong Buddhist influence that inspired the shape of what we have termed class II pot-shaped weights. In addition, the pot-shaped weights are also reminiscent of certain Lao and Khmer betel containers, which were a very important part of daily life and traditional rites.

The *luang* symbol

In contrast to the Burmese animal-shaped weights, Lao weights show rarely, if at all, a mark which appears on some class I geometric weights. Geographically, the mark is limited to old Lan Xang, particularly the northern part of Laos and old Lan Na. It consists of a wave-shaped motif resembling the letter W, showing occasionally at one end an inconspicuous thickening (Figs. 8b). Although it is reminiscent of the old Siamese letter *ma* and the letters *p* or *b* of the *fak kham* script of Lan Na (Gear 2000, 3), it is not a letter but an abstract symbol. The origin, as well

as the antiquity, of this motif are not known for certain, but the evidence points to a Tai Lao cultural substratum. Guehler (1949, 141) connects it rather expansively to similar signs of the Indus culture and ancient India:

Plate III/m No. 17 is found on bar money from the North. There is a similar mark on Mohenjo-Daro seals and again on Indian punch-marked coins. The symbol seems to represent a snake. It may signify the Naga, the pet of Siva or the Naga-King Mucilinda, which sheltered the Lord Buddha.

The motif is called *luang* in Lao. Translated into English it means ‘snake’ or ‘snake motif’. The word apparently derives from, or is at least cognate with, Chinese for dragon (*liong/louang/lung*), which, according to Eichhorn (1973, 71), can be traced back to an old pre-Shang period (pre-1600 B.C.) community worshipping a dragon totem in the Hoang Ho and Wei region. On the other hand, Prunner (1975, 188) refers to the dragon’s origin as a distinct phenomenon of the Dai minorities in Southern China. The earliest depictions of dragons have their origin in jade ornaments of the Xinglongwa culture (6200–5400 B.C.) of northeast China (Underhill and Habu 2006, 126–127). But this does not exclude the idea that the conception of the dragon in Southeast and East Asia has its deepest roots not in the mythology of the Chinese but the early Tai peoples. The Lao *luang* and the Chinese dragon share only superficially characteristics, e.g. an affinity to the element air and in later Lao art are similarly represented.

Of considerable interest is an historic event in the territory of the Black Tai which caused a snake to become the insignia of the ruling aristocrats. Cam (2000, 12) writes:

In the 13/14 century, to summon people to a gathering of the Thai, a chief of the Black Thai called Lo Let, with the pseudonym *nguu hau* (cobra), hoisted a flag made of black fabric pennant edged by wavy red braid, in the middle of which a white fabric cobra, wriggling as if swimming in water, is sewn. The Thai used to call the flag ‘Old Mr. Cobra’ (*ko puu chau nguu hau*), which the noble families of this müang area (area called ‘chäu müang’) maintained until the August Revolution of 1945.

According to Cam (2000, 12) *nguu hau* sounds like a transliteration of *nguu hong*, a name which was given by king Ly Thanh Tong (1054–1072) to the inhabitants of the region northwest of Hanoi. In the eighteenth century Hoang Binh wrote in his book *Hung Hua Xu Phong Tho Luc* that *nguu hong* and *ai lao* both had a similar script and similar customs. *Ai lao* is the old Vietnamese name for the Tai Lao (*ai*=man, *lao*=big).

This indicates that a chieftain of the Black Tai gathered other Tai peoples around a kind of standard showing a snake which seemed to serve as a unifying symbol and, moreover, had probably already been worshipped for a very long time. At some early stage of social evolution it became the symbol of the ruling class and evolved from a snake (*ngu*) or dragon into the mythical *luang*. Since the Black Tai had close cultural relations to the Tai Lao, it is plausible to argue that the latter were all the more familiar with this tradition. The origin of the *luang* symbol, which was later exclusively reserved for the royal house, can be explained in this way. It was a very old and powerful sign of the kingdom and served to legitimate royal dignity. Mayoury and Pheuiphanh (2009, 7) write: 'In the early sixteenth century, the preferred translation for "Sisattanakhanahuta" changed from "A Million Naga" to "A Million Elephants" or "Lan Xang" in Lao'. Hence it follows that the white elephant rose to be the royal symbol only considerably later, probably not before the sixteenth century, although, according to Cresswell (1974, 30), it is already depicted on early *lat* money dating to the thirteenth or fourteenth century (Fig. 9).

Even if at the beginning of the twentieth century the meaning of the symbol was no longer part of common knowledge, at least in the consciousness of the older generation the belief survived that the *luang* was still alive.

Lao mythical snakes

There are three known groups of snakes in Lao mythology, each with its own meaning. They are endowed with either positive or negative forces and named *luang*, *ngeuak* and *nak*. A comprehensive study of the origin and meaning of the latter two can be found in Mayoury and Pheuiphanh (2009); here is given only a short overview.

The genesis of these mythical snakes can be explained as follows. Before the spread of Buddhism among the Lao there existed the conception of two different mythical snakes. They lived in the waters and were a symbol for the chthonic elements. One snake embodied the positive, the other the negative forces. Apparently these antagonisms are only aspects of a single divine snake. According to Cam (2000, 11), the legends of the Tai peoples in northwest Vietnam relate that the dominant god of the aquatic world is a gigantic snake endowed with magic abilities and carrying two names: one is *ngeuak*, which means dragon, the other *luang*; the *ngeuak* belongs to the dangerous gods, but as soon as it is named *luang* it becomes an important divinity. To this day the Lao avoid speaking the word *ngeuak* as long as they are on a river or lake, fearing its incalculable wrath. In Lao art the *ngeuak* is figured like the Indian *makara* which often spits out the *nak* (the *naga*). Of the two terms *luang* and *ngeuak*, only the latter is older and derives from proto-Tai (Chamberlain 1977), while the former, although the word might have its origin in

the Chinese language, is imbued with Tai and not Chinese conceptions. The Chinese dragon, which is nearly always supplied with wings and horns, lives in the ocean as well as in the air, bringing rain and is an expression of the male forces (Sälzle 1965, 263). The Lao *luang* is an agent of the sky, without, however, bringing rain, and expresses the female forces, originating in a culture much stronger adhering to matriarchaic strains, which can still be observed in several Tai ethnic groups.

Eventually, under the influence of Buddhism, the belief in a third snake, the *naga/nak*, evolved. The *naga* is of Indian origin and derives from an autochthonous earth cult. The importance of the *nak* in connection with the life of the Buddha caused, so to speak, a final division of the already existing positive *luang* into a *nak* attached to the element water and a heavenly, female *luang*. The belief in the ancient *luang* was too strong to be suppressed by Buddhism; instead it was given a new meaning within the context of the officially sanctioned religion.

It is necessary to stress this clear distinction between *luang* and *nak* for they are based on two different concepts. In Southeast Asia the *naga* is prominent in mythology and art, appearing as an apotropaic element (that is, supposedly avoiding bad luck or evil influences) and a fertility symbol.² The *naga* is a water snake endowed with mainly positive attributes, especially protection and fertility, and innumerable legends deal with this fabulous creature, which even in Buddhism plays an outstanding part. In Southeast Asia, however, the early Mon and Khmer peoples practiced an even older indigenous snake cult, which was later mingled with the cult of the Indian *nak* and finally adopted by the Tai Lao, who in turn introduced their *ngeuak* and *luang*. Therefore when the term *nak* is used in the Lao language it has to be interpreted in the context discussed above.

In Lao mythology the *luang* has a special rôle which is not identical with that of the *nak*. While *nak* are principally connected with water, the *luang* is an element of the air. In the imagination of the Lao, the *luang* is able to fly and appears only at full moon in the nocturnal sky with a tail of fire. It is loosely connected with the Chinese dragon and also occasionally depicted with four claws. Up to the present in Northern Laos the older generation narrates a myth about the *luang*, which embodies purity and virtue (see Appendix 2). In White and Black Tai language the meaning of *luang* is larger than large (Cam 2000, 16) and the notions great/mighty/royal at least stem from the same root. In the poem *pao khwan muang faa* of the Black Tai,

² On Lao fabrics the *nak* is found as a subtle and abstract pattern in an 'S' form and is named *lai nak* (river dragon pattern) (Cheesman 1988, 95). Occasionally two *naga* form a W-shaped pseudo-*luang*, as illustrated in Cheesman (1988, 33–34) on a fabric from Sam Neua, but genuine *luang* patterns are found very rarely. In most cases the supposed *luang* motifs on textiles which were presented to the author were actually *nak*. Thus it seems very likely that textiles adorned with this motif should not be worn by ordinary people but members of the royal house only.

the *luang* is a symbol for female souls and therefore part of ancestor worship (Cam 2000, 11). Moreover, the Black Tai have a female water snake, and the White Tai a bird, as symbols. It is a legitimate question whether it is a mere coincidence that certain Burmese weights have the shape of a bird on a base that shows a snake-shaped *gha* sign. Of course this combination could also be considered in view of the Garuda-Naga antagonism of Indian mythology.

The *luang* symbol on means of payment

Over centuries in Lan Xang, boat- or bar-shaped money of different sizes served as a means of payment. Often this means of payment was provided with symbols among which also appears the *luang* motif (Fig. 9). It is best termed *lat* or bar-money after Cresswell (1974, 30), who divides it according to shape, metal alloy and marks, into *lat* money type one to three. This division into three types is not completely convincing. Kneedler (1936, 5) writes with regard to the two most common marks on bar money:

The two commonest marks are shown in plate VI, Nos. 7 and 8. The latter I have not seen on the large size coins. The former, looking like a snake, appears on coins of other types also, as may be noted, and has been interpreted to me as being 'Na' a somewhat sacred symbol.

LeMay (1927, 247) states:

[the bar money forms] are $4\frac{3}{4}$ w and $4\frac{3}{8}$ a inches long, and weigh 1453 and 1200 grains respectively; and are stamped in three places with a serpentine letter, or figure the meaning of which, if any, I do not know.

This money was donated on special occasions, particularly as an offering for monasteries and at shrines (Graham and Winkler 1992, 53–55). Therefore a connection with religious ceremonies is obvious.

Apart from the *luang* symbol, there appears an S-shaped motif which is equated to the *lai nak* on Lao weaving, already mentioned in note 2. So we find that the two most common snake symbols on money are always either the *luang* or the *nak*. The elephant as a royal symbol, of course also appears on *lat* money, but never together with the two snake signs. The elephant is combined with both the Buddhist Wheel of the Law and the lotus flower and consequently clearly separate from the indigenous *luang/nak* cult. The money was marked with these important symbols and thus rendered officially valid.

The so-called *kakim* or *chiang* money - *chiang* = city - (Fig. 9, top right) was the standard coinage of the kingdom of Lan Na, dating to the fourteenth to sixteenth centuries (Kneedler 1936, 5 and 6). It was allegedly also marked with the *luang* symbol, although Cresswell (1974, plate II) does not list it among the manifold signs found on this means of payment, which is in accordance with our observations. Several pieces of *kakim* money with the *luang* symbol are illustrated in Mitchiner (1998, 203: plate 682 and 683), but they are definitely nineteenth century copies, because their inscriptions are in modern Thai script. Kneedler (1936, 3) mentions the occurrence of the *luang* symbol also on the more or less shell-shaped *tok* money of Chiang Mai.

The *luang* symbol in religious art

The *luang* is distinguished in the religious art of Lao. It is true, compared to the *naga*, that it is kept in the background, but this does not predicate anything about its real significance. In monasteries we can find it on some door panels, where it carries the semi-divine guardians (Fig. 10), or on religious furniture like candle holders and prayer chairs. Then, however, it appears not stylised as on the weights, but as a snake, figured more or less naturalistically and sometimes provided with fore and hind legs, reminiscent of the Chinese dragon. Apparently in the course of time, under Chinese influence, the *luang* evolved into a more elaborately designed fabulous and fanciful creature. Occasionally the motif is even formed by two *luang*, whose intertwined bodies resemble a double wave-shaped W (Fig. 8a).

The *luang* is generally confined to the lower part of decorated objects, and in architecture is attached exclusively to the ordination hall (*sim*), where, however, it is never seen on walls or roofs³. At least this is the conclusion drawn from observations made in several old monasteries, where nowadays only a very few have *sim* with representations of the *luang*, usually carved on the wooden doors. These monasteries are or were, by name, Vat Vixun, Vat Hua Xieng, Vat Aram, Vat That Luang and Vat Mai in Luang Phrabang, as well as Ho Pha Khaeo in Viangchan. Vat Vixun and Vat Mai once housed the palladium of Lan Xang, the Pha Bang Buddha image, and Ho Pha Khaeo the famous Pha Khaeo, or so called Emerald Buddha image. The *luang* obviously acted as a further protector of venerated Buddha images, but under a different premise than the *nak*, which was already established and connected with Buddhism for a long time. The *luang* was subdued, but not eliminated, by Buddhism and became a servant, although now second in rank to

³ However, there is a modern stucco relief on a roof gable in Vat Sene, showing two *luang*, apparently listening to the teachings of the Lord Buddha.

the *nak*, of the Lord Buddha. Of course, it is quite conceivable that the *luang* was more widespread as a religious motif in ordination halls of other monasteries, but was gradually replaced and thus its importance forgotten. But there is also good reason to believe that its presence was in fact limited to very distinguished buildings connected with the most important Buddha images of Lan Xang.

In Lao art history the motif is nearly completely ignored or, if at all, merely mentioned as a decorative element and at best incidentally illustrated like in Marchal (1964, Pl. I, VII, XXV and XXXIX) and Parmentier (1955, Pl. 14, 22, 30 and 52). Without doubt the *luang* symbol plays at least a subliminal part in Lao art. Nowhere is it a dominant motif, often only subtly inserted into ornaments, but it is nevertheless present.

The *luang* symbol as a mark of authentication

In Southeast Asia weights were partly provided with particular authentication marks verifying their genuineness. In Laos both weights and bar-shaped coins were provided with the *luang* symbol, proving that they were valid weight pieces and means of payment. By this symbol, considered as sacred, both weights and coins were protected. Manipulations could not be prevented, but tampering would be considered sacrilege. Burmese animal-shaped weights occasionally even show a re-authentication with special signs, a custom which is not seen in the case of the Lao weights.

However, in relation to the reference collection, only the hexagonal, heptagonal and especially the octagonal prisms, as well as the hexagonal and heptagonal truncated double-pyramids, carry the *luang* symbol. In addition, two flat spheroids are very rare exceptions (Fig. 12). Generally, the symbol appears more or less clearly on the lower and upper planes of the weights, unless worn out by long usage. Only a fraction, e.g. 31 pieces, of all geometric weights is marked with this symbol. Of that again, on just five octagonal prisms the *luang* symbol is represented on all eight sides – in one case even alternately as a single and a double snake, one on top of the other. These snakes are depicted in a sloping position, which gives them a certain dynamic, as if they are about to ascend. Most probably not more than 30 to 40 per cent of the geometric weights were issued or later provided with this authentication mark. The sign seems to have evolved from an ‘archaic’ (Figs. 1 and 8d), through a ‘simple’ (Fig. 8e) to a ‘classic’ design (Fig. 8b), although it was always stylised due to the small size of the weights.

At closer view the *luang* symbol shows a striking similarity to the *gha* sign (Fig. 8c) on certain Burmese bird-shaped weights (Gear 1992, period F, G, H and Ia), with just slight differences in minor details. The Burmese letter *gha* is similar to the letter W. According to Gear (1992, 196), it is even an auspicious letter and

is, like the *luang* symbol, connected with the notions of importance and might. It is an interesting fact that the *gha* sign appears on Burmese bird-shaped weights at the end of the sixteenth century, only a short time after the conquest of Lan Na and the following military expeditions into Lan Xang under King Bayinnaung of Hongsawaddi (Pegu). It is not out of the question that the *gha* sign is in fact also an old snake-symbol, which was later mixed up with the letter of the same name. From Lan Na a type of bird-shaped weight is known that bears, in addition, an inscription in *fak kham* script as well as the *luang* symbol, which, however, is mistakenly interpreted by Gear (2002, 21 and fig.1) as a letter. A single octagonal prism in the collection has a sign that looks like a transition from *gha* to *luang* (Figs. 1 and 8d) and therefore might be dated tentatively to the end of the sixteenth century or even earlier. At least the patina and wear of this rare weight speak well for this assumption.

The *luang* symbol was an authentication mark which guaranteed the genuineness of the weight. Possibly the sign was affixed not immediately after the manufacture of the weight but much later through an officially appointed royal servant. Since only a small fraction of the weights has this special mark, perhaps it was directly issued by the royal court or an authorized office. Weights without authentication marks were by no means used illegally, especially in the fairly frequent cases where the *luang* symbol is totally worn out by frequent use, but weights with the mark were probably in circulation in the vicinity of the court or at least had a special purpose for the trade in precious luxury items.

Weights and their magical meaning

The geometric shape of the weights has certainly not evolved by chance, but mirrors magic conceptions. Strikingly frequent are hexa-, hepta- and octagonal solids, confirming the special use of auspicious numerals. The five regular or platonic solids were consistently avoided as weight shapes, although one can assume that the Lao were aware of them and would have been able to manufacture a weight in the shape of a cube, for example, which is also easy to handle. For unknown reasons, most probably originating in magic and superstition, these solids were deliberately not used. According to interviews with older inhabitants of Luang Phrabang, the weights also served as charms protecting bearers from evil influences. This was probably the case with one spheroid, which was worn as a pendant (Fig. 12). Sometimes soldiers carried one in battle, for protection from wounds and death by their magical power. Cheesman (2004, 192) mentions scale weights among the ritual objects of a shaman (*mor song phi taai*) for a funeral ceremony, indicating that the weights had an apotropaic character. This argument is further supported by the fact that they were and occasionally still are consecrated by monks at Buddhist

monastery celebrations. To this day in the villages around Luang Phrabang, weights are kept by families as heirlooms, which are honoured and only reluctantly sold.

The set of seven weights and their ratios (see discussion below) are an expression of the belief in the magic of odd numbers, which are generally comprehended positive. This is the reason why a binary or decimal system for the mass unit or an even number of weights for the total set was not used.

At first the simultaneous use of geometric and pot-shaped weights seems to be odd. Several antique dealers supported the presumption that both basic shapes, in fact, constitute a unit. Without exception all geometric weights have two parallel planes, e.g. the pinacoid, of which one serves as the base and the other can carry a pot-shaped weight (Fig. 13). Furthermore, the geometric weights are considered as female, the pot-shaped weights male. If we take into consideration that the *luang* symbol on the geometric weights represents the female aspect, then the presumption is more likely to be true. Accordingly, the pot-shaped weights can also be interpreted as phallic symbols and stand for the male principle. But these notions were certainly added later to give a more popular explanation for the quite unusual presence of two weight classes. More probably they result from an antagonism between traditional beliefs and Buddhism, which, during the thirteenth to fourteenth centuries, was still struggling for predominance over the spirit cults. The pot-shaped weights were a symbol for the spread of the new religion, for use in commerce and as a counter-balance to the old geometric weights.

Manufacture and materials

Although there are apparently no existing documents such as drawings or travel reports discussing the manufacture of the weights, the technique can be reconstructed with relative certainty. The majority of the weights were cast by either the lost wax method or with a reusable mould. The gauging was achieved by carefully grinding the parallel planes of the geometric weights or the base of the pot-shaped weights. A great number of pot-shaped weights, as well as the spheroids and truncated double cones, were made with a different technique in order to save metal. For these weights, a clay mixture of unknown composition was used for the basic shape, which was subsequently covered with a thin wax layer and then again covered with clay. The metal replaced the wax enclosing the clay core. Some Burmese *hintha* (mythical bird) weights were similarly made (Fig. 11); however, here a stone core of pegmatite was used (Gear 1992, 48).

As the metal layer covering the clay core is usually very thin (<1mm), the weight could not have been gauged by grinding. In this case, while making the clay model, there had to be a small hollow space set aside in which some material could later be inserted or removed through a circular or quadrangular opening. This open-

ing is located at the bottom, that is, the stand, of the pot-shaped weights and at one or both planes of the spheroids. Truncated double cones (Fig. 3) have the opening on both planes, while a rare pot-shaped weight has an opening on its flat top plane (Fig. 6). With the help of a rivet or metal pin, in most cases apparently made from lead or bronze, the opening could be closed. In some rare cases even massive metal weights have such an opening for re-gauging. Damage by a strong blow causes the surface of the weights with clay cores to deform, whereas massive metal weights show scores or lines scratched into the surface. It should be remembered that in reality many of the seemingly massive metal weights have, in fact, a clay core. The weights consist of different metal alloys, of which bronze seems to be dominant. Probably fewer weights have a higher silver, lead or tin content. Consequently, the patina ranges from greenish grey/black to silver. Weights made from brass are rare and could be later copies. Future metal analysis should provide details about the exact composition of the alloys and perhaps the origin of the metal ores.

In most cases the *luang* sign was affixed to the weight after its making. Obviously with the help of a small chisel of circular diameter the sign was punched into the surface rather than marked with a prefabricated stamp. With the help of a magnifier one can see that there are half-moon-shaped marks along the outline of the sign resulting from this technique. An exception is the flat spheroid (Fig. 12) which received its sign during the casting process. The reason for this subsequent adding of the sign is most probably that an authorized office proved the accuracy of the weight after its manufacture. Very few weights, especially the prisms with more than ten sides, show traces of later work by hammering. Possibly crude metal weights were touched up in this manner in order to give further details or even the proper shape.

Mass unit

Weighing standards and mass units from Babylonia and Persia reached, via the Achaemenid Empire, India and China, from whence they later appeared in Southeast Asia (see the thorough discussion of this in Decourdemanche 1913). In the course of time in Southeast Asia different weight shapes with varying mass units were used, and not until the nineteenth century with the arrival of coins were they eventually adjusted to European standards. Both geometric and pot-shaped weights have the same mass unit and were compatible. The basic mass unit for the weights investigated is determined to be approximately 12.3g. This mass unit has a striking similarity to the Indian *tola* of 12.75g (Decourdemanche 1913, 122) and its fraction the *krishnala* of 0.12g (Freydank et al. n.d., 281), respectively.

A set of weights consists of the proven pieces with the following ideal masses: 3.69 - 6.15g – 12.3g – 36.9g – 61.5g – 123g. Obviously this seems to be the

lower part of a more extensive weight set, because higher mass units are known and still used in the market today (Table 1 and Appendix III). The ratios of the weights are $\frac{1}{3} : \frac{1}{2} : 1 : 3 : 5 : 10$. A complete 'lower set' comprised with certainty a weight with the ratio $\frac{1}{10}$ referred to 12.3g, although up to now this author has not seen such a piece. Nevertheless, a weight with a mass of 1.23g must have existed and in any case may have indirectly derived from the known mass units *hahoi* (615g), *phan/sang* (1230g) *muen* (12300g) and *saen* (123000g), which literally mean 500, 1000, 10000 and 100000 (of one unit), respectively. Finally, its listing as a mass unit among the official Lao weighing standard at the turn of the nineteenth century is the proof that this weight definitely existed (Anonymous 1900, 138). Then the complete lower set consisted of seven weights. The ratios do not follow a pure decimal system, but seem to be somewhat erratic because they are based on the powers of 10 of the decimal system and their multiples with the numbers 3 and 5. Whether an older weighing standard based on odd numbers, e.g. powers of 3 or 5, was mixed with a Chinese decimal system introduced through Cambodia remains speculative, but one should keep in mind, that the Lao certainly chose these ratios due to their belief in the magic of odd numbers. At least it seems to be part of the Siamese 'mercantile' weighing standard according to Decourdemanche (1913, 166), which includes the *tamlung* and the *chang/sang* (see Appendix 3). In any case, with this weight set all weighing operations can be easily carried out by adding or subtracting weights on both sides of the scales.

Among the various authors there is some confusion with regard to the naming of the weights and their masses (Table 1). Of the six-piece set investigated, the only weights definitely known by their old names are the *salung* with a mass of 3.69g as well as the *tamlin* and the *tamlung*, with ideal masses of 36.9g and 61.5g, respectively. But the question is whether the term *tamlung* is really standing for a specific mass unit or only a mere variant for *tamlin*, as it certainly is the case for the homonym *damlung*. Unfortunately, the names for the other three weight units have been completely forgotten over the course of time and can only be reconstructed with reservations.

Table 1: Weight names and mass units as proposed by various authors

| Reference | Weight names and mass | | | | | | | |
|-----------------------------|-----------------------|---|---------------|-----------------------------------|------------------------|-------------|---|----------------|
| | <i>salung</i> | <i>tamlin</i> | <i>daming</i> | <i>tamlung</i> | <i>phan/jyan/sang</i> | <i>muen</i> | <i>baht</i> | <i>kakim</i> * |
| Anonymous, 1900 | 3.75g | | | 60g | | 12000g | 15g | |
| Decourdemanche, 1913 | | | | 60.5g | 1208g | | 15.1g | |
| Groslier, 1921 ¹ | | 37.5g | | | | | | |
| LeMay, 1932 ¹ | | | | 61g | | 12684g | | |
| DeCampos, 1941 | | | | 37.58g (old) 34.5g (new) | | | | 61g |
| Gear, 1992 | | | 123g | | | | | |
| Graham & Winkler, 1992 | | | | | | | 15.375g (old); 15.244g (new) | |
| Wicks, 1992 | | 61g; 37.5g in the 19 th century | | | 1230g | | 12.4g (Lan Na, 17 th century) | |
| Mitchiner, 1998 | | 37.5g | | 61g | 1230g | | | 61g |
| Ongsakul, 2005 | | | | | 1230g (80 old baht) | | | |
| Souvichi, 2006 | | | | 61g | | | | |

* The *kakim* as a means of payment appears for comparison

¹ These authors use the term *tael* for different mass units

Generally the Lao use the term *mak peng* for the old scale weights. According to Gear (1992, 256) the *peng* is the name for a definite, but today unknown, mass unit of Chinese origin. Nevertheless, Decourdemanche (1913, 152) mentions a Chinese weight termed *ping*, which had a mass of about 544g. *Ping* and *peng* sound similar and seem to have the same meaning, but it must be emphasized that the mass unit does not fit in the old Lao weight set. The basic mass unit for the complete reconstructed set was named *fin* (Anonymous 1900, 38) and has an ideal mass of 1.23g. Unfortunately, it is not documented by actual weights in the reference collection because they were presumably lost due to their small size while still in use. According to Penth (1994, 320) the old Lan Na mass unit *parimana* traditionally had a mass between 1.2g and 1.5g, which matches the basic mass unit of the Lao weights.

Evidently Chinese mass units had a major influence in Angkor and thus later in Lan Xang. ‘Before 1595 a great deal of silver was imported from China in well-defined weights, namely variants of the *tael*, which in Cambodia became the *damleng* (Siamese, *tamlu’ng*).’ (LeMay 1932, 11). During the classic Angkor period the Chinese obviously managed a big share of the trade and introduced their weighing standard. LeMay (1932, 63) further states, that ‘...the *damleng* we know, was never a coin but only a weight except in the North of Siam...’ The Chinese *liang* (European *tael*) only indirectly influenced the old Lao mass unit through the Khmer *tamlin*. After 1271 it already had a mass unit between 35g and 40g and in the course of time fluctuated considerably in different parts of China (Gear 1992, 27). In Laos, on the contrary, the mass unit was decidedly constant, whence the conclusion can be drawn that after its introduction it was affected neither by internal nor external reforms. At the turn of the nineteenth century, however, there was obviously a second, non-Thai and non-decimal, weighing standard in use, which was based on the Chinese *tael* (Anonymous 1900, 138), although at the moment it is not possible to say when this standard was adopted. The *phan/sang/chang* was introduced by the Khmer, who used a mass unit named *jyan*, which means 1000 (of a unit) and is equivalent to 80 old *pada/baht* (Mitchiner 1998, 210; Wicks 1995, 195). This strongly suggests a Khmer origin of the *fin*.

The reconstructed complete set is shown in Table 2. The mass unit of 369g is not listed among the weights still used at the beginning of the twentieth century (Appendix 3) and therefore conjectural.

Table 2: Lao weight sets and ratios

| | | | | | | | | | | | | |
|---------------------------------------|------------|---------------|------|--------------|---------------|----------------|-----|------|--------------|-------------|-------------|-------------|
| Mass (g) | 1.23 | 3.69 | 6.15 | 12.3 | 36.9 | 61.5 | 123 | 369? | 615 | 1230 | 12300 | 123000 |
| Weight name | <i>fin</i> | <i>salung</i> | | <i>baht?</i> | <i>tamlin</i> | <i>tamlung</i> | | | <i>hahoi</i> | <i>sang</i> | <i>muen</i> | <i>saen</i> |
| Set proven by weights | | * | * | * | * | * | * | | | | | |
| Still known or used today as a unit | | | | | | | | | | * | * | * |
| Ratios | | 1/3 | 1/2 | 1 | 3 | 5 | 10 | | | 100 | 1000 | 10000 |
| Ratios for complete reconstructed set | 1 | 3 | 5 | 10 | 30 | 50 | 100 | 300 | 500 | 1000 | 10000 | 100000 |

The old *baht* used in Siam and Lan Na had an ideal mass of 15.357g and was standardised under King Mongkut (r.1851–1868) to 15.244g (Graham and Winkler 1992, 45). The basic mass unit of the Lan Na *kakim* (61.5g), also termed *chiang* money (Fig. 9), is equivalent to four old *baht* or one *tamlung*, respectively. Thus there was a means by making use of this comparative mass unit, to check weight

sets dissimilar to the Lao weights. For weighing gold and silver in Laos nowadays a mass standard is used still following the old *baht*, which existed before the introduction of the metric system and had been brought along with the Siamese at the latest in the nineteenth century; however, this system is not compatible with the old scale weights. In the second half of the nineteenth century the Siamese collected tax in the form of silver currency (*baht*) (Stuart-Fox 1998, 136), and so most probably the lower part of the old complete set was partly replaced by the Siamese weighing standard, while the upper part, for whatever reasons, was retained (Appendix 3).

The old Lao weights could only have been used together with scales in order to weigh small quantities of goods; for bulk goods dial balances/steelyards with sliding weights had to be employed, which were made of unknown material, probably stone and metal. At the latest at the end of the nineteenth century only dial balances survived – small ones made from ivory, big ones from wood (Anonymous 1900, 138) – while scales and scale weights went out of fashion.

The standard deviation of the weights expressed as a percentage is astonishingly low (Table 3) and exceeds, with but a few exceptions, not even five per cent. Particularly striking is the high accuracy of the octagonal prisms and the spheroids. The most accurate weights are those with a mass of 123g; their deviation is less than one per cent. Only the smallest pot-shaped weights with an ideal mass of 6.15g have a ten per cent deviation. Approximately two-thirds of all weights have a mass which is slightly higher than the calculated ideal mass. Since most of the weights show no oxidation that would increase the mass, the flaw must be explained by inaccuracy during manufacture or due to manipulation. The number of pot-shaped weights in comparison with the geometric weights supposedly mirrors the actual proportion (40:60) when the weights were still in use.

Table 3: Standard deviation (estimated standard deviation s_x) expressed in per cent referred to the ideal mass of all weights (N=140) and all pot-shaped weights (N=54), octagonal prisms (N=22) as well as spheroids (N=19)*

| Mass (g) | 3.69 | 6.15 | 12.3 | 36.9 | 61.5 | 123 |
|----------------------------------|--------|-----------------|-----------------|-----------------|-----------------|-----------------|
| All weights | (N=3)* | 7.93% (N=13) | 3.16% (N=36) | 2.82% (N=32) | 2.81% (N=42) | 0.99% (N=14) |
| Pot-shaped weights group A and B | (N=1) | 9.71% (N=5) | 3.79% (N=19) | 2.54% (N=14) | 4.17% (N=10) | 0.38% (N=7) |
| Octagonal prisms; Group A | - | - | 1.42% (N=3) | 1.93% (N=8) | 0.79% (N=11) | - |
| Spheroids ¹ ; Group D | (N=1) | (N=1) | 1.91% (N=7) | 2.22% (N=4) | 2.38% (N=5) | 0.73% (N=2) |

¹ Without very flat spheroids (Group D.e.)

* N = number of weights

Nearly all pot-shaped weights and a smaller number of the spheroids and truncated dicones have a device for re-gauging. Under the base, and in two cases on the top (Fig. 6) of these pot-shaped weights is either a small rivet-shaped seal or a metal plug. The spheroids also have a rivet-shaped seal (Fig. 4), the truncated dicones even at the upper and lower side. A hollow space inside the weight allowed it, if necessary, to be filled with metal or other material until it was gauged. The standard deviation of these weights is very low and they are usually slightly lighter.

Chronology

Due to the lack of sources, the dating of the weights is more than difficult. Unfortunately, there are no known available archaeological reports elucidating the age of the weights, except an oral communication from the staff of the Palace Museum in Luang Phrabang concerning a showcase with seven weights (those three pot-shaped and four geometric weights are so far the only weights on display in Laos) which reputedly date to the fourteenth century and were found in the *that* in front of the *sim* of Vat That Luang. This *that* is actually a much older structure, which was restored and reused for the funeral of King Sisavang Vong in 1960. Further information was not available, but the date in general is in conformity with the results outlined in this paper. However, since pot-shaped weights probably did not appear before the time of King Vixunarat, a sixteenth century date is more appropriate. In contrast to the work of Gear (1992) on Burmese animal-shaped weights, which demonstrates a continuous increase of the basic mass unit *kyat* under subsequent kings, it is not possible to substantiate a similar chronological sequence for the Lao weights. Variations of the mass unit are not significant enough to derive different dates for the various weight types or classes. On the contrary the weights show no noticeable deviations from the calculated mass unit regardless of some expected exceptions. Thus 1.23g or 12.3g was the current standard mass unit in Lan Xang until the nineteenth century. The materials sometimes give clues about age and origin. Cresswell (1974, 30–37) goes so far as to date the different types of *lat* money on grounds of differences in metal composition as well as marks, and establishes a chronology. If the alloy is indeed an indication for the age of the *lat* money, the weights unfortunately cannot likewise be divided; in general base metals were used and, only in a few exceptions, silver or even gold. Possession of weights with a high silver alloy was certainly a privilege of the ruling class.

According to Cresswell (1974, 31) the basic mass unit in Lan Na and Laos was 9.7g in the thirteenth and beginning of the fourteenth centuries and was fixed to about 12.3g in the middle of the fourteenth century. It is unlikely a mere coincidence that this weight reform coincides with the founding of Lan Xang. Based on the Khmer *fin/tamlung/jyan*, the new mass units replaced rather abruptly an older, perhaps indigenous, standard.

If the assumed evolution of the *luang* motif from an 'archaic' to a 'classic' design is corroborated by comparative metal analysis, then this can be another indication for a relative chronology. Patina and wear are of limited use as criteria for determining the age of a weight, but at least might show a tendency.

From what has been said above, it is obvious that the first weights are datable to the reign of King Fa Ngum (1353–1378), who introduced not only a new mass unit but also the geometric weights, both of which he adopted from the Khmer. The pot-shaped weights were most probably introduced at a later stage under King Vixunarath (r.1501–1520) or King Pothisarath (r.1520–1547), who both tried to promote Buddhism at the expense of the still strong spirit cults. Since the geometric weights were too burdened with magic and the ancient *luang* tradition, a second class, the so-called pot-shaped weights, symbolizing the new religion, was introduced, without however replacing the former.

Under King Sulinyavongse (r.1638–1695) Lan Xang reached the zenith of its power, resulting in very active trade. In this context it is remarkable that between 1614 and 1728 there are no known tributary missions from Lan Xang to China (Stuart-Fox 1998, 90). A new, unmistakable Lao, mass unit with unique weights was a visible means to express independence and power. At the end of the seventeenth century, however, trade decreased and neighbouring Siam, Cambodia and Vietnam repeatedly narrowed Laos' ambitions (Stuart-Fox 1998, 90, 97). The Siamese kings, in particular, hampered Lao traders, discriminating in favour of their own. As a land-locked country, Lan Xang had no direct access to the sea and thus was excluded from maritime trade.

As a result of the failed 1828 uprising of Chao Anouvong, troubled times began for large parts of Laos. It was at the mercy of its more powerful neighbours Siam and Vietnam, who both tried to bring their influence to bear. In 1847 an agreement was signed between Lan Xang and Siam and shortly after King Mongkut's accession to the throne in 1851 the new *baht* must have been introduced in Laos. Thus transactions of goods between the Siamese-controlled parts of Laos and Siam were facilitated. Until the arrival of the French, for a short period of time there existed two different weighing standards side by side. In the end only the *baht* lasted, because it became the gold mass unit in Siam/Thailand and Laos, where it is used beside the metric system to this day. The only surviving contemporary illustration of Lao weights is a tinted lithograph by Delaporte in Garnier (1873, Vol. 2, plate XXVI), which shows a market scene in Luang Phrabang, where a vendor is about to handle pot-shaped weights for putting them on scales.

Origin of the Lao weight shapes

Compared with the neighbouring countries, Lao weights are quite unusual, not only with regard to shape, but also because there were two different classes in use. Apparently neither the cultural and commercial ties with Lan Na and Burma lead to the development of animal-shaped weights in Lan Xang nor were Chinese weights copied. On the contrary, since the reign of King Fa Ngum the Lao had stronger ties with Angkor and imported both the mass unit and most probably the shape of the geometric weights, which, however, were provided with the old indigenous *luang* symbol. However, up to the present no obviously old Khmer weights have been found, except two, which are discussed below. After the conquest of Lan Na by the Burmese, who introduced their mass unit *kyat*, including the animal-shaped weights, Lan Xang stuck all the more to its own tradition. Although the Burmese weighing standard was widely used in Lan Na after 1556 and was also brought by traders to Lan Xang, it did not replace the Lao mass unit. In neighbouring Vietnam a kind of pot-shaped sliding weight for dial balances was in use following a different weighing standard (see Decourdemanche 1913, 167).

Some of the Burmese animal-shaped weights dating to the fifteenth to sixteenth centuries have a base which shows similarities to some Lao geometric weights (Fig. 11). In eighth century Java, spheroid-shaped weights were used (Wicks 1992, 254) and in Malaysia special hexa- and octagonal coins for funerals of the sultans were issued (Gardner 1933, 171 and 175). A pair of scales with a set of spheroids, which, however, are not further mentioned in the text, but apparently of Malay origin, are illustrated in Anonymous (2005, 32), but unfortunately neither their mass nor their age is indicated. In Malleret (1962, Pl. LIII) a hexagonal weight or charm is shown. Although this proves that in other regions of Southeast Asia known geometric objects were also used for different purposes, in Laos the sheer abundance of different shapes and the combination of geometric and pot-shaped weights is unique. While evidence for an origin of these weight shapes is meagre, at least some conclusions can be drawn.

During recent decades new excavations have been carried out in the Mekong delta revealing more evidence for the spread of Oc Eo period cultural sites. The key archaeological site remains Oc Eo, where Malleret carried out excavations, unearthing a wealth of evidence for early contacts beyond the Indian connection. Hundreds of finds prove contact with the Mediterranean world, especially Rome, Byzantium and the new Islamic empire. Beads in geometric shapes made from gold and other minerals are a particularly striking feature of the material culture. Among the small finds are also 41 tin objects, which, with reservations, have been taken by Malleret (1960, 347–349 and plate CXII, 4–6) to be weights; they might have had another purpose as well, such as charms.

The majority of these objects consist of flat cylinders, described by Malleret as small tablets, hexagonal and octagonal prisms, and spheroids, some of them inscribed with signs that are difficult to interpret. Some look like Greek characters or numbers, while many objects show dotted circles, which are typical for certain Byzantine and Islamic weights. Weights in the shape of spheroids, termed by Quedar *Kugelzonengewicht* (German for sphere-zone weight), were widespread in the Eastern Mediterranean under Roman rule from the third to fifth centuries (Quedar 1978, 20). The relationship of the Lao geometric weights to these much older finds is striking (Fig. 14), although the absence of tetrahedron, and especially dodecahedron pieces is somewhat strange. In his discussion on the mass unit of these weights, Malleret (1960, 345) tentatively attaches them to the Chinese *tael* and the *tamlin*, but a connection to the late Roman and early Byzantine mass unit *libra/litra* (316 to 324g from the fourth to sixth centuries) and its fractions (Schilbach 1970, 166) should be considered. One weight with a mass of 29.040g matches the Byzantine *uncia* of the so-called anonymous weights (*kugelschichtig*, German for sphere-layered), dating between 570 and 640 (Quedar 1983, 52), and there are three groups of weights from Oc Eo (mean 3.37g, 4.51g, 5.90g) falling in the range of the early Byzantine period mass units *drachme* (3.398g), *sextula* (4.53g) and *sicilicus* (6.795g) (Schilbach 1970, 160). The rest of the 41 tin objects, however, do not match any other weighing standard and might be charms modelled on weights. In addition to this, Malleret (1960, 346) compares the shape of some weights with similar lead objects from Pompeii. There are further finds of Roman-Byzantine provenance in Vietnam and Thailand, proving at least an indirect contact with the Mediterranean via India, e.g. through the ancient port of Arikamedu. Trade relations between Southeast Asia and India might be expected at the latest since the last two centuries B.C. (Hall 1992, 186). An exchange of goods and ideas existed, particularly since the cultural presuppositions had been created, especially in the Mekong delta (Stark 2003).

A considerable problem arises between the demise of Funan/Oc Eo in the first half of the seventh century and the appearance of the first Lao weights in the middle of the fourteenth century, after nearly 700 years have passed. However, there is some reason to believe that the Khmer Empire as Funan's successor continued the tradition of manufacturing weights in geometric shapes. This is suggested by the finding of two weights in an area west of the village of Trapéang Sé near Siem Reap, one is in the shape of an octagonal prism, one in the shape of a star, with a mass of one and two *tamlin*, respectively (Groslier 1921, 28). The octagonal prism has exactly the shape of its respective later Lao counterpart. These two weights might be tentatively dated to and are seemingly the only recorded weights of the Angkor period; they most probably constitute the admittedly weak 'missing link'. At least for the present another source for an origin of the shape of the Lao

geometric weights is not to hand. In the future, further excavations of Angkor period sites will, hopefully, provide more clues.

Conclusion

Since the fourteenth century an indigenous basic mass unit of 1.23g (12.3g) was in use, which was borrowed, together with the shape of the geometric weights, from the Khmer. The design of the geometric weights has its origin most probably in Oc Eo and related sites, where a wealth of small finds, among them objects in the shape of geometric solids, has been excavated. These objects, which were either imported from the Mediterranean region or locally made copies, were at least in part weights. The Khmer appear to have continued to use the same or similar kinds of weights and transferred both mass unit and shape to the Lao. Some of the geometric weights were provided with an authentication mark, proving that they were genuine. This mark shows the *luang*, a mythical dragon-like snake, which served as an important and powerful symbol for the ruling class. The introduction of pot-shaped weights, probably in the sixteenth century, was an attempt by kings strongly adhering to Buddhism to counterbalance the geometric weights, which were a symbol of pre-Buddhist traditions. Once the basic mass unit *fin* was accepted, it apparently never changed until the nineteenth century, when the Siamese took control of Lan Xang and introduced their *baht* standard. It is very difficult, if not impossible, to establish an exact chronology of the weights unless archaeological excavations reveal new evidence. The different geometric solids, for example, might well be an indicator for more precise dating. This paper will hopefully serve as a catalyst for further discussion and also an invitation to collectors to provide more material in order to elucidate a neglected part of Lao cultural legacy.

Appendix 1: The reference collection of Lao weights

Class I: Geometric weights

The term geometric weight is preferable to polyhedron because it also includes the spheroids, cylinders and cones. The geometric solids are best described with the help of geometric and crystallographic terms. Minerals belong to different crystal classes comprising ideal geometric basic solids. The majority of the geometric weights consist of a combination of different crystal classes, which cannot be found in nature, but at least prisms A.a. and A.c. actually occur in minerals. A striking fact is the total absence of the five regular polyhedrons or Platonic solids, namely cube, tetrahedron, octahedron, dodecahedron and icosahedron. At least the dodecahedron was known in early Southeast Asia in the shape of imported gold beads from the Mediterranean region. A special exception might be the 'hidden Platonic solids' in the six-sided truncated double pyramid (B.a.), which combines cube and octahedron (Malleret 1967, 429).

The following geometric solids are proven and described (see also fig. 1 to 4):

A. Prisms

Hexagonal prism and basic pinacoid (six-sided prism) [4]¹

Heptagonal prism and basic pinacoid (seven-sided prism) [4]

Ditetragonal (Octagonal) prism and basic pinacoid (eight-sided prism) [22]

Polygonal prism and basic pinacoid (many-sided prism with more than eight sides) [1]

B. Dipyramids

Hexagonal dipyramid and basic pinacoid (six-sided truncated double-pyramid) [3]

Heptagonal dipyramid and basic pinacoid (seven-sided truncated double-pyramid) [7]

Ditetragonal (octagonal) dipyramid and basic pinacoid (eight-sided truncated double-pyramid) [7]

Nonagonal dipyramid and basic pinacoid (nine-sided truncated double-pyramid) [1]

¹ The figures in square brackets indicate the total number of weights in this category in the collection.

C. Trapezoids

Heptagonal trapezoid and basic pinacoid (seven-sided trapezoid) [1]

D. Spheroids

- a. Spheroid and basic pinacoid [20]
- b. Octagonal spheroid and basic pinacoid (eight-sided spheroid) [1]
- c. Undecagonal spheroid and basic pinacoid (eleven-sided spheroid) [2]
- d. Tridecagonal spheroid and basic pinacoid (thirteen-sided spheroid) [1]
- e. Flat spheroids [2]

E. Cylinders

- a. Flat cylinder and truncated dicone [1, classified under cylinders]

F. Cones

- a. Truncated dicone and basic pinacoid (truncated double-cone) [4]

Class II: Pot-shaped weights

Group A. Pot-shaped weights with distinct bases [46] (including two very rare weights with flat tops: Fig.5)

Group B. 'Nipple' weights [10] (these weights are overrepresented within class II)

The pot-shaped weights are not as varied in form as their geometric counterparts, but can, however, be broadly divided into two groups. The weights of both groups are reminiscent of round containers with bases and cone-shaped, more or less tapering lids, resting on bulging lower parts. Class II Group A weights (Figs. 5 and 6) show a surrounding line, which marks the transition between lid and body. With the exception of the very tip, the whole lid is covered with finely worked concentric circles. The usually odd number of circles numbers between at least five and at most 17, but this does not take weight into consideration. The distinct base has a smaller diameter than the body or lid and is often shaped like a flat truncated cone. Class II Group B weights (Fig. 7) are simpler in design and their appearance is sturdier, though they do not lack elegance. Their lids have a very pronounced tip, looking like a nipple, and often show only a few concentric circles. Only some have a surrounding line like the Class II Group A weights. They possess a less distinct and very flat base, which is often totally worn. Class II Group A weights are much more common than the rare Group B weights. It is to be noted that in general the pot-shaped weights are more elaborate and detailed than the geometric weights.

Appendix 2: The Legend of the Luang

A long time ago in a village, there lived an orphan boy whose whole body was attacked by leprosy. The villagers disliked him and treated him very badly. So he was condemned to a miserable life, surviving by begging for alms. One day the villagers refused to tolerate the sight of him any more and cast him out of the village. The boy wandered about from village to village, distressed and hopeless. Finally, a kind-hearted village chief took pity on the poor boy and suggested that he make his living in the forest, far away from people; that would be better than being a despised beggar. He gave the boy a knife, so that he could carve hunting tools and build a bamboo hut. With a crossbow he shot birds, taking the paddy seeds from their beaks and crops in order to plant rice. For ten years he lived in isolation. Then his only thought was to leave this place and challenge his fate. The boy raised his hands in devotion and implored his long-dead parents to relieve him of his fate. That same night, while watching the glittering stars and the full moon in the firmament, he suddenly noticed on the horizon a gleam that came closer and closer, becoming brighter every moment. Eventually he could see that it was a mighty fire-spewing, dragon-like *luang*, which only once in a full moon appears in the nocturnal sky. But it reveals itself only to the virtuous and pure, who worship their ancestors. The boy climbed up a tree to watch this phenomenon in its full magnificence. His astonishment grew still greater when he saw that the *luang* passed the tree on which he was sitting. In a sudden movement he plucked up courage and jumped on the *luang*'s back, flying to the end of the world. There the *luang* flew down to an age-old quarry and began to eat the rocks, crushing them with its mighty jaws, and leaving a huge heap of excrement behind. At first the boy was scared, but then he observed that the excrement was in fact pure gold. He collected as much gold as he could carry. After a while the *luang* set about to leave this strange and wondrous place in order to return to the other world before sunrise. The boy quickly climbed on its neck and at lightning speed the beast carried him away, passing the old village where he had grown up. In no time he jumped down, while the *luang* vanished behind the horizon. The next morning the villagers were astonished to see the handsome young stranger. But then they recognized him and could not believe their eyes: his leprosy had disappeared and, over and above all, he was rich. Everybody wanted to know how he obtained the gold and listened to his story. Another boy wanted to visit the fabulous quarry in order to become rich, too. On the next full moon night he saw the *luang*, flew with it to the quarry and collected the gold. But he was greedy and when the *luang* set about to leave he could not climb on her neck because the gold in his sack was too heavy. He was left behind and died utterly alone. The virtuous boy, however, governed righteously as ruler over all the nearby villages.

Appendix 3: The Lao weight system

The Lao weight system still in use at the turn of the nineteenth century modified after Anonymous (1900, 138) and Decourdemanche (1913, 166). Bold figures indicate the calculated ideal old Lao mass units.

| | |
|--|------------------|
| <i>fin</i> (basic mass unit) | 1.23g |
| <i>salung</i> (term probably of Siamese origin) | 3.69g |
| <i>tep</i> | 11.7g |
| <i>baht/tical</i> (definitely introduced by the Siamese) | 15.24g |
| <i>tamlung</i> | 61.5g |
| <i>hahoi</i> (five hundred) | 615g |
| <i>phan/sang/chang</i> (one thousand; market weight) | 1230g |
| <i>muen</i> (ten thousand) | 12300g |
| <i>hab</i> | 61500g |
| <i>saen</i> (hundred thousand) | 123000g |
| <i>lan</i> (one million) | 1230000g |
| <i>tu</i> (ten million) | 12300000g |

References

- Anonymous, 1900. Poids, Mesures et Monnaies du Laos. Hanoi, *Revue Indo-Chinoise*, 1st sem., 138–139.
- Anonymous, 2005. *The Money Museum and Art Center: Malaysian Numismatic Heritage*. Kuala Lumpur, Corporate Service Department, Bank Negara Malaysia.
- Braun, Rolf and Ilse, 1983. *Opium Gewichte/Opium Weights*. Landau, Pfälzische Verlagsanstalt.
- Cam, Trong, 2000. What can we learn from the Tai ethnic group's names about their origin? *Tai Culture*, V/1, 8–17.
- Chamberlain, James Robert, 1977. *An introduction of Proto-Tai zoology*. University of Michigan, Ph.D. theses.
- Cheesman, Patricia, 1988. *Lao Textiles, Ancient Symbols – Living Art*. Bangkok, White Lotus.
- _____, 2004. *Lao-Tai Textiles: The Textiles of Xam Neua and Muang Phuan*. Chiang Mai, Studio Neanna.
- Cresswell, Oliver D., 1974. *Early Coinage of South-East Asia*. Dallas, Texas, Numismatics International.
- DeCampos, Joachim, 1941. The Origin of the Tical. *Journal of the Siam Society*, XXXIII/2, 119 – 135.
- Decourdemanche, Jean-Adolphe, 1913. *Traité des monnaies, mesures et poids anciens et modernes de l'Inde et de la Chine*. Paris, Publications de l'Institut Ethnographique International.
- Eichhorn, Werner, 1973. *Die Religionen Chinas*. Stuttgart, Kohlhammer.
- Freydank, Helmut, Walter F. Reinecke, Maria Schetelich, and Thomas Thilo, n.d. *Wörterbuch zur Kultur und Kunst des Alten Orients*. Hanau, Verlag Werner Dausien.
- Gardner, Gerald B., 1933. Notes on some ancient gold coins from Johore River. *Journal of the Malayan Branch of the Royal Asiatic Society*, XI/2, 171–176.
- Garnier, François, 1873. *Voyage d'exploration en Indo-Chine effectué pendant les années 1866, 1867, et 1868*. Paris, Hachette, Vol. 2.
- Gear, Donald and Joan, 1992. *Earth to Heaven*. Harrow, Twinstar.
- _____, 2002. *An Ancient Bird-Shaped Weight System from Lan Na and Burma*. Chiang Mai, Silkworm Books.
- Graham, Mark and Manfred Winkler, 1992. *Thai Coins*. Bangkok, Finance One Limited.
- Groslier, George, 1921. *Recherches sur les Cambodgiens d'après les textes et les monuments depuis les premiers siècles de notre ère*. Paris, Augustin Challamel.

- Guehler, Ulrich, 1949. Essay on the Symbols and Marks of Old Siamese Coins. *Journal of the Siam Society*, XXXVII/2, 124–143.
- Kneedler, Harding, 1936. The Coins of North Siam. *Journal of the Siam Society*, XXIX/1, 1–12.
- LeMay, Reginald, 1927. *An Asian Arcady*. Boston and New York, Houghton and Mifflin.
- _____, 1932. The Coinage of Siam. *Journal of the Siam Society*, Vol. XXV/1, 1–78.
- Malleret, Louis, 1960. *L'Archéologie du Delta du Mékong*. La Civilisation Matérielle d'Oc-Éo. Paris, Publications de l'École Française d'Extrême-Orient, XLIII, Tome 2.
- _____, 1962. *L'Archéologie du Delta du Mékong*. La Culture du Fou-Nan. Paris, Publications de l'École Française d'Extrême-Orient, XLIII, Tome 3.
- _____, 1968. Polyèdres Antiques et Modernes en Or et en Bronze. Paris, *Extrait du Journal Asiatique* (1967), 423–430.
- Marchal, Henri, 1964. L'Art Décoratif Au Laos. *Annales du Musée Cernuschi*, X/2, Numéro Spécial.
- Mayoury and Pheuiphanh Ngaosrivathana, 2009. *The Enduring Sacred Landscape of the Naga*. Chiang Mai, Mekong Press.
- Mitchiner, Michael, 1998. *The History and Coinage of South-East Asia*. London, Hawkins Publications.
- Penth, Hans, 1994. *Jinakalamali Index*. Chiang Mai/Oxford, Silkworm Books/Pali Text Society.
- Prunner, Gernot, 1975. Die Religionen der Minderheiten des südlichen China, in Andreas Höfer, Gernot Prunner, Erika Kaneko, Louis Bezacier, and Manuel Sarkisyanz, *Die Religionen Südostasiens*. Stuttgart, Kohlhammer, 131–197.
- Quedar, Shraga, 1978. Gewichte aus drei Jahrtausenden. *Münz Zentrum Auktion* XXXII. Cologne, Münz Zentrum Albrecht und Hoffmann GmbH.
- _____, 1983. Gewichte aus drei Jahrtausenden, Teil IV. *Münz Zentrum Auktion* XLIX. Cologne, Münz Zentrum Albrecht und Hoffmann GmbH.
- Sälzle, Karl, 1965. *Tier und Mensch Gottheit und Dämon*. Munich, Bayerischer Landwirtschaftsverlag GmbH.
- Santi Souvichi, 2006. The History of Money in Laos. *Visiting Muong Lao*, 30, Lao National Tourism Administration, 65–73.
- Sarassawadee Ongsakul, 2005. *History of Lanna*. Chiang Mai, Silkworm Books.
- Schilbach, Ernst, 1970. *Byzantinische Metrologie*. Munich, Handbuch der Altertumswissenschaft, XII, 4.
- Stark, Miriam T., 2003. Angkor Borei and the Archaeology of Cambodia's Mekong Delta, in Koo, James C.M. ed., *Art and Archaeology of Fu Nan*. Bangkok, Orchid Press, 87–105.

Stuart-Fox, Martin, 1998. *The Lao Kingdom of Lan Xang: Rise and Decline*. Bangkok, White Lotus.

Underhill, Anne P. and Junko Habu, 2006. Early Communities in East Asia: Economic and Sociopolitical Organization at the Local and Regional Levels, in Miriam Stark, ed., *Archaeology of Asia*. Oxford, Blackwell Publishing, 121–148.

Wicks, Robert Sigfrid, 1992. *Money, Markets and Trade in Early Southeast Asia*. Ithaca, NY, Cornell University.

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Fig. 1 Octagonal prisms. Left: with 'archaic' *luang* mark (61.95g, height 1.5 cm, ϕ 2.5 cm, 16th century or earlier); Right: with 'classic' *luang* mark on top and sides (37.60g).



Fig. 2 Heptagonal dipyrramids. From left: 62.07g (height 1.8cm) - 36.82g - 12.88g. Left weight with *luang* symbol.



Fig. 3 Truncated dicones with opening for re-gauging. From left: 62.84g (height 1.6 cm, ϕ 2.9 cm) - 12.39g - 65.59g.



Fig. 4 Spheroids; five-piece set. From left: 122.99g (height 1.9cm, ø 3.4cm) – 61.75g – 37.17g – 12.34g - 6.81g.



Fig. 5 Pot-shaped weights. From left: 123.12g (height 2.6 cm, ø 3.6cm) – 60.39g – 38.11g - 12.12g.



Fig. 6 Pot-shaped weights. Left: two weights in the shape of relic boxes (35.95g – 12.21g); Right: very rare weight (36.33g) with flat top and rivet for re-gauging. Left weight: height 2.7 cm, ø 2.6 cm.



Fig. 7 Rare 'nipple' weights. Left: 61.84g, height 2.0 cm, ø 2.7 cm; Right: 12.25g.

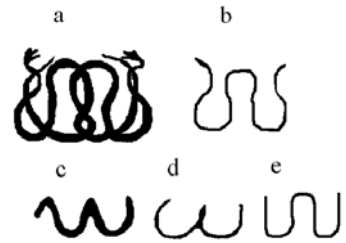


Fig. 8 a) intertwined *luang* (not found on weights); b) 'classic' *luang* symbol with head of snake pointing to left side; c) Burmese *gha* sign; d) 'archaic' *luang*-symbol; e) 'simple' *luang* symbol.



Fig. 9 Means of payment. Lan Xang *lat* or bar-money: bottom (type three) with *luang* symbol appearing three times (104.14g, length 11.5 cm, fourteenth century until recent times); middle (type three) with *nak* (*na*) and wheel (*cakra*) (59.13g); top (type one) with mark of unknown meaning (lotus flower?), elephant and wheel (35.09g, fourteenth century and earlier). Top right. Lan Na *kakim* (59.83g, fourteenth to sixteenth centuries).



Fig. 10 Luang Phrabang, Vat Mai, *sim*. Two *luang* are carrying the door guardians.



Fig. 11 Burmese bird-shaped weights on hexagonal and octagonal base (fifteenth to sixteenth centuries). Left: visible is damaged base with inner pegmatite(?) core; 138.93g (12.5 *kyat*), height 4 cm. Right: 282.31g (25 *kyat*).



Fig. 12 Flat spheroids. Left: with cast 'simple' *luang* symbol (63.23g, ϕ 2.9 cm, fifteenth to sixteenth centuries); Right: two borings indicate that it was probably used as a charm (65.70g).



Fig. 13 Combination of geometric and pot-shaped weights forming a unit. Left: pot-shaped weight (37.40g, height 1.9 cm, \varnothing 2.3 cm), superimposed on spheroid (37.17g); 'nipple' weight 61.39g, octagonal prism 61.55g.



Fig. 14 Weights of Mediterranean provenance. From left: two Byzantine polyhedrons covered with dotted circles (58.58g = 2 *unciae* & 20.36g; 6th/7th century); Greek/Roman spheroid (*Kugelzonengewicht*) with Greek characters (28.35g = 1 *uncia*, third to fifth centuries); Islamic weights with one or two dotted circles covering the surface (1, 2 and 2½ *dirham*, seventh to twelfth centuries). Left weight: height 2.0 cm.

All figures are from the author. Digital scales from Mettler, type Toledo (e=0.1g, d=0.01g, min 0.5g)