

# New Researches on the *Lei-ssũ*

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## INTRODUCTION

There is little need to elaborate upon the fact that the representative digging implements of pre-Ch'in times were the *lei* 耒 and the *ssũ* 耜. It is, therefore, indispensable for the study of the agricultural techniques employed in those days to identify the forms and functions of these two implements. In a very early stage of their development there was a confusion of the terms applied to them and their original forms became unidentifiable. The researches on the terms and original forms of the *lei-ssũ* had long been neglected until recently, when in 1930 Hsü Chung-shu 徐中舒 published his 'Researches on the *Lei-ssũ*.'<sup>(1)</sup> This outstanding article is full of references to documentary records and archaeological finds, and would seem to have given a definitive answer to the *lei-ssũ* problem. In fact, no scholars after Hsü Chung-shu have entertained doubts regarding his opinion. For instance, such Japanese scholars as Amano Motonosuke 天野元之助<sup>(2)</sup> and Nishiyama Takeichi 西山武一<sup>(3)</sup> accepted whole-

(1) Hsü Chung-shu 徐中舒; 'Lei-ssũ-k'ao' 耒耜考 ('On Some Agricultural Implements of the Ancient Chinese'), *Kuo-li-chung-yang-yen-chiu-yüan Li-shih-yen-yü-yen-chiu-so Chi-k'an* 國立中央研究院歷史語言研究所集刊, Vol. 2, Part 1, 1930.

(2) Amano Motonosuke 天野元之助; 'Chügoku ni okeru suki no hattatsu' 中國におけるスキの發達 ('The Plough in China; Its Development and Rôle in Agricultural Economy'), *Tōhō gakuho* 東方學報, No. 26, 1956.

(3) Nishiyama Takeichi 西山武一; 'Gijutsu-shi' 技術史 ('A History of Technology'), *Gen-dai chūgoku jiten* 現代中國辭典, 1950.

sale Hsü's opinion. As Naitō Boshin 内藤戊申 said,<sup>(4)</sup> 'even today, students of ancient agriculture usually take Hsü Chung-shu's "Researches on the *Lei-ssü*" as a basis of discussion'. Therefore, serious results may follow in case the starting point of the discussion should not be found tenable.

Recently, upon an investigation of the pre-Ch'in coins I came to observe that the *pu*-coins can generally be classified into two types and that both were closely connected with the ancestral form of the *lei-ssü*.<sup>(5)</sup> According to Hsü, all the *pu*-coins originated from the *lei*. However, I am of the opinion that the origin of the *pu*-coins is traceable both to the *lei* and to the *ssü*. What does this imply? The investigation of the geographical distributions of the two types of *pu*-coins will throw light upon the area of the circulation of the *lei* and the *ssü*. Moreover, if we can find causes of such differentiation, we may clarify some important problems in the history of agricultural technology in pre-Ch'in times. My method is similar to that of Hsü, but I arrive at a different conclusion. It is generally understood that the development of Chan-kuo 戰國 culture owed much to cultivation by the ox-drawn plough. The question remains, however, when, where, and how this type of cultivation came into existence. Was it from the *lei* or the *ssü* that cultivation by the ox-drawn plough developed? These questions will naturally touch upon some fundamental points in the study of agriculture in pre-Ch'in times. In the following survey, I shall, therefore, first introduce the various theories on the *lei* and the *ssü*, and then clarify the actual features of the two implements.

## I

### VARIOUS THEORIES CONCERNING THE *LEI-SSÜ*

A direct clue for the study of the ancestral form of the *lei* and the *ssü* is to be found in character forms in oracle-bone texts and in bronze inscriptions. Further consideration on this point will be given later in this article, but first I would like to take up some examples indicating the usage of the *lei* and the *ssü* in the traditional literature. As Amano Motonosuke has pointed out,<sup>(6)</sup> agricultural implements were referred to uniformly as the '*lei-ssü*' 耒耜 in such sources as the first and second chapters of the T'êng Wên-kung 滕文公 in the *Mêng-tzû* 孟子, the Chi-tung-chi 季冬紀 in the *Lü-shih ch'un-ch'iu* 呂氏春秋, the

(4) Kaizuka Shigeki 貝塚茂樹 ed.; *Kodai Yin teikoku* 古代殷帝國 (*The Ancient Yin Empire*), Misuzu-shobō みすず書房, 1957, p. 182.

(5) Sekino Takeshi 関野雄; 'Fusen no shutsudo-chi to shutsudo-jōtai ni tsuite' 布銭の出土地と出土状態について ('Remarks on the Area of Distribution and Nature of Excavations of the *Pu*-coins'), *Tōyō-gakuhō* 東洋學報, Vol. 41, Part 2, 1958, p. 123.

(6) Amano Motonosuke; 'Chūgoku ni okeru suki no hattatsu', p. 108.

Yüeh-ling 月令 in the *Li-chi* 禮記, the Shan-yü 山虞 in the *Chou-li* 周禮, the Hsiao-k'uang 小匡, the K'uei-t'u 揆土 and the Kuo-hsü 國蓄 in the *Kuan-tzû* 管子, the Ch'i-yü 齊語 in the *Kuo-yü* 國語, and the Nung-ch'i 農器 in the *Liu-tao* 六韜. The *lei-ssü* may mean: first, two different things, *lei* and *ssü*; secondly, a particular farming tool called the *lei-ssü*; thirdly, a generic term for all digging implements on account of the fact that the *lei* and the *ssü* were popular digging tools. At present, it is almost impossible to show in which of the above meanings the word is used in different cases recorded in the documents. Hsü Chung-shu regarded the *lei-ssü* as a compound of two words, *lei* and *ssü*, and used the word exclusively in the second sense above. However, we must not jump to his conclusion. But judging from the fact that the character, *ssü* 耜 is a combination of *ssü* 呂 and *lei* 耒, it is certain that *lei* 耒 and *ssü* 耜 became intermingled. The way this happened will be mentioned later, for the existence of a particular agricultural implement named the '*lei-ssü*' is fairly doubtful. On this point of dispute Hsü did not give any positive basis to substantiate his contention.

*Lei* and *ssü* were originally two different digging tools. Later, the interpretation was given that the *lei* 耒 is a wooden handle of the tool, while the *ssü* 耜 is a wooden or metallic blade set under the handle. The following quotations offered by Hsü<sup>(7)</sup> verify the matter:

The *ssü* is a blade (*ting* 耜) set under the *lei*, that is, a part with which to turn over the soil. The *lei* 耒 is a curved wooden handle fixed above the *ssü* 耜.<sup>(8)</sup>

The *lei* is a curved wooden handle above the *ssü*. The *ssü* is a metal artifact located at the end of the *lei*.<sup>(9)</sup>

The *lei* is a curved piece of wood used to cultivate. The *ssü* 耜 is the end of the *lei*.<sup>(10)</sup>

The *ssü* is a wooden part at the end of the *lei*, to which a metal blade is set.<sup>(11)</sup>

The part forced into the soil is called *ssü*.<sup>(12)</sup>

The *ssü* is an iron blade at the end of the *lei*.<sup>(13)</sup>

Such a view does not seem to have necessarily originated with the Han *literati*. This is indicated by the fact that the paragraphs concerning the *ch'ê-jên* 車人 (chariot maker) and the *chiang-jên* 匠人 (worker) in the K'ao-kung-chi 考工記

(7) Hsü Chung-shu; '*Lei-ssü-k'ao*', p. 47.

(8) 耜耒下耜也, 耒耜上句木也. (Ching Fang's note on the Hsi-tz'ü in the *Yi* 易, 繫辭, 京房注)

(9) 耒耜之上曲也, 耒耜之金也. (Chêng Hsüan's note on the Yüe-lin in the *Li-chi* 禮記, 月令, 鄭玄注)

(10) 耒耜曲木也, 耜耒耜也. (*Shuo-wên chieh-tzû* 說文解字)

(11) 耒耜端木, 所以施金也. (Yen Shih-ku's note on the Shih-huo-chih in the *Ch'ien-han-shu* 前漢書, 食貨志, 顏師古注)

(12) 入土曰耜. (Wei Chao's note on the Chou-yü in the *Kuo-yü* 國語, 周語, 韋昭注)

(13) 耜耒頭鐵也. (*The San-ts'ang* quoted in the *Chuang-tzû shih-wên* 莊子釋文所引, 三蒼)

of the *Chou-li* 周禮 had already adopted a similar view.

After the Han period, it became universal to regard the *lei* as the wooden part of the digging tool and the *ssü* as the metal part, but the original forms of the two implements seemed to have been forgotten. However, in 1930 Hsü published 'Researches on the *Lei-ssü*,' in which he made public a new, noteworthy opinion based on extensive researches to remove misunderstandings of more than 2,000 years. This article is too long to be summarized here, so I introduce five points related closely to the problem of the *lei* and the *ssü*.

(1) The single *lei* 耒 characters those containing a left-hand radical *lei*, and other characters developed from the character *lei* in oracle-bone texts and in bronze inscriptions show a certain uniformity: the upper end of character form of *lei* is curved and the lower end is ramified. By this character form the shape of the *lei* in ancient times may be assessed. The *lei* was an agricultural implement modeled after the form of a branch of a tree. From the changes of the *lei* traced with the help of the study of *pu*-coins descended from the *lei*, it is concluded that the *lei* evolved from a wooden artifact to a metal one, from the two pronged form to the single-cutting-edge, and further from the 'solid-handle' to the 'socketed' version. On the stone with bas-reliefs in Wu-shih-tz'ü 武氏祠 there are carved figures of Shên-nung-shih 神農氏, Hsia Yü 夏禹 and hermits with wings 有翼神仙 each holding a digging tool with two prongs in their hands which may be surmised to depict the form of the *lei*.

(2) The *yi* 耜 was the first agricultural implement. It was suitable for loosening the soil, but inconvenient for turning over the sod. In later years a wooden round-headed flat plate was set to the lower end of the *yi*. The implement thus made was a *ssü*. The survival of the *ssü* can be seen in the *nenohi no tegarasuki* 子日手辛鋤 lodged in the Shōsōin 正倉院 in Japan, also in the spade-tips excavated from the old tombs in Japan and the ploughs used throughout Japan in the present time. These digging tools just mentioned have a wooden plate with a metal blade under it. On the other hand, in China, strangely enough, no such implement survives. But, the inverted figure of the coins of pre-Ch'in times called *ching-chime-coins* 磬幣 or *ch'iao-bridge-coins* 橋幣 is similar to that of the spade-tips in Japan. From this, it may be inferred that this type of coin was modeled after the *li-kuan* 犁鉤<sup>(14)</sup> (plough-share) with their origin in *ssü*. The *ssü* was originally a wooden tool; in later years, a semi-circular metal blade was set to the flat end of the *ssü*.

(3) In oracle-bone texts, there are many characters related to the *lei*. There are, however, only two *ssü* characters and no characters including *ssü* as an element have been found. The *lei* might have been popularly used by the people in the Yin 殷 period, and was successively adopted in the eastern countries where the Yin people were dispersed. The area of circulation of *pu*-coins with the Three Chin 三晉 as its centre is also the area of circulation of the *lei*, and in the Chan-kuo and Latter Han 後漢 periods the *lei* was used

(14) *Li-kuan* 犁鉤 is written *li-kuan* 犁冠 or *li-ch'an* 犁鑣.



also in Ch'i 齊 which belonged to the area of circulation of *pu*-coins.

(4) Hou-chi 后稷, the founder of Chou 周 established his domain in Tai 邰. The character *tai* 邰 consists of two characters, *yi* 邑 and *t'ai* 台, and the latter is the same character as *ssũ*, so he named his country *ssũ* 𡵓. In the *Shih-ching* 詩經 there are four *ssũ* 耜 characters, but no examples of the character *lei*. Thus it may be that the *ssũ* was a popular digging tool in Chou. Oracle-bone texts and bronze inscriptions represent the human figure with a wooden pestle hulling the seeds of millet, and so it may be concluded that the *ssũ* was used in the land of Ch'in 秦 between Ch'ien-shui 涇水 and Wei-shui 渭水 even after the transfer of the capital of Chou to the east.

(5) Both the *lei* and the *ssũ* were implements for digging and cultivating of the soil, but their forms and the areas of their circulation were different. As the general public had little chance of comparing the agricultural implements, people in eastern lands regarded the *lei* as the *ssũ*; in western lands vice versa. In this way the two terms, *lei* and *ssũ* intermingled into one compound word, *lei-ssũ*. All the *ssũ* that appear in the *Shih-ching* are accompanied with an adjective meaning 'sharp'. Judging from this, the *ssũ* was a metal object. The *ssũ* in western lands was made without much difficulty, so a metal tip was set to its lower end much earlier than the *lei* in eastern lands. Later when metal was adopted also on the *lei*, *lei* and *ssũ* were combined into one term, and *lei* became regarded as a curved wooden handle above the *ssũ* and the *ssũ* as a metal tip or *ting* under the *lei*.

Among the above mentioned various explanations offered by Hsü, the view pertaining to the forms of the *lei-ssũ* is now an established conclusion which nobody holds in doubt. For instance, Amano Motonosuke depended wholly upon Hsü's opinion, and considered the *tabi* in Tog-chuk-to 德積島 80 km. south-west of Seoul in Korea to be a survival of *ssũ*.<sup>(15)</sup> The following quotations<sup>(16)</sup> from Amano's survey summarize concisely the divergent opinions on the *lei-ssũ*.

The digging tool employed during the periods of Yin and Chou was the spade which was dug into the soil with the hands and with the help of a foot, to turn over the soft and fertile loess of North China, while the hoe, which was used by striking downwards and then pulling, appeared as a weeder in the Chou period, so far as we know from documentary sources.

Today the hoe is used as an implement for cultivation and is suitable for poor land, and there are several different types of hoe such as the *hao-t'ou* 鋤頭, the *t'ieh-t'a* 鐵搭 (four-pronged hoe), etc. The period of the appearance of the hoe as a digging tool is unknown. But it most likely

(15) Amano Motonosuke; 'Chūgoku ni okeru suki no hattatsu', p. 109.

Amano Motonosuke; 'Seishū no nōgyō' 西周の農業 ('The Agriculture of Western Chou'), *Silver Jubilee Volume of the Zinbun-kagaku-kenkyūsho, Kyōto University*, 京都大學人文科學研究所創立25周年記念論文集, 1945, pp. 25-27.

(16) Amano Motonosuke; 'Chūgoku ni okeru suki no hattatsu', pp. 143-144.

appeared later than a spade.

The *lei* in the Yin period is now regarded as a two-pronged spade. Two holes were made at one thrust, in which were sowed seeds of such crops as millet and barely. Judging from the expression '貞, 夷小臣令衆黍' (the king consulted the oracle whether he should order his courtiers to tell the people to grow millet or not) in an oracle bone text (*Yin-hsü shu-ch'i* 殷虛書契, Vol. I, chap. 4, p. 30, 1.2), there existed a custom of co-operative cultivation and sowing among the commoners working on the royal fields; some people made two holes with a *lei*, while others sowed the seeds and covered and pressed them with the soil. This co-operative cultivation is called *ou-kêng* 耦耕.

In the Chou period, on the other hand, the *ssü* was the main agricultural implement. The spade-tip of the *ssü* could produce only one hole at a time, but it could turn over a wider clod of soil than the *lei*. Therefore, the *ssü* may be deemed to be a more advanced tool than the *lei*. As the *lei* could dig two holes at a time, the area one person could sow was greater than in the case of the *ssü*. In the Chou period, however, there appeared such tools as the *po* 耨 for loosening and turning over the soil, and the *ch'ien* 錢 for raking—the two tools were employed for both medium depth cultivation and weeding (the *Ch'ien-kung* 臣工 and the *Liang-ssü* 良耜 in the *Shih-ching*). Therefore, even if the area under sowing per worker was small, the harvest per unit area was much greater due to the weeding work which prevented water or nutritive substance invaluable in the western areas of China where rain was scarce from being wasted upon weeds and unrequired seedlings of millet.

On the basic form of the *lei-ssü*, Nishiyama Takeichi is of the same opinion as Hsü and Amano; he assumed a tread-spade to be a farming tool before the advent of an iron plough. He wrote as follows: <sup>(17)</sup>

The agriculture in the Chou dynasty down to the Ch'un-ch'iu period is characteristically 'garden farming by irrigation'. A primary factor of Chou's victory over the pastoral economy of Yin was in the agricultural economy with higher productivity. And its main feature was the cultivation of barley by the tread-spade with irrigation and drainage equipment in the alluvial plain area of the Yellow River. The pattern of the soil preparation written in the *Chou-li* consisted of a high ridge and a dike made by the tread-spade used by two persons standing side by side. Even if it was written in the Han dynasty as more likely than not it was, the descriptions were without doubt based on the agricultural pattern before the cultivation by plough appeared in the Shensi 陝西 districts.

The spade was originally a wooden fork-like implement which developed into an oar-like shape. Further in later years as *furo-suki* 風呂鍬,

(17) Nishiyama Takeichi; 'Gijutsu-shi', p. 568.

it was strengthened by fixing a metal tip around its end. However, its digging efficiency was so limited that it was suitable only for the cultivation of the coarse and soft alluvial soils.

As Amano pointed out in his comments,<sup>(18)</sup> the above mentioned 'wooden fork-like implement and the oar-like one' refer no doubt respectively to the *lei* and the *ssũ*. Setting aside the question whether the view is correct or not, the explanation is concise and to the point.

The most important point common to the three views is the assertion that the *lei* and the *ssũ* were agricultural tools for turning over the soil by pushing it with the hands or thrusting with the foot, that is to say, they were spade-shaped agricultural implements.<sup>(19)</sup> The times the two implements were used, the area of their distribution, and their relation with *pu*-coins are secondary problems. Unless the forms and functions of the two implements become clear, any further discussion is meaningless.

However, is it correct to regard the *lei* and the *ssũ* as spade-shaped implements? The next discussion will be concerned with this question.

## II

### THE *LEI*

According to Hsü's view, the *ssũ* developed from the *yi* 弋, that is, a wooden stick, and the *nenohi no tagarasuki* is a survival of the *ssũ* (Fig. 1). Although at first sight this view sounds plausible, further considerations bring out many points hard to accept. Having singled out from bronze inscriptions characters including the radical '弋' such as *yi* 𠂔 and *pi* 必, Hsü concluded:

The character *yi* 弋 was originally written 𠂔. This is modeled on the form of a wooden stick. The side line of the character *yi* 弋 has the same significance as that of the character *fang* 方.<sup>(20)</sup>

Also he explained the character *fang* 方 as follows:

The character *fang* represents the *lei*. The upper short horizontal line is modeled on the side wood at the top of the handle, and the lower long horizontal line represents the part which was stepped on, and the short vertical side line is probably decorative (Fig. 2).<sup>(21)</sup>

The horizontal middle line of the character *yi* 弋, like the long, curved line

(18) Amano Motonosuke; 'Nishiyama Takeichi-shi "Chũgoku gijutsu-shi" ni yosete' 西山武一氏「中國技術史」に寄せて ('Comments on Nishiyama Takeichi's "A History of Technology in China"'), *Chũgoku kenkyũ* 中國研究, Vol. 15, 1952, p. 46.

(19) In China the character *ch'iao* 鍬 indicates spade and *ch'u* 鋤, hoe. On the contrary, in Japan *kuwa* 鍬 means hoe and *suki* 鋤, spade.

(20) Hsü Chung-shu; '*Lei-ssũ-k'ao*', p. 33.

(21) *ibid.*, p. 17.

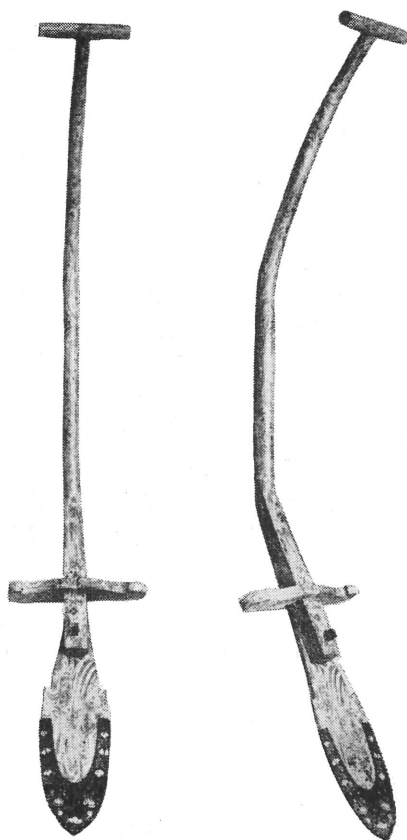


Fig. 1. The *nenohi no tegarasuki*, Length 130 cm.  
(After *Shōsōin gyomotsu zuroku*)

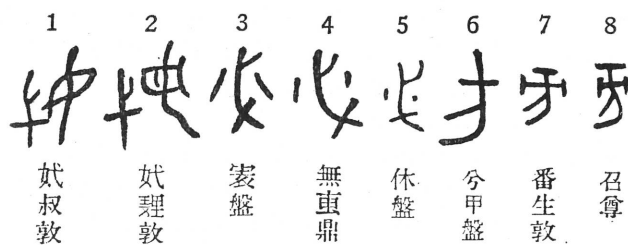


Fig. 2. The characters *yi* 狄 (nos. 1, 2), *pi* 裴 (nos. 3-5)  
and *fang* 方 (nos. 6-8) from various bronze inscriptions.  
(After 'Lei-ssü-k'ao')

of the character *fang* 方, represents the 'hsün' 鐔, that is, a horizontal bar on which the farmer set his foot as he dug the soil with the stick. If this explanation is correct, we may rather conclude that the *yi* is related more to the *lei* than to the *ssü*, because the character *lei* in oracle-bone texts and in bronze inscriptions is often accompanied by a *hsün*, while such is never the case with

the character *ssü*. Moreover, although Hsü did not take notice, some explanations should be given concerning the small ramified projection on the upper right corner on the character. A further study of the character *yi* brought out the following facts.

With doubt, *yi* 弋 is modeled on the shape of a wooden stick. Its horizontal middle line, however, does not represent a *hsün*. This becomes obvious when we trace the process of the evolution of a wooden stick into the character *yi* through the study of the character *wu* 戊 (戊), for example. The oldest pictograph of the character *wu* (Fig. 3, No. 1<sup>(22)</sup>) represents the shape of a handle with a blade set to the former at right-angles, and added to the upper and lower part of the wooden handle are two short slanted sticks presumably as ornaments. The part of the wooden handle with short lines grows beyond doubt into the character *yi* as it changed from the second down to the fourth character in Fig. 3. To illustrate the point, remove the element '八'<sup>(23)</sup> from the character *pi* 必 in Fig. 2 and add to it the element of the T-shaped blade, and the two will make the character *wu* 戊. Also, the elimination of the part of blade from the pictographs 5 and 6 in Fig. 3 produces a form nearly identical with *yi* 弋 in the character 𠄎 in Fig. 2. To sum up, the long horizontal line of *yi* and its upper projection are nothing but the changed forms of the two slanted lines added as ornaments. This is the true origin of the upper projection.

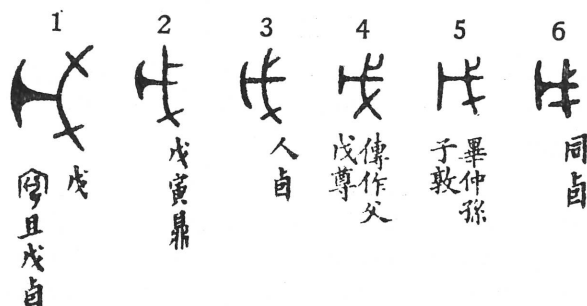


Fig. 3. The character *wu* 戊 as found in bronze inscriptions.  
(After *Ku-chou hui-pien*)

Since the horizontal line of the character *yi* is not a *hsün*, the theory that relates it to the *nenohi no tegarasuki* on the basis of the origin of this line cannot be maintained. If, then, there is an ancestral tool of the *tegarasuki* form, that is, a wooden stick with a *hsün*, what can it be? In my opinion that is none but the *lei* itself. The reasons are as follows: the character *lei* in oracle-bone texts and in bronze inscriptions sometimes has a line which indicates a straight handle, but also, and more frequently, it has an s-shaped, curved, vertical line. The part which is thrust into the soil is fixed at the end of the handle, either straight or at some angle, or in rare cases at right-angles. In the

(22) Hsü Wên-ching 徐文鏡; *Ku-chou hui-pien* 古籀彙編, Vol. 14, Part 2.

(23) According to the *Shuo-wên chieh-tzû* 說文解字, 'pi' 必 consists of *pa* 八 and *yi* 弋.

last case, and especially the *lei* with two prongs, they might be used as harrows. The same type of the character *lei* inscribed on the Lei-tun 耒敦 and Lei-tso-fu-chi-yi 耒作父己彝 not only has a *hsün* to push with the foot, but also near it is inscribed a hand, showing that it was used as a spade. It is, therefore, evident that it does not belong to the category of a hoe for hoeing and pulling towards a cultivator. In general, the characters *lei* in oracle-bone texts and in bronze inscriptions are ramified at the end into two or three branches. But an undivided ending is not rare. For instance, the character *li* 力 modeled on the form of *lei* and the character *lei* composing the character *ching* 靜 have often undivided endings, and a little above the lower end of the character is drawn a slanted line equivalent to a *hsün* (Fig. 4). It is not doubted that this type of character was modeled on the form of 'the first agricultural implement' which Hsü regarded as the ancestral form of the *tegarasuki*, that is, a wooden stick with a *hsün*.

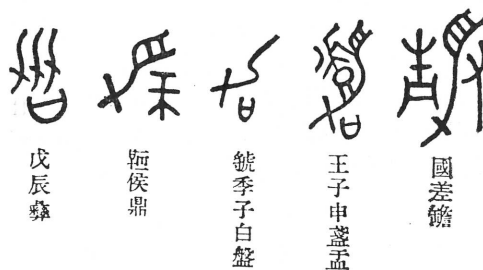


Fig. 4. The characters *hsie* 劓, *lê* 勒, *chia* 加, *chia* 嘉 and *ching* 靜 as found in bronze inscriptions. (After 'Lei-ssü-k'ao')

Hsü said as follows:

The *lei* and the *ssü* are two different kinds of agricultural implements. The *lei* is two-pronged and the *ssü* is single-edged. The *lei* is modeled on the branches of the tree and the *ssü* on a wooden stick.<sup>(24)</sup>

As already indicated, however, among *lei* there are some modeled on a wooden stick, and for this reason we cannot differentiate the *lei* from *ssü* only on the basis of the form of the part which is thrust into the soil. In a word, as Hsü explained, the *lei* is a 'spade-shaped' implement. And only this was the indispensable basic feature of the *lei*. It has nothing to do with the essential requisite of the *lei* whether its end is divided, flattened or accompanied by a stone or metal edge. It is clear now that the *nenohi no tegarasuki* in question and *tabi* discussed by Amano (Fig. 5) are nothing but relics of *lei*.

As already quoted, Amano said as follows:

The *lei* in the Yin period is now regarded as a two-pronged spade. Two holes were made at one thrust, in which were sowed seeds of such crops as millet and barley.<sup>(25)</sup>

(24) Hsü Chung-shu; 'Lei-ssü-k'ao', p. 32.

(25) Amano Motonosuke; 'Chügoku ni okeru suki no hattatsu', p. 144.

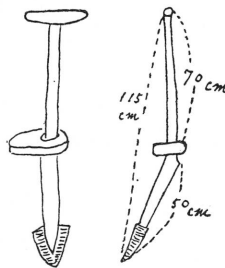


Fig. 5. The *tabi* used in Tog-chuk-to 德積島, Korea.  
(After 'Chugoku ni okeru suki no hattatsu')

And in another place, he said:

The staple articles of crops in the Yin dynasty were two kinds of millet, and these seeds of the granule were probably sowed in shallow holes made by a partly worked branch of a tree.<sup>(26)</sup>

It is not without question to suppose that the two-pronged *lei* of the Yin period was intended to make two holes at a time in the ground. If the supposition is warrantable, we shall have to conclude that a single-pronged *lei* is for one hole and a three-pronged *lei* for three holes. If a multi-pronged *lei* is more efficient for sowing, why is it that there still existed in the Western Chou period a single-pronged *lei* as shown in bronze inscriptions? A more reasonable explanation may be possible.

If we accept Amano's contention that the *lei* is only for making shallow holes, we cannot explain the necessity of a *hsün* set to the *lei*. It is now superfluous to say that *hsün* is the part of the *lei* to step on with a foot to make its end sink deeper into the soil. Suppose one thrusts a two-pronged *lei* into the soil up to the level of the *hsün*, and digs it up, pulling the handle towards one, one cannot produce two holes but only a lump of soil will come up. The same is true with a three-pronged *lei*. But, needless to say, the amount of the soil dug out increases as the prongs of the *lei* increase. The original form of a *lei* is most certainly a simple wooden stick, which came to have prongs so as to increase the amount of soil dug out. If the force applied by the foot is same, the force pressed on one prong of a two-pronged *lei* is half the whole force and one-third on one prong if the *lei* is three-pronged. Therefore, a single-pronged *lei* is suitable for the hard soil. This may be an explanation of the survival of a primitive wooden stick type *lei* in the Western Chou period.

Then, what was the size and the shape of the *lei* in pre-Ch'in times? The most important document concerning this question is the following passage from the Ch'ê-jên 車人 in the *K'ao-kung-chi* 考工記. It is long, but bears quotation in the full.

車人為耒。耒長尺有一寸，中直者三尺有三寸，上句者二尺有二寸。自其耒緣其外，以至於首，以弦其內，六尺有六寸，與步相中也。堅地欲直耒，柔地欲句耒。直耒則利推，句耒則利發。倨句磬折，謂之中地。

(26) *ibid.*, p. 109.

A chariot-maker makes a *lei*. The length of the *tz'ũ* 庇 is one *ch'ih* 尺 one *ts'un* 寸. The straight part in the middle is three *ch'ih* three *ts'un* long. The upper curved part is two *ch'ih* two *ts'un* long. The length from the *tz'ũ* to the end of the handle measured along the body of the *lei* is six *ch'ih* six *ts'un*. However, the string from the *tz'ũ* to the end of the handle is six *ch'ih* long, which corresponds to one *pu* 步. The *tz'ũ* set to the end of the handle as its straight extension is suitable for a hard soil, and for a soft soil, the *tz'ũ* is set to the handle at some angle. The former is convenient for thrusting into the soil and the latter for turning over the soil. When the angle between the handle and the *tz'ũ* is between that of a right angle and an acute angle, that is, a little curved to form the shape just like a head of a *ch'ing* 磬, this is called *chung-ti* 中地.

As to the *tz'ũ* Sung Yi-jang 孫詒讓 said in the *Chou-li chêng-yi* 周禮正義 as follows:

The *tz'ũ* is probably the wooden part to dig the soil and the *ssũ* is the metal edge set to the *tz'ũ*.

*Tz'ũ* in the above passage means a wooden part under the handle to which a metal edge is set. A chariot-maker is a wood-worker—not a metal-worker. Therefore, in the above passage, the *lei* means the wooden part of the digging tool, that is, the handle and the *tz'ũ*. The *ssũ* elsewhere referred to in a paragraph of the Chiang-jêng 匠人 in the *K'ao-kung-chi* as 'the width of the *ssũ* is five *ts'un*' is a metal edge set to the *tz'ũ*. This shows that when the *K'ao-kung-chi* was written, the original meanings of the *lei* and the *ssũ* had already been lost.

Of the various commentaries on the above passage the most noteworthy is Ch'êng Yao-t'ien's 程瑤田 opinion written in the *K'ao-kung ch'uang-wu hsiao-chi* 考工創物小記. But questions may be raised as to whether the handle of the tool was bent and the *tz'ũ* was attached to the handle at the angle, as Ch'êng suggested. Let us examine these points with the help of the drawing of the *lei* in Ch'êng's book (Fig. 6). Ch'êng explained that while the middle part of the handle was straight, the upper part of the handle was bent in the direction opposite to the *tz'ũ*. This explanation contradicts the following description: 'the length from the *tz'ũ* to the end of the handle measured along the body of the *lei* is six *ch'ih* six *ts'un*. However, the string from the *tz'ũ* to the end of the handle is six *ch'ih* long.' Also Tai Chên's 戴震 *K'ao-kung-chi-t'u* 考工記圖 has recorded a peculiar figure of a *lei* like a twisted bow. Lin Hsi-yi 林希逸 wrote about an ancestor of the *lei* in detail in the 2nd volume of his *Ch'i-ch'ai k'ao-kung-chi-chieh* 虞齋考工記解:

The line drawn between the *ssũ* set under the *lei* and the upper end of the *lei* resembles the string of a bow. It seems that the lower and upper ends of the implement were a little curved and the middle part was straight. If we stretch a cord between the two ends, the whole shape may be just like a bow.



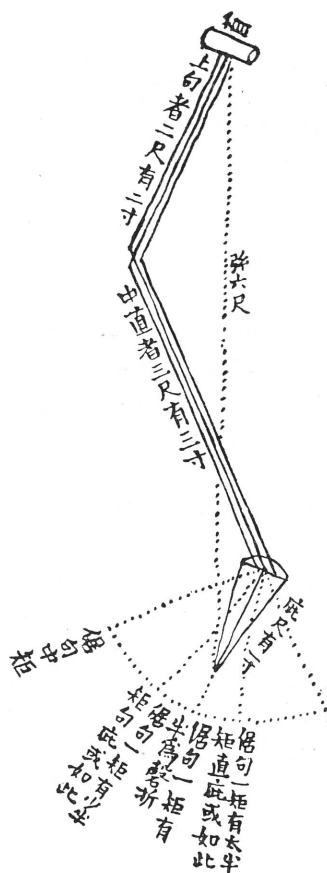


Fig. 6. A diagram of the *lei* after K'ao-kung ch'uang-wu hsiao-chi.

Also Katō Shigeshi 加藤繁 wrote as follows:

The length of the *lei* measured along its curved body is six *ch'ih* six *ts'un*.

But the length of the string is six *ch'ih*, which corresponds to the length of a *pu* 步.<sup>(27)</sup>

As they both agree, the upper part of the handle must be bent in the same direction as the *tz'ū*. The *nenohi no tegarasuki* and the Korean *tabi* are bent in this way.

Before we proceed to the study of the angle between the handle and the *tz'ū*, it is necessary to elaborate briefly upon an aspect of the English translation of the K'ao-kung-chi passage above. The words 'straight' and 'hook-shaped' in the paragraph do not literally mean 180° and 90° respectively, but are to be read as a matter of degree when compared to the curvature of a *ch'ing-chê* 磬折. As for the term '*chung-ti*' Lin 林 states: 'The people in Chekiang 浙江

(27) Katō Shigeshi 加藤繁; 'Shina kodensei no kenkyū', 支那古田制の研究 ('A Study of the Management System of Land in Ancient China'), *Shina keizaishi kōshō* 支那經濟史考證, Vol. 1, Tōyō-bunko 東洋文庫, 1952, p. 532.

mean "useless" by the phrase *pu-chung* 不中, and this shows the meaning of the character *chung*. Tai 戴 said, 'Chung-ti means to be suitable for cultivation.' Then, *chung-ti* indicates the possibility of *t'ui* 推 'thrusting' and *fa* 發 'digging'<sup>(28)</sup> regardless of the hardness of the soil. In other words, *chung-ti* is an all-round agricultural implement combining the merits of the *chih-tz'ü* 直庇 and the *chü-tz'ü* 句庇 angles.

With the above in our mind, let us reexamine the drawing of the *lei* restored by Ch'êng. According to this drawing, the angle between the handle and the *tz'ü* is prescribed as follows:

*chih-tz'ü* 直庇, one and two-third *chü* 一矩有太半矩,  $90^\circ + 90^\circ \times 2/3 = 150^\circ$

*chü-tz'ü* 句庇, one and one-third *chü* 一矩有少半矩,  $90^\circ + 90^\circ \times 1/3 = 120^\circ$

*ch'ing-chê* 磬折, one and a half *chü* 一矩有半,  $90^\circ + 90^\circ \times 1/2 = 135^\circ$

At first sight, those calculations seem plausible. But, they do not hold out in the light of certain documents. Ch'êng concluded that the *ch'ing-chê* was one and a half *chü* (135°) from the following passage of the Ch'ing-shih 磬氏 in the *K'ao-kung-chi*:

磬氏爲磬, 倨句一矩有半。

The chime-maker makes *ch'ing* 磬. The angle of the bending of the head is one and a half *chü*.

But a more valuable clue is found in the introductory section of the *K'ao-kung-chi* passage quoted before:

車人之事, 半矩謂之宣, 一宣有半謂之櫛, 一櫛有半謂之柯, 一柯有半謂之磬折。

The chariot-maker calls a half *chü*, a *hsüan* 宣, one and a half *hsüan*, a *shu* 櫛, one and a half *shu*, a *k'o* 柯, and one and a half *k'o*, a *ch'ing-chê* 磬折。

According to this measurement, a *hsüan* is 45°, a *shu* 67.5°, a *k'o* 101.25°, and a *ch'ing-chê* 151.875°, which does not check with Ch'êng's reckoning of 135°. On this point Ch'êng made a strained explanation in his *Ch'ing-chê ku-yi* 磬折古義 that *k'o* in the phrase '一柯有半' is written in error for *chü* 矩. However, as Ch'ên Yen 陳衍 pointed out in the 3rd chap. of the *K'ao-kung-chi pien-chêng* 考工記辨證, the syntax does not permit *k'o* to be replaced with *chü*. After all, the *ch'ing-chê* used by the chariot-maker is a wider angle than that used by the chime-maker. What does this signify?

There can be no objection to the view that the *lei* made by a chariot-maker was used mainly as a spade. As such, it must have been designed with a view to the utmost efficiency as a spade. The *lei* with the *chih-tz'ü* or the *chü-tz'ü* angles seem to have been special cases and the one with the *ch'ing-chê* angle was probably far more usual. After experimenting with various kinds of *lei*, people in those days discovered that the angle of *ch'ing-chê* was too small and made spades with a special angle called one and a half *k'o* 一柯有半. They

(28) *T'ui* means thrusting of the blade of a spade-shaped implement. After this action we turn over the soil by pushing down the handle of the implement. The latter action is called *fa*.

called this angle also *ch'ing-chê* simply signifying that the angle was similar to the *ch'ing-chê*. In all ages and countries the handles generally form an obtuse angle with the spade-tip.<sup>(29)</sup> Here, too, we can assume that the angle most suitable for the purpose was selected after much experience. Anyway, all spades are of the *chung-ti* type in their forms and functions.

With the above taken into consideration, the diagram of the *lei* with an angle of *ch'ing-chê* is as drawn in Fig. 7. The angle formed by the upper

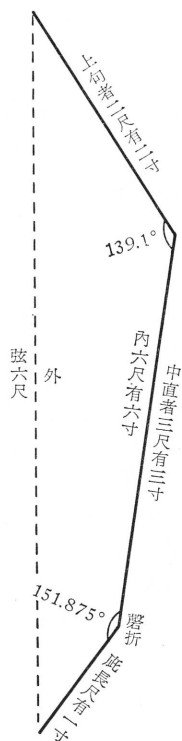


Fig. 7. Author's reconstruction of the *lei* as described in the *K'ao-kung-chi*.

handle and the straight middle stick is computed to be about  $139.1^\circ$ , which is smaller by  $12.775^\circ$  than the angle between the middle stick and the *tz'ü*,  $151.875^\circ$ . This type of *lei* is greatly different from the earlier one with prongs and a footrest. Nevertheless, we can imagine from this diagram the form of the *lei* as described in the *K'ao-kung-chi*. Ch'êng had no solid ground to conclude that the *chih-tz'ü* was one and two-third *chü*, and the *chü-tz'ü*, one

(29) Trittspaten used in present China (Wilhelm Wagner; *Chinesische Landwirtschaft*, Berlin, 1926, Abb. 60:3). Wooden tread-spades in the Yayoi 彌生 period in Japan and Gōshū 江州 spades in pre-modern times in Japan [Yawata Ichirō 八幡一郎; 'Nihon no kodai-suki' 日本の古代鋤 ('Wooden Spades in Ancient Japan'), *Minzokugaku kenkyū* 民族學研究, Vol. 21, No. 4, 1957, Figs. 1 and 4]. Hebridean 'caschrom' (mentioned later). Shovels of today.

and one-third *chü*. Simply assuming that the *ch'ing-chê* angle is one and a half *chü*, he merely posited the above model angles. In a sense, the *chih-tz'ü* and the *chü-tz'ü* may be a metaphor to explain the significance of the *ch'ing-chê* angle.

### III

#### THE SSÜ

The previous chapter has demonstrated that the *lei* was a spade-shaped digging tool. What, then, was the *ssü*? Discussing the digging tools in China, we must not lose sight of the general tendency attending the development of agricultural implements in the world. That is to say, the basic patterns of agricultural implements should be understood.

Ever since Edward Hahn's lecture in 1891,<sup>(30)</sup> it was generally accepted that agriculture in the world began with the Hackbau which was later superseded by the Pflugbau. The Hackbau includes not only cultivation by the Hacke (hoe) but also cultivation by the Grabstock (digging stick) and the Spaten (spade) developed from the Grabstock. The ambiguity of the word 'Hackbau' was pointed out by Alfred Götze as follows:

Pflug und Hacke stehen in einer gewissen Relation zueinander. Der Urtypus beider ist ein spitzer Stock, aber seine verschiedene Handhabung bewirkt von Anfang an eine Zweiteilung, . . . . Entweder wird der Stock schiebend vorwärts gestossen, oder der Arbeiter macht eine hauende, gegen sich gerichtete Bewegung, indem er selbst vorwärts schreitet. Diese grundverschiedene Handhabung führt einerseits zum Pfluge, anderseits zur Hacke.<sup>(31)</sup>

'Ein spitzer Stock' (a pointed stick) is a Grabstock and is quite different from a Hacke with Winkelschaft (hooked shaft). Therefore, in recent years Hackbau (hoe farming) is usually recognized to be different from Grabstockbau (digging stick farming). For example, Emil Werth entitled his book *Grabstock, Hacke und Pflug* and in it he stated:

Die Grabstock- und Hackbaukultur ist aber nicht nur die älteste Landbaukultur, sondern auch die älteste Viehzüchterkultur.<sup>(32)</sup>

Werth also wrote on the process of the development from Grabstock to Spaten as follows:

Im einfachsten Falle ist der Grabstock ein gewöhnlicher, unten zugespitzter

(30) Edward Hahn; *Die Haustiere und ihre Beziehung zur Wirtschaft des Menschen*, Leipzig, 1896, S. 388.

(31) Alfred Götze; 'Pflug und Hacke', (Max Ebert; *Reallexikon der Vorgeschichte*, Bd. X) S. 118.

(32) Emil Werth; *Grabstock, Hacke und Pflug, Versuch einer Entstehungsgeschichte des Landbaues*, Ludwigsburg, 1954, S. 56.

Stab. . . . Sehr verbreitet ist überhaupt das Bemühen, dem unteren Ende des Stockes zur leichteren Bodenbearbeitung mehr Fläche zu geben. Im einfachsten Falle wird dies dadurch erreicht, dass man das Holz nicht allseitig, sondern einseitig flach zuspitzt, dann aber vor allem dadurch, dass man es unten abflacht und zugleich verbreitert. Damit ist bereits eine primitive Spatenform gegeben, von der es alle Übergänge bis zum vollendeten Spaten gibt.<sup>(33)</sup>

Grabstock and Spaten belong to the same class of implements. Cultivation with them is categorically called Grabstockbau, and there is no such term as Spatenbau. The Gabelspaten (a forked spade) which resembles the Chinese *lei*, the Holzspaten mit Stelztritt (a wooden spade with a footrest) reminiscent of the *chang-ch'an* 長鑿 as recorded in Wang Chen's 王禎 *Nung-shu* 農書, and the Trittspaten (a tread-spade) which is almost identical with Japanese *tegara-suki* (Fig. 8), are all bracketed together as variations of the Grabstock.<sup>(34)</sup> This is the reason why Werth did, indeed, itemize the Spaten under a special heading in his explanation of the various kinds of agricultural implements. It is also

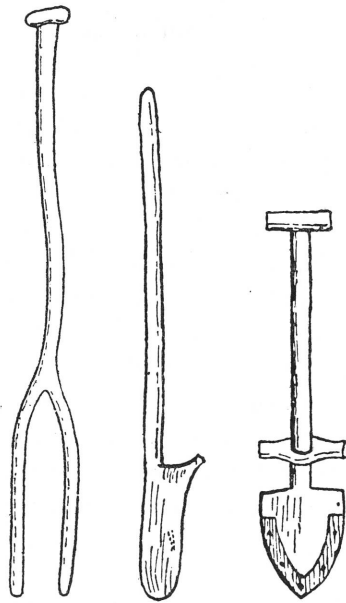


Fig. 8. Gabelspaten (left), Holzspaten mit Stelztritt (middle), Trittspaten (right). (After Grabstock, Hacke und Pflug)

worth our notice that E. Cencil Curwen wrote on the two descendants of primitive farming implements as follows:

A digging stick was a strong, straight, pointed stick, possibly weighted with a stone (as are some modern specimens), and from it have been

(33) *ibid.*, S. 130.

(34) *ibid.*, Abb. 21, 24.

developed the spade, the garden fork, and perhaps the series of angular digging sticks of which the Hebridean *caschrom* is the best-known example. The hoe was an instrument consisting of a blade, made of hard wood, stone, or metal, set at an acute angle to its handle; it was the ancestor of the mattock and the pick. Both of these implements—the digging stick and the hoe—have survived among primitive tribes down to the present day where plowing is not practiced.<sup>(35)</sup>

In the above quotation, too, the digging stick and the hoe are mentioned as two representative types of agricultural implement, and the spade is placed in the same order as the digging stick. Gudmund Hatt made hardly any distinctions between a digging stick and a spade as can be seen in such expressions as 'the digging stick, the end of which was sharpened and flattened,' 'spade-shaped wooden digging sticks,' and 'a large digging stick, a kind of narrow spade provided with a footrest.'<sup>(36)</sup>

In the last analysis, the basic forms of digging tools are a spade and a hoe. (A plough will be discussed later, for it developed from these two basic tools.)<sup>(37)</sup> The hitherto accepted theory held that the *lei* and the *ssū* were originally spade-shaped digging tools, and the only difference between them was that the *lei* was two-pronged, while the *ssū* had a round-headed and flattened end. These features, however, do not constitute the essentials of a digging tool. If the *lei* and the *ssū* are the terms applied to two different kinds of digging tool, it is more logical to assume that the distinction between them consisted in the differences of their functions. It is highly probable that while the *lei* is spade-shaped, the *ssū* is a hoe-shaped digging tool. Besides, it is already proved that the *lei* is a spade-shaped implement.

As to the origins of a spade and a hoe, Amano wrote as follows:

The digging tool employed during the periods of Yin and Chou was the spade which was dug into the soil with the hands and with the help of a foot, turned over the soft and fertile loess of North China, while the hoe, used by striking downwards and then pulling, appeared as a weeder in the Chou period, so far as we know from documentary sources.<sup>(38)</sup>

It is questionable whether we can conclude that the only digging tool employed during the Yin and Chou periods was the spade. W. M. Flinders Petrie said,

(35) E. Cencil Curwen & Gudmund Hatt; *Plough and Pasture, The Early History of Farming*, New York, 1953, p. 63. The Part 1 (up to p. 147) is written by Curwen and Part 2 by Hatt.

(36) *ibid.*, pp. 172, 194, 231.

(37) The explanation by Yawata Ichirō is as follows: Farming tools comprise two types: digging sticks and spades evolved from them, and hoes developed from the hooks of antlers or trees. Those are primary tools. Those tools if drawn by oxen are ploughs, so ploughs are secondary farming tools. This explanation is concise and to the point. Yawata Ichirō 八幡一郎; 'Nōgu' 農具 ('Agricultural Implements'), *Sekai daihyakka jiten* 世界大百科辞典, Vol. 22, Heibon-sha 平凡社, 1958, p. 466.

(38) Amano Motonosuke; 'Chūgoku ni okeru suki no hattatsu', p. 143.

'The spade is a much later tool than the hoe, and none are preserved before Roman times.'<sup>(39)</sup> So, there is a possibility that in China, too, a hoe-shaped tool existed early in its history. In evidence of this, we may cite the unique Chinese stone axe with a hole, some examples of which seem to have been used as hoes in conjunction with a wooden handle passed through the hole.

The above examination suggests that the *ssü* was probably a hoe-shaped digging tool. Let us verify the proposition by the character forms in oracle-bone texts and in bronze inscriptions. The character 耒 is a combination of *lei* 耒 and *ssü* 𠂔, and the original form of 𠂔, that is, 𠂔 is a pictograph modeled on the digging tool in question. The character 𠂔 in oracle-bone texts and in bronze inscriptions does not at all indicate a digging tool itself, but is used in almost all cases in the meaning of the character *yi* 以. On this point, Hsü contended:

*Yi* 𠂔 is 'an implement'. Therefore, in the old writings it is replaced with the character *yi* 以 which has the same meaning as *yi* 𠂔. The character means 'use' (*ying* 用).<sup>(40)</sup>

This explanation may sound far-fetched, but I cannot suggest a more appropriate interpretation. Anyway, here in the present article, it may be deemed sufficient if we succeed in bringing to light the original form of the agricultural tool upon which the character was modeled.

Upon a close study of oracle-bone texts, Hsü concluded:

Only two instances of the character 𠂔 are found and no character is found accompanied with 𠂔. Even from such a numerical point of view, it is apparent that the *ssü* was not in common use by the Yin people.<sup>(41)</sup>

In the space of thirty years since Hsü made public his view, counter-evidence has accumulated. A number of further examples of the character 𠂔 have been found in oracle-bone texts. Although they are still fewer than the characters related to the character 耒, we cannot conclude that the *ssü* was not in ordinary use in the Yin period. Random samples of the pictographs of 𠂔 in the oracle-bone texts are shown in Fig. 9.<sup>(42)</sup> Characters 1, 2 and 3 no doubt portray a hoe-shaped implement. Character 1 with a sharp curved handle shows well a characteristic of the hoe. Character 2 is similar to the character 𠂔 found in bronze inscriptions of Ch'un-ch'iu and Chan-kuo times.<sup>(43)</sup> Character 3, seen

(40) Hsü Chung-shu; '*Lei-ssü-k'ao*', p. 30.

(41) *ibid.*, p. 46.

(42) Nos. 1, 3, 11 and 12 are quoted from the authorized version of *Fu-shih yin-chi lei-tsuán* 籒室殷契類纂 compiled by Wang Hsiang 王襄.

No. 2 from the second volume of *Tsêng-t'ing Yin-hsü shu-chi k'ao-shih* 增訂殷虛書契考釋 written by Lo Chên-yü 羅振玉.

Nos. 4-9, 13, 14-16 and 18 from Chap. 14 of the *Chia-ku wên-pien* 甲骨文編 by Sun Hai-po 孫海波.

Nos. 10, 17 and 20 from the second volume of *Chia-ku-hsüé wên-tzû-pien* 甲骨學文字編 by Chu Fang-p'u 朱芳圃.

(43) Cf. Fig. 10: 11-13.

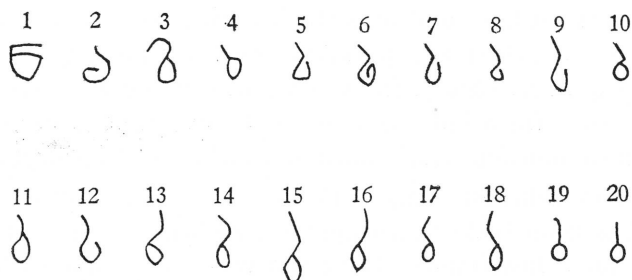


Fig. 9. Examples of the character *yi* 𠂔 in oracle bone texts.

in its entirety, is unmistakably a hoe, although the handle is turned downwards. Characters from 4 to 12 also show the shapes of the hoe. They may be taken to represent a spade, but their handles are too short for a spade. They may rather be regarded as indicating a hoe with a handle turned slantwise to the left either forwards or backwards. Of course, the above explanation is possible only if the technique of perspective drawing existed, as I think it did. Characters from 13 to 18 show a hoe with the end of a handle curved somewhat to the outside. At first sight, they may appear to be a spade. However, it is possible to use them as a hoe, by gripping their handles from the opposite side. No doubt there must be some who contend that 19 and 20 show a spade. But a hoe may look like these, seen from the front or from the back.

Since pictographs were drawn in the age of primitive drawing, it is impossible to decide only on the basis of the character forms in oracle-bone texts whether a spade or a hoe was the prototype of the character 𠂔. But there are at least three examples of a character evidently showing a hoe, which opens up a possibility that other characters indicate a hoe. At least, there is such a possibility.

Now let us survey the character 𠂔 in bronze inscriptions. The character 𠂔 appears in bronze inscriptions of the Chou dynasty in several hundred cases which is far more than the oracle-bone texts can offer. I sorted out approximately 150 *ssü* 𠂔 characters from the inscriptions on more than 3,700 bronze vessels recorded in the *Hsiao-chiao-ching-ko chin-wên t'o-pên* 小校經閣金文拓本 compiled by Liu T'i-chih 劉體智, and then selected from various books of epigraphy other 𠂔 characters not found in the above book. As the drawings in bronze inscriptions are far more accurate than those in oracle-bone texts, they provide more reliable clues to the true nature of 𠂔. Not one pictograph in this collection is identical with another. But, they are divided roughly into the following two categories.

#### A. Longitudinal type (Fig. 10)

This type shows the *ssü* picked up by the end of the handle and placed on the ground. The blade touches the ground with the handle held upwards.<sup>(44)</sup>

(44) Nos. 7 and 17-18 indicate all a character 't'ai' 台. '厶' is equal to '𠂔', and '台' is also '𠂔'. All these mean 'yi' 以.



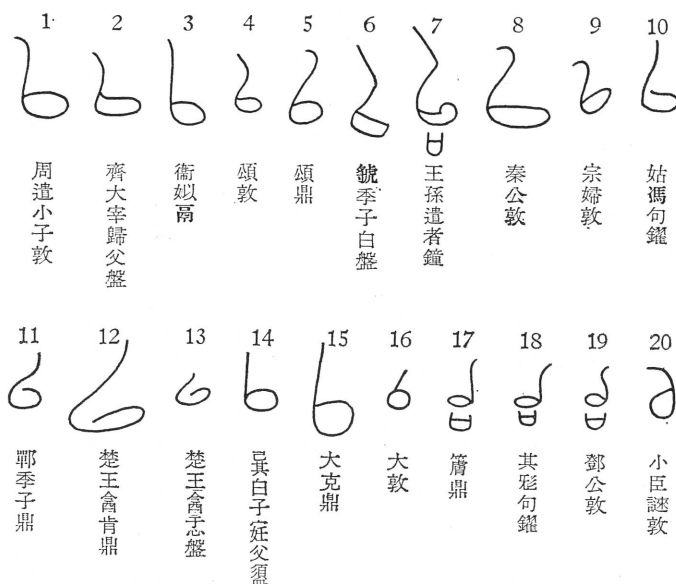


Fig. 10. Examples of the character *yi* 𠄎 in bronze inscriptions—longitudinal type.

Almost all of them have their edges turned to the right (1–16), while only a few to the left (17–20). The end of the handle is usually bent in the opposite direction to the blade (1–13, 17–19); it is at right-angles to it in rare instances (14–16), and in one case it is bent in the same direction as the blade (20). A handle and a blade form ordinarily either a right angle or an acute angle, and an obtuse angle only in rare cases. Therefore, this type of pictograph may be most appropriately interpreted as representing a hoe rather than a spade. An implement with its handle set at such an extraordinarily acute angle (5, 9, 11–13) could not possibly be used as a spade. Historically, the pictographs 1–5, 14–16 and 20 belong to the Western Chou period while 7–13 and 17–19 to the Ch'un-ch'iu or the Chan-kuo period.<sup>(45)</sup> This shows that the 𠄎 characters of the longitudinal type were used in succession from the beginning of Chou to the end of the Chan-kuo period in spite of some changes in their forms.

#### B. Horizontal type (Fig. 11)

In this type edges are turned downwards and handles are extended at a slant forwards or backwards. For the most part, the handles turn to the right (1–13), and those turning to the left are few (14–16). As is apparent at first sight, this type of character indicates a hoe-shaped digging tool. Especially, 2, 3, 15 and 16 represent skillfully the characteristics of a hoe. If the *ssü* had been a spade, it would have never been drawn as above. In many cases, the handles are drawn short because they were aslant, and sketched with the aid

(45) No. 6, Kuo-chi-tzū pai-p'an 虢季子白盤 is supposed to date back to the latter half of the Western Chou period or to the beginning of the Ch'un-ch'iu period.



Fig. 11. Examples of the character *yi* 𠂔 in bronze inscriptions—horizontal type.

of a technique of perspective drawing. To prove this point, the length of the handles of the two pictographs differ depending on the directions the 𠂔 was seen. This way of drawing shows a well advanced skill of expression of the ancient Chinese, and it is interesting to come across such materials for study of the history of drawing.<sup>(46)</sup> All the 𠂔 characters of this type are found only in the Western Chou period and not later than Ch'in-ch'iu.

From the above examination, it is clear that 𠂔 (equivalent to 耜) is a hoe-shaped digging tool. Even the corrupted forms which at first sight seem to represent the shape of a spade turn out, upon a close study, to be simply a variation of one of the two types of a hoe. Furthermore, the 𠂔 characters in the bronze inscriptions will show, if referred back to the oracle-bone script, that all the 𠂔 characters therein also represent a hoe. In oracle-bone script, too, there were, as a rule, two basic types of character, i.e. longitudinal and horizontal. In this case, however, distinctions are difficult to make on account of the immature technique of drawing. It seems, indeed, strange that such a simple fact that the character 𠂔 represents a hoe has never been clarified until now. Different from the character *lei*, the graph *ssü* is never accompanied with a footrest, which variation in particular shows that 𠂔 was originally a pictograph of a hoe. The misunderstandings that have persisted for 2,000 years or more are hereby corrected. China is no exception to the general tendency of

(46) Even in the Han period a technique of perspective drawing was hardly developed. For instance, on the stone with bas-reliefs in Wu-shih-t'zū are inscribed waiters going upstairs with dishes in their hands, and strangely enough those dishes are drawn uniformly as we can see them straight as a whole. A more progressive way of drawing is seen in the 𠂔 character. The head of this character of longitudinal type is drawn a little long and narrow as it is really seen by adopting a technique of perspective drawing. Also, the handle of 𠂔 character of horizontal type is drawn short aslant.

the development of agricultural implements throughout the world; in China, too, there existed two types of implements, spade-shaped and hoe-shaped, from the early years of her history.

## IV

## THE FORMATION OF A PLOUGH

Completing thus our general investigation of the forms of the *lei* and the *ssü*, we may now consider the relation between the *lei*, the *ssü* and the plough. Hsü observes: 'A plough is a large-sized *ssü*, and the pre-Ch'in coins called *ch'ing-pi* 磬幣 or *ch'iao-pi* 橋幣 are probably modeled on the *li-kuan* 犁鎗, plough-share'.<sup>(47)</sup> But, did a plough really develop from the *ssü*? Is it certain that the *ch'ing-pi* (or *ch'iao-pi*) were in fact coins? Hsü's views on such points seem highly problematic. To answer these questions, we must study under what circumstances the Chinese plough came into existence.

Needless to say, a plough is an ox-drawn agricultural implement and it is called in Japanese *kara suki* (Chinese plough) or *ushi suki* (ox-drawn plough). According to the Introduction to the *Ch'i-min yao-shu* 齊民要術, it was in the reign of the Emperor Wu ti 武帝 of the Former Han 前漢 period that Chao Kuo 趙過 began cultivation by the plough. Without doubt this report cannot be regarded as reliable. However, it is not easy to determine when the ox-drawn plough was first used in China. Some scholars<sup>(48)</sup> contend that the ox-drawn plough came into use as early as the Yin period, on the grounds that the character *wu* 物 in oracle-bone texts is a pictograph of an ox-drawn plough. At present, this view seems to be dominant among Chinese historians. But, it cannot be called an established theory, for the traditional view to regard *wu-niu* 物牛 as the name of a mottled cattle<sup>(49)</sup> has not been disproved yet. Besides, it is too risky to conclude from a single character that cultivation by an ox-drawn plough was practised in the Yin period. Neither a wooden plough nor one with a stone blade could have stood the strong traction capacity of an ox.<sup>(50)</sup> Moreover, no stone implement suitable to function as a blade for

(47) Hsü Chung-shu; '*Lei-ssü-k'ao*', pp. 35-41.

(48) Kuo Mo-jo 郭沫若, Chien Po-tsan 翦伯贊, Lü Chên-yü 呂振羽, Hu Hou-hsüan 胡厚宣, Fan Wên-lan 范文瀾, Li Ya-nung 李亞農, Wu Tsé 吳澤 and Shu Shih-ch'êng 束世徵.

(49) Wang Kuo-wei 王國維, Wang Hsiang 王襄, Lo Chên-yü 羅振玉 and Sun Hai-po 孫海波.

(50) Hu Hou-hsüan 胡厚宣 presupposed the use of the ox-drawn plough and the dog-drawn plough in the Yin period, and further on this basis he supposed the existence of bronze agricultural implements in those days. But I cannot agree with him. Hu Hou-hsüan; *Chia-ku-hsüe shang-shih lun-ts'ung* 甲骨學商史論叢, Vol. 2, Part 1-1, 1945, pp. 77-81.

an ox-drawn plough has been found in the Yin site at An-yang. Besides, there is ample room to doubt that bronze digging tools were used in the Yin period.<sup>(51)</sup> Therefore, we cannot but conclude that cultivation by the ox-drawn plough would not have been possible in the Yin period and that the existence of an iron industry would have been a major prerequisite to this type of cultivation. From such a point of view, it is far more appropriate to suppose that cultivation by the ox-drawn plough began in or after the Ch'un-ch'iu period.

We will not discuss here in detail the views based on the traditional sources that cultivation by ox-drawn ploughs was practised in the Ch'un-ch'iu period, for it has been fully explored elsewhere.<sup>(52)</sup> Suffice it to mention that Hsü denied the basis of the assertion of Chou Pi-ta 周必大 of the Sung 宋 period in dating the origin of the plough in the Ch'un-ch'iu period,<sup>(53)</sup> and advocated that it originated in the Chan-kuo period upon an examination of the style of the writing of *huan jên* (or *yüan*) *yüeh* 黃人(元)鉞 in the *Chin-wên-ts'un* 金文存 which he claimed to mean *li-kuan*.<sup>(54)</sup> On the other hand, Amano sought a proof of the existence of the plough in a passage, *chang-fu êrh-li, t'ung-wu-ch'ih yi-li* 丈夫二犂, 童五尺一犂, in the Ch'êng-ma-p'ien 乘馬篇 of the *Kuan-tzû* 管子 which is attributed to the end of the Chan-kuo period, and noted as follows:

The first example of a plough as a digging tool recorded in documents is found in the Chan-kuo period. On this ground, it may be that an ox-drawn spade was called a plough as late as in the Chan-kuo period. However, we can suppose that the plough itself had existed before its terminology was established.<sup>(55)</sup>

Further, he said:

The formation of a plough drawn by an ox instead of man power is worthy of special mention. It appeared following very closely, though not simultaneously with the use of an ironware.<sup>(56)</sup>

And then, quoting my earlier view that 'the appearance of iron digging tools dates back to the middle of the Ch'un-ch'iu period, that is, 600-550 B.C.,<sup>(57)</sup>

(51) Sekino Takeshi 關野雄; 'Yin-ôchô no seisan-teki kiban' 殷王朝の生産的基盤 ('Productive Basis of the Yin Dynasty') *Chûgoku kôkogaku kenkyû* 中國考古學研究, Tōyōbunka-kenkyūsho, Tōkyō-daigaku 東京大學東洋文化研究所, 1956.

(52) Amano Motonosuke; 'Chûgoku ni okeru suki no hattatsu', pp. 115-117.

(53) *Shan-hai-chin* 山海經, Yung-yeh-p'ien in the *Lun-yü* 論語, 雍也篇, K'ung-tzû ti-tzû lieh-chuan in the *Shih-chi* 史記, 孔子弟子列傳, Chi-tung-p'ien of the Yüe-lin in the *Li-chi* 禮記, 月令, 季冬篇, *Hsin-shu* 新書 and *Hsin-hsü* 新序.

(54) Hsü Chung-shu; 'Lei-ssü-k'ao', pp. 56-58.

(55) Amano Motonosuke; 'Chûgoku ni okeru suki no hattatsu', p. 117.

(56) *ibid.*, p. 147.

(57) Sekino Takeshi; 'Chûgoku seidôki-bunka no ichi-seikaku—seidô no sozai-kachi o chû-shin to shite' 中國青銅器文化の一性格——青銅の素材價值を中心として ('A Characteristic of Chinese Bronze Culture, Centering on the Basic Value of Bronze'), *Chûgoku kôkogaku kenkyû*, p. 146.

he expressed agreement.<sup>(58)</sup> Nishiyama, however, sought a somewhat later date for the invention of the ox-drawn iron plough in 500 B.C.<sup>(59)</sup> Among non-Japanese and non-Chinese scholars, E. C. Curwen suggested that in China cultivation by the ox-drawn plough occurred in the third century B.C.,<sup>(60)</sup> while Branimir Bratanić proposed that it took place around 600 B.C. in North China and about 200 B.C. in Southwest China.<sup>(61)</sup>

Among the above views, most reliable are those of Amano, Nishiyama and Bratanić. Even if the appearance of the ironware dates back to the middle of the Ch'un-ch'iu period as I suggested, it may not necessarily have given rise to cultivation by the ox-drawn plough immediately. All things taken into consideration, I am inclined to conclude, in view of the current paucity of relevant evidence, that cultivation by the ox-drawn plough began in the latter half of the Ch'un-ch'iu period. A considerable number of archaeological remains relating to cultivation by ox-drawn ploughs in the Han period have been uncovered,<sup>(62)</sup> but from pre-Ch'in sites, only seven iron *li-kuan* have so far been excavated. They were found in Tombs No. 1 and No. 2 in Ku-wei-ts'un 固圍村, Hui-hsien, Honan 河南省輝縣, which were constructed at the end of

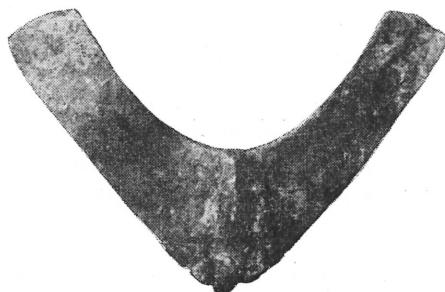


Fig. 12. Iron plough-share (*li-kuan*) excavated at Hui-hsien (1/4).  
(After *Hui-hsien fa-ch'üe pao-kao*)

(58) Amano Motonosuke; 'Shunjū-sengoku-jidai no nōgyō to sono shakai-kōzō—kahoku-nōgyō no tenkai-katei' 春秋戰國時代の農業とその社會構造——華北農業の展開過程 ('The Agriculture and Social Structure in the Ch'un-ch'iu and Chan-kuo Periods; the Developmental Process of Agriculture in the Hua-pei Districts'), *Matsuyama shōdai ronshū* 松山商大論集, Vol. 7, No. 3, 1956, p. 7.

(59) Nishiyama Takeichi; 'Gijutsu-shi', p. 569.

(60) E. C. Curwen & G. Hatt; op. cit., p. 74.

(61) Branimir Bratanić; 'Einige Möglichkeiten zur Fortführung der Pfluggeräteforschung' (*Actes de IV<sup>e</sup> Congrès International des Sciences Anthropologiques et Ethnologiques, Vienne, 1952, Tome II, Ethnologica I, Wien 1955*) Abb. 1.

(62) *Li-kuan*-s 犁鎬 of the Han period were discovered from Lo-yang in Honan 河南省洛陽, Ku-lang in Kansu 甘肅省古浪, Ch'ing-ho-chên in Peking 北京市清河鎮 and Pao-chi in Shensi 陝西省寶雞.

The scene of cultivation with the ox-drawn plough is inscribed on the bas-relief stones at Hung-tao-yüan 宏道院, T'êng-hsien in Shantung 山東省滕縣 and in Wang Tê-yüan's 王得元 tomb in the Han dynasty at Sui-tê in Shensi 陝西省綏德.

the Chan-kuo period (Fig. 12).<sup>(63)</sup> These *li-kuan* were all V-shaped socketed plough-share.

The circumstances in which the plough came into existence in China is the next question. Did the Chinese plough come into existence as a result of influences from outside or was it indigenous to China? This question is related to the important problem whether ploughs throughout the world originally came into being at one time and in one place (monism), or independently at different times and in different places (pluralism). The most representative monism is the following view of E. C. Curwen:

The plow was developed as a result of the adaptation either of a digging stick or of a hoe so that it could be dragged continuously through the ground. It is not at all likely that the original invention was made independently at different times and in different places, but it is quite possible that, once the principle of traction had been established and diffused among neighboring peoples, it was applied by some peoples to digging sticks and by others to hoes, according to the implement which they had been accustomed to using. This would most readily account for the two principal types of primitive plow that have survived down to the present day.<sup>(64)</sup>

On the other hand, there are many pluralists. For instance, Kamo Giichi 加茂儀一 contented as follows:

Ploughs did not necessarily originate in one place, for instance, in ancient Egypt, and diffuse among other countries as European scholars supposed, but they rather originated independently in different places and developed in their own ways.<sup>(65)</sup>

At present, it is impossible to judge which of the above two opinions is correct. The point of concern here is whether the plough in China developed from the spade or the hoe. From the point of view of monism, the question is whether the principle of a plough was applied to a *lei* or to a *ssü*, and from the view point of pluralism, the question is whether the Chinese plough originated from the *lei* or the *ssü*. As to the origin and the development of the plough in the world generally there are two different opinions. E. Werth concluded uncompromisingly that 'Da sich ohne Zweifel alle Pflüge—darüber sind sich heute wohl alle Forscher einig—vom Grabstock und nicht von der Hacke ableiten.'<sup>(66)</sup> As against this, Carl W. Bishop pointed out that some types of a plough belonged to the category of a hoe:

(63) K'ao-ku-yen-chiu-so, Chung-kuo-k'ê-hsüe-yüan 中國科學院考古研究所; *Hui-hsien fa-chüe pao-kao* 輝縣發掘報告 (*Report on the Excavation at Hui-hsien*), K'ê-hsüe-ch'u-pan-shê 科學出版社, 1956, pp. 82, 91.

(64) E. C. Curwen & G. Hatt; op. cit., pp. 69-72.

(65) Kamo Giichi 加茂儀一; *Gijutsu-hattatsu-shi* 技術發達史 (*A History of the Development of Technology*), Tōyō-shokan 東洋書館, 1948, pp. 49-50.

(66) E. Werth; op. cit., SS. 167-168.

The plow was first developed from the digging stick in some such way as the following. The lower part of the digging stick may already have been bent at an obtuse angle to facilitate levering up the soil, just as the blade of a spade is set at a slight inclination to the handle. A cord was then tied to the digging stick close to this angle, and while one worker kept the point of the implement in the ground, another pulled on the cord so as to drag the point through the soil, thus producing a furrow. The next step lay with the priests who, for ceremonial purposes concerned with the fertility of the soil, caused a cow or a bull to be tied by the horns to the digging stick and to share with the men the labor of drawing it. . . . , the cord was replaced by a pole or beam, one end of which was firmly attached to the digging stick and the other to a yoke which was tied to the animal's horns. . . . . This type of plow, derived from the digging stick, has been called a *spade plow*.

But there is another type of plow which has been, and still is, found in widespread use; this has been called the *crook plow* because it has clearly been derived from a forked branch, such as was the primitive hoe, and it may be regarded as a large hoe dragged through the ground by its handle. . . . . It is evident that no intermediate stage of traction by cords would have been possible in its development, so that it may have been the product of a hoe-using people who had learned the advantages of traction from the users of the spade plow, and who adapted the principle to their own implement.<sup>(67)</sup>

If ploughs of all kinds throughout the world can be demonstrated to have developed from the digging stick, that is, a spade, the matter is simple. But it will not be so if there should be examples of ploughs which originated from the hoe. In the latter case the possibility of the application of traction to the hoe is not excluded upon its introduction to China.

To clarify these points, it is necessary to trace the origin of a plough back to the one drawn by man power which C. W. Bishop pointed out. The point of his observation is appropriate, and it is very natural to suppose that a plough was drawn by man power before it came to be supplanted by the ox. G. Hatt also said as follows:

The association of the plow with oxen is very old, but there is reason to believe that the plow was first drawn by men. A traction spade, pulled by human power by means of ropes, is known from many parts of Asia—for example, from Korea. This may be a forerunner or a prototype of the traction plow.<sup>(68)</sup>

In fact, in China, too, a plough drawn by man power was used in the Han period as is shown in the following passage from the *Shih-huo-chih* 食貨志 in

(67) Carl W. Bishop; 'The Origin and Early Diffusion of the Traction-Plough' (*Antiquity* X, 1936) p. 261.

(68) E. C. Curwen & G. Hatt; op. cit., p. 282.

the *Ch'ien-han-shu* 前漢書:

Some people suffered from a shortage of oxen, and ran away to the marsh.

Kuang 光, the late prefectural governor of P'ing-tu 平都, taught Kuo 過 to use a plough drawn by man power.

P'ing-tu is present An-ting-hsien 安定縣 in Shensi 陝西省. Kuang is the first name of the prefectural governor, and his family name is unknown. Kuo 過 is Chao Kuo 趙過 who held the position of *Chao-su tu-wei* 搜粟都尉. This passage shows that a plough was drawn by man power in age when land was cultivated already by ox-drawn ploughs. At the same time, the passage suggests the primitive form of a plough in China. On the origin of the Chinese plough, E. Werth wrote:

Der Chinesische Pflug leicht auf den einfachen Grabstockpflug—ein mit einer Zugstange (Grindel) versehener Grabstock—zurückführen.<sup>(69)</sup>

He explained the process of the development of a Chinese plough examining various forms of ploughs for use in the rice-fields<sup>(70)</sup> referred to by Wilhelm Wagner. This gave Werth a basis to maintain that ploughs throughout the world evolved from digging sticks. But the examples he used are restricted to the ox-drawn ploughs for use in rice-fields, which sets a limit to the validity of his view. Also, ploughs drawn by man power<sup>(71)</sup> used in China today as illustrated by W. Wagner and Rudolf P. Hommel being those with a mould-board just of the same structure as the ox-drawn one, they cannot serve for the solution of the above problem. Nishiyama's view<sup>(72)</sup> quoted in the following passage is worthy of notice because of his point by point description of the original form of the most primitive ploughs drawn by man power in China:

The tread-spade is thrust into the soil, and is pushed down forwards into the soil. Moving backwards, a cultivator continues this action. Setting a complementary stick to the spade to form a V-shaped support makes possible a new type of cultivation. Of two persons standing face to face with the spade between them, one thrusts the spade into the soil and the other pulls it up handling the end of the complementary stick. To continue the same action, the former goes backwards and the latter forwards. Such was the way of cultivation by the tread-spade which is called the *ch'iang-li* 耨犁 and made daily use of in Shansi even today, and the efficiency of this type of cultivation by the *ch'iang-li* is three times as large as that by a usual tread-spade. The phrase *ou-k'eng* 耦耕 in the passage: 'Ch'ang Chü, Chieh Ni *ou-k'eng*' 長沮, 桀溺, 耦耕 (*Kung-tzū chia-yü* 孔子家語)<sup>(73)</sup> might mean not a simple co-operation of two persons standing

(69) E. Werth; op. cit., S. 167.

(70) W. Wagner; op. cit., Abb. 55: 1, 2, 4, 5.

(71) *ibid.*, Abb. 55: 9, Rudolf P. Hommel; *China at Work*, New York, 1937, Figs. 63, 64.

(72) Nishiyama Takeichi; 'Gijutsu-shi', pp. 568-569.

(73) As Amano pointed out, this is an erratum of the Wei-tzū-p'ien in the *Lun-yü* 論語, 微子篇.



side by side using a tread-spade, but two persons' co-operation using the *ch'iang-li*.

If the second person performing the part of pulling the *ch'iang-li* did not pull it up, but dragged it going backwards, while the first went forwards pushing the *ch'iang-li*, this would, in effect, be the same method of cultivation as that with a plough. In this case the second person would have found it better to turn his back to the first, and this would have been a short step to his being replaced by an ox with its greater traction power. Furthermore, the edge of the plough must be of iron. Thus, cultivation by an animal-drawn plough is established. Its efficiency is seven times as large as that of cultivation by a tread-spade.

As there are neither documentary records nor archaeological remains which may offer a clue for the solution of the problem of the plough, such an ethnological observation as above is a sole and a most effective method of study. Nishiyama referred only to Shansi today as the place where the *ch'iang-li* was used. However, according to Amano, it is also called the *ch'iang-li* 槍犁, and used in the Lu-an 潞安 districts of Shansi today (Fig. 13).<sup>(74)</sup> He postulated two explanation on the *yi-li* 一犁 and *êrh-li* 二犁 in the Ch'êng-ma-p'ien

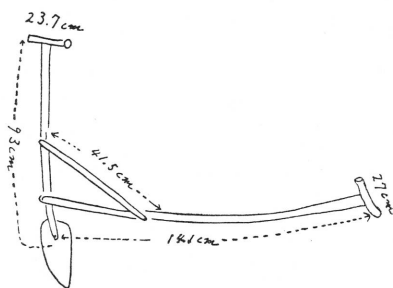


Fig. 13. The *ch'iang-li* type of plough used in Kang-t'ou-ts'un, Chin-ch'êng-hsien, Shansi 山西省晉城縣崗頭村. (After 'Chūgoku ni okeru suki no hattatsu')

of the *Kuan tzũ*, and said that *yi* and *êrh* mean the number of oxen to draw a plough, or, possibly, the *yi-li* is a type of a *ssũ*, and the *êrh-li* a *lei*—both with a shaft.<sup>(75)</sup> Given this hypothesis, a *ch'iang-li* is regarded as 'a *ssũ* with a shaft, that is, a plough without mould-board.'<sup>(76)</sup> As already shown, a spade-shaped implement belongs to the category of the *lei* regardless of the form of the edge. The *ch'iang-li* in question is a *lei* with a shaft, and as such it is a most suitable implement to explain the circumstances under which a Chinese plough came into existence. In this case, it is of little importance whether the

(74) Amano Motonosuke; 'Chūgoku ni okeru suki no hattatsu', p. 112.

Amano Motonosuke; 'Nishiyama-shi "Chūgoku gijutsu-shi" ni yosete', p. 46.

(75) Amano Motonosuke; 'Chūgoku ni okeru suki no hattatsu', p. 119.

(76) *ibid.*, p. 112.

principle of traction disseminated from outside and was applied to the *lei*, or the ancient Chinese devised a shaft to set to the plough. The most important point is that the origin of a Chinese plough seems to be closely related to the *lei*. This is the more natural way of thinking because no link between the plough and the *ssü* is evident.

A plough drawn by man power does not necessarily need an iron edge. Therefore, there is a possibility that a plough drawn by man power came into existence before the appearance of an ironware. As was mentioned earlier, the beginning of cultivation by ox-drawn ploughs was probably in the latter half of the Ch'un-ch'iu period. If this assumption is correct, the appearance of a plough drawn by man power is presumably before the middle of the Ch'un-ch'iu period, and possibly sometime towards the end of Western Chou or the beginning of Ch'un-ch'iu, though there is no sure evidence to support this assumption. If the birth of a plough drawn by man power 'with the efficiency three times as large as that of a usual tread-spade' increased the agricultural productivity in a certain area, as it probably did, it would not necessarily be meaningless to associate it with the political ferment at the beginning of the Ch'un-ch'iu period.

As the *ou-kêng* is mentioned by Nishiyama, let us refer to it briefly in respect to the following passage from the Chiang jên 匠人 in the *K'ao-kung-chi*:

匠人為溝洫。耜廣五寸，二耜為耦。一耦之伐，廣尺深尺，謂之剛。

The civil engineer excavates drains for irrigation. The *ssü* 耜 or the blade is five *ts'un* wide. Two *ssü* make an *ou* 耦 or a pair. The drain dug by a pair of *ssü* is one *ch'ih* 尺 wide and one *ch'ih* deep. It is termed a *ch'üan* 剛. Commenting on this, Chêng Hsüan 鄭玄 said, 'In ancient times the *ssü* was single-edged, and two men worked side by side in turning over the soil with it.' Since then the view has been held that *ou-kêng* means cultivation by two persons standing side by side. Hsü also said as follows:

Before the Chan-kuo period, this kind of repetition of thrusting and turning over the soil was done in general by two men. It was called *ou-kêng* 耦耕.<sup>(77)</sup>

And further he explained the meaning of *ou-kêng* in detail. Nishiyama questioned this view saying, '*Ou-kêng* may be a co-operative division of labour using the *ch'iang-li*,' and Amano regarded it as 'integrated and simultaneous labour involving both cultivation and sowing,' taking as the basis of his argument such description as 'Ch'ang Chü, Chieh Ni, *ou-kêng*.' (The Wei-tzū-p'ien 微子篇 of the *Lun yü* 論語).<sup>(78)</sup> I personally prefer to the old accepted theory. As Hsü said, '*Ou-kêng* is just a dictate of an ancient custom,'<sup>(79)</sup> it seems that the ancient Chinese often did their work in pairs:

(77) Hsü Chung-shu; '*Lei-ssü-k'ao*', p. 53.

(78) Amano Motonosuke; 'Nishiyama-shi "Chūgoku gijutsu-shi" ni yosete', pp. 46-47.

(79) Hsü Chung-shu; '*Lei-ssü-k'ao*', pp. 53-55.

One thousand pairs of persons engaged in weedings.....<sup>(80)</sup>

Our ancestors in pairs cultivated this land in turns.....<sup>(81)</sup>

Just like the peasants in pairs engaged in weeding all over the country.....<sup>(82)</sup>

In a broad sense, the above may be regarded as the *ou-kêng*. I have no intention of discarding the opinions of Nishiyama and Amano, but desire to point out that the meaning of *ou-kêng* as they defined it is too limited. The *K'ao-kung-chi* offers us only one example of *ou-kêng*, hence it is unnecessary to restrict it to the sole interpretation above. The descriptions in the Wei-tzū-p'ien of the *Lun-yü* can be interpreted in almost whatever way one wishes. For instance, the following is one interpretation. Ch'ang Chü and Chieh Ni were cultivating side by side. There came K'ung-tzū 孔子 who had Tzū lu 子路 ask them the site of a ferry. While Ch'ang Chü received them, Chieh Ni, having nothing else to do, sowed seeds and covered them with the soil.<sup>(83)</sup>

So much for a digression. A few words now about the so-called *ch'ing-chime-coins* 磬幣 or *ch'iao-bridge-coins* 橋幣 (Fig. 14, above) which Hsü sup-

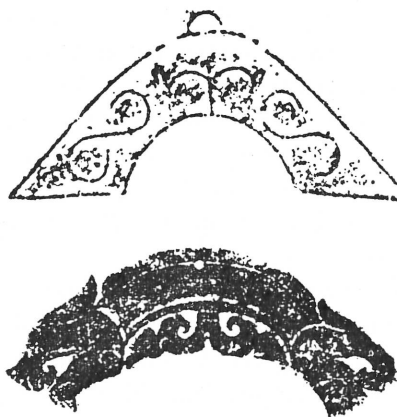


Fig. 14. A bronze *huang* and a jade *huang* (1/2).  
(After 'Kuan yü "ch'iao-hsing-pi"')

posed had evolved from the *ssü*. As their names suggest, they had been treated as coins from old. However, they were put to reexamination when many of them were actually unearthed after the World War II. Today, it is more or less settled that they were bronze *huang* 銅璜 or a *huang*-shaped ornaments 璜形飾 Shih Shu-ch'ing 史樹青, for instance, gave eight reasons for

(80) Chapter of Tsai-shan, Chou-sung 周頌, 載芟 in the *Shih-ching* 詩經.

(81) *Tsuo-chuan* 左傳 (Chao-kung 昭公 16th year: 526 B.C.).

(82) Wu-yü in the *Kuo-yü* 國語, 吳語.

(83) When we are spoken to by others while doing hard work such as cultivation with a spade or a hoe, we usually stop working. If Chang Chü and Chieh Ni together had been cultivating and sowing, and if Chang Chü had stopped his part in the cultivating, Chieh Ni would not have had any work to do.

the above view.<sup>(84)</sup>

- (1) No letters are inscribed on them.
- (2) Their size and weight are not uniform.
- (3) They contain designs of clouds or dragons, which are never seen on other coins.
- (4) Those lacking perforations cannot be strung together while those with rings on top would soon wear out.
- (5) In burial sites it is stated that *pan-liang*-coins 半兩錢 were found on the east side of the deceased person's head and the bridge-coins on the west side. However, since the unification of China under Ch'in no such items are known to have functioned as coins.
- (6) They are too widely distributed to be coins.
- (7) As *ming-pi* 冥幣 or the mortuary coin is usually identical in shape with the actual one, but not in quality, chime- or bridge-coin can never be regarded as *ming-pi*.
- (8) Those found at Êrh-li-kang 二里崗 in Chêng-chou 鄭州 are diverse in their shapes and designs. Besides, the number of the articles turned out of the tombs is not definite and they are found with jade rings on all the parts of the body.

These reasons seem sufficient to refute the earlier theory. Quoting a legend of 'hung-yin' 虹飲,<sup>(85)</sup> Shih clarified the substance of jade *huang*, and suggested that the so-called bridge-coins were bronze *huang*, and explained that jade was substituted by copper as the material of *huang* owing to the rise of price of jade towards the end of Chan-kuo or the beginning of Former Han. Later, Wu Min-shêng 吳銘生 and T'ang Shih-fu 唐石父<sup>(86)</sup> added new evidence in support of Shih's opinion.

Such being the case, chime-coins or bridge-coins cannot be regarded as coins. Besides, they are not really modeled on the *li-kuan* which is assumed to be a large-sized *ssü*, but rather on the *huang*, and further on the *hung-yin*. Hsü's idea which was somewhat original thirty years ago is now no longer tenable.

(84) Shih Shu-ch'ing 史樹青; 'Kuan yü "Ch'iao-hsing-pi"' 關於「橋形幣」 ('On the *Ch'iao*-bridge-coin'), *Wên-wu ts'an-k'ao tzü-liao* 文物參考資料, 1956, Vol. 7, pp. 60-61.

(85) When the rainbow spans the sky, both its ends seem to come near the ground. The legend explained this as follows: The two ends are dragon's heads and the two dragons descend from the heaven to drink water on the ground.

(86) Wu Ming-shêng 吳銘生; 'Ping pu shih "Ch'iao-hsing-pi"' 并不是「橋形幣」 ('Certainly not "Bridge-coin"'), *Wên-wu ts'an-k'ao tsü-liao* 文物參考資料, 1956, Vol. 10, p. 70. T'ang Shih-fu 唐石父; '"Ch'iao-hsing-pi" fei Ch'ien chih Wo-chien' 「橋形幣」非錢之我見 ('My Opinion that the So-called "Bridge-coin" is not a Coin'), *Wên-wu ts'an-k'ao tzü-liao*, 1957, Vol. 8, p. 87.

## V

THE RELATIONSHIP BETWEEN *PU*-COINS  
AND THE *LEI-SSŬ*

It has been pointed out by many scholars that *pu*-coins were modeled on the shape of a digging implement.<sup>(87)</sup> The question remains, however, whether we can say that *pu*-coins stemmed exclusively from the *lei* as Hsü advocated. It is not difficult to suppose that the digging tool most commonly used in those days would have served as the original model for coins if agricultural tools in general were the basis of design. The most universal digging tools at the time were the *lei* and the *ssŭ*, and this indeed was the reason why Hsü supposed that *pu*-coins derived from the *lei*, and chime-coins or bridge-coins from the *ssŭ*. As already mentioned, chime-coins or bridge-coins should be called bronze *huang* or *huang*-shaped ornaments, and not only are they not coins but their shapes have no relation with the shape of the *ssŭ*. Consequently, if we take Hsü's opinion and restrict the origin of *pu*-coins to the *lei*, a question may arise as to why the *ssŭ* did not develop into a coin. There is no evidence to show an exclusive use of *lei* in the Ch'un-ch'iu period when *pu*-coins appeared. If the *lei* really served as a model for coins, it is entirely possible that the *ssŭ* was similarly modeled on. Having speculated carefully on this point, I have come to the conclusion that some *pu*-coins are derived from the *lei* and others from the *ssŭ*.

First of all, my opinion on the changes of the shape of *pu*-coins is as follows:<sup>(88)</sup>

It is no doubt that the 'socketed' *pu*-coin 空首布 appeared earlier than any other type of *pu*-coin. That part into which a handle was inserted was socketed, upon which a hole for a nail was opened. The 'socketed' *pu*-coins were faithfully modeled on a metal digging tool. Following them, the 'solid-handle' *pu*-coins 平首布 of various kinds with flattened heads were made. In the order of the appearance of *pu*-coins of this type there were 'sharp-shoulder sharp-pronged' *pu*-coins, 'square-shoulder sharp-pronged' *pu*-coins, 'square-shoulder square-pronged' *pu*-coins, 'round-shoulder square-pronged' *pu*-coins, and 'round-shoulder round-pronged' *pu*-coins. These changes show the rounding off process of the corners of shoulders and prongs alternately. At present, no other developmental order of *pu*-coins seems assessable.

(87) According to my investigation of coins, *pu*-coins possibly evolved not from bronze digging tools, as is usually supposed, but from iron digging tools.

Sekino Takeshi; 'Chūgoku seidōki bunka no ichi seikaku', pp. 138-146.

(88) Sekino Takeshi; 'Fusen no shutsudo-chi to shutsudo-jōtai ni tsuite', pp. 112.

On the other hand, Hsü concluded that both the *lei* and the *pu*-coins themselves 'changed from "solid-handle" to "socketed"' for the reason that 'the supposed process of the change from "socketed" to "solid-handle" is utterly unreasonable, it involving a change in setting handles from simple and strong to complicated and weak.'<sup>(89)</sup> But this argument overlooks the fact that the evolution of the *pu*-coins did not always parallel the development of digging tools. The 'socketed' *pu*-coins that first appeared were shaped most like a digging tool. But later they were simplified for convenience of treatment so as to have a flattened neck and rounded shoulders and prongs. Hsü's opinion was published thirty years ago, so he himself may now be aware of his misunderstandings.

Thus, fair is the outline of the development of the *pu*-coin. They seem to comprise two main types: those with two pronounced prongs or legs—'two-pronged' *pu*-coins 兩足布—and those with a crescent-shaped base—'crescent-base' *pu*-coins 彎足布. On both types of *pu*-coins, a detailed explanation will be given shortly. Of the 'socketed' *pu*-coins there are some typical 'two-pronged' *pu*-coins with sharp shoulders and sharp prongs (Fig. 15). The shape of this type of

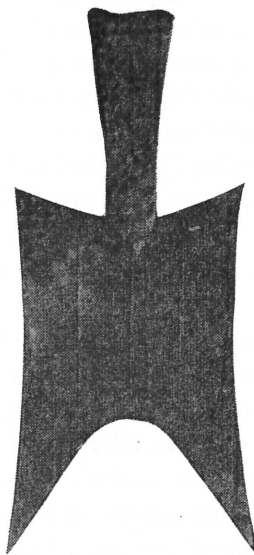


Fig. 15. The 'socketed' *pu*-coin with sharp shoulders and sharp prongs (1/2). (Lodged in the Bank of Japan)

*pu*-coin changed successively to the 'solid-handle' *pu*-coin with sharp shoulders and sharp prongs, to the 'square-shoulder sharp-pronged' *pu*-coin, to the 'square-shoulder square-pronged' *pu*-coin, to the 'round-shoulder square-pronged' *pu*-coin, and finally to the 'round-shoulder round-pronged' *pu*-coin. Therefore, the 'socketed' *pu*-coin with sharp shoulders and sharp prongs is not

(89) Hsü Chung-shu; '*Lei-ssü-k'ao*', p. 28.

only an ancestral form of the 'two-pronged' *pu*-coin but also a prototype of the various kinds of 'solid-handle' *pu*-coins. Numerous 'two-pronged' *pu*-coins have been discovered and they amount to the greater part of the *pu*-coins found to date. In other words, the main stream of *pu*-coins comprises the 'two-pronged' type. On the other hand, the 'socketed' *pu*-coins comprise two other types quite different from those with sharp shoulders and sharp prongs: those with right-angled shoulders and crescent-shaped base—the 'square-shoulder crescent-base' type and those with oblique shoulders and crescent-shaped base—the 'oblique-shoulder crescent-base' type (Fig. 16). As already shown, the

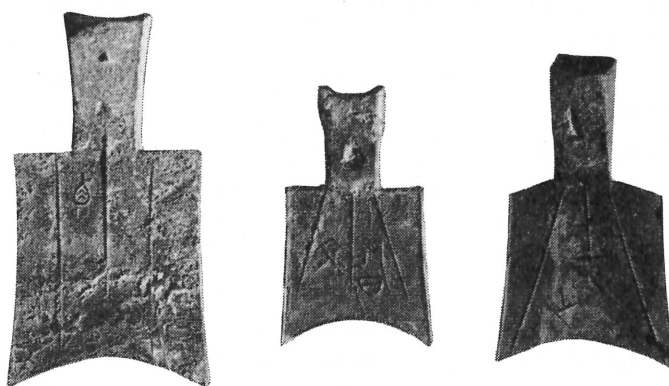


Fig. 16. The standard-sized (left), the small-sized (middle) 'square-shoulder crescent-base' *pu*-coin and the 'oblique-shoulder crescent-base' *pu*-coin (right), (1/2). (Lodged in the Bank of Japan)

'square-shoulder' type first appeared, from which evolved the 'oblique-shoulder' type.<sup>(90)</sup> In contrast to the rich variety of 'two-pronged' *pu*-coins, the 'crescent-base' *pu*-coins comprise only two kinds: those with square shoulders and those with oblique shoulders. The 'crescent-base' type appears in the 'socketed' *pu*-coins, but ceases to appear in the 'solid-handle' *pu*-coins. However, the 'socketed' *pu*-coins are not always older than the 'solid-handle' *pu*-coins. As already pointed out, some of the 'socketed' *pu*-coins of the 'oblique-shoulder crescent-base' type were found in tombs of the end of the Chan-kuo period with the 'square-shoulder square-pronged' *pu*-coins.<sup>(91)</sup> Therefore, it is possible that the 'crescent-base' *pu*-coins were used side by side with the 'two-pronged' *pu*-coins well into the end of the Chan-kuo period. According to Hsü's view, the prongs of 'two-pronged' *pu*-coins became gradually shallow enough to be crescent-shaped, and further to be straight-edged.<sup>(92)</sup> But the 'two-pronged'

(90) Sekino Takeshi; 'Fusen no shutsudo-chi to shutsudo-jōtai ni tsuite', pp. 112-114.

(91) *ibid.*, pp. 104, 112.

Ti-yi-tui, Ho-nan Wên-wu-kung-tsu-tui 河南文物工作隊第一隊; 'Chêng-chou Kang-tu fu-chin ku-mu-tsang fa-chüeh-chien-pao' 鄭州崗杜附近古墓葬發掘簡報 ('Preliminary Report on the Excavation of Old Tombs in the Vicinity of Kang-tu, Chêng-chou'), *Wên-wu ts'an-k'ao tzü-liao* 文物參考資料, 1955, Vol. 10, pp. 13, 15, 16, 18, 22.

(92) Hsü Chung-shu; 'Lei-ssü-k'ao', p. 24.

*pu*-coins and the 'crescent-base' *pu*-coins belonged, from the outset, to two categories, having no relationship with one another. In the investigation of the geographical basis of the culture and of the economic organization in pre-Ch'in times, it is very interesting to know that *pu*-coins comprised these two lines of development.

The next problem is the relationship between *pu*-coins and the *lei*-ssü. As mentioned in the previous chapter, the elementary form of a wooden *lei* was a two-pronged stick with a footrest (*hsün* 鐺) at the point of the division of prongs. The foot is pressed on the footrest to thrust the sharp ends of the prongs into the soil, and a handle is pulled towards the cultivator to turn over the clod. What shape results when this form and function of a wooden *lei* is interpreted in metal? It is exactly the shape of a 'socketed' *pu*-coin with sharp shoulders and sharp prongs. The shoulders were sharpened so that a foot pressed on it might not slide, and two prongs must have been modeled on the two-pronged ends of the stick. Taking abrasion into consideration, the raising of the shoulders to this extent may be reasonable. The wooden handle of a metal digging tool from which originated the 'socketed' *pu*-coin with sharp shoulders and sharp prongs must have been inserted in the same direction as the socketed neck. Such an inference is justified by the stone bas-reliefs in Wu-shih-tz'ü 武氏祠 on which are carved figures of Shên-nung-shih 神農氏 (Fig. 17), Hsia Yü 夏禹 and hermits with wings 有翼神仙 each holding a digging tool in their hands, which, very much like the 'square-shoulder square-pronged'



Fig. 17. Bas-relief depicting Shên-nung-shih. (After 'Lei-ssü-k'ao')



*pu*-coin, has a handle set at an extension of the digging part. Upon the basis of this evidence, we may conclude that the metal digging tool from which stemmed the 'socketed' *pu*-coins with sharp shoulders and sharp prongs evolved from a wooden *lei* which was in fact a spade for deep cultivation. In other words, all the 'two-pronged' *pu*-coins stemmed from the *lei*. What can we say about the 'crescent-base' *pu*-coins?

It was already mentioned above that the 'crescent-base' *pu*-coins comprise two types, namely, those with square shoulders and those with oblique shoulders. The latter is not suitable for deep cultivation, because a foot pressed on it slides down. Thus it is also doubtful whether the square shoulder of the former functioned as a footrest. In spite of a few differences in their shapes, the two kinds of 'crescent-base' *pu*-coins must have served the same purposes, for they both belong to a common type. Moreover, the edge of the 'crescent-base' *pu*-coin is wider than that of the 'two-pronged' *pu*-coin, thus requiring far greater strength if it were to be thrust deep into the earth. Implements of the 'crescent-base' type accordingly do not seem to have been suitable for deep cultivation. Is it not probable, then, that their use was very different from those with two prongs? Crescent-base *pu*-coins might represent a digging tool with hooked handle—a kind of hoe. When hoeing, only momentary force is applied, so it does not sink into the soil lower than its shoulders unless the soil is exceptionally soft. Its nearly straight edge suggests the special function of weeding. This kind of digging tool must have been for medium depth cultivation or for weeding. The inward curving of the blade may have been a means of avoiding too rapid a wearing away of the edge. The iron blade of a hoe excavated at Ui-uon 渭原 in Piyong-an puk-do 平安北道 in Korea<sup>(93)</sup> and the edges of hoes used in China today<sup>(94)</sup> reproduced by R. P. Hommel are curved somewhat inwards. The 昌 characters in bronze inscriptions, especially those belonging to the horizontal type, do not suggest the shape of a hoe with the handle directly passing through the blade, but rather one with a curved hook-shaped handle set to the upper end of the blade. By simply setting a hook-shaped handle to a 'crescent-base' *pu*-coin a very similar outline drawing would follow. No doubt, then, 'crescent-base' *pu*-coins stemmed from a hoe-shaped digging tool, that is, the *ssŭ*. If the blade of a hoe through which a handle is passed is made of iron, the hoe requires a pronounced frame<sup>(95)</sup> around the

(93) Umehara Sueji 梅原末治 & Fujita Ryōsaku 藤田亮策; *Chōsen kobunka sōkan* (*A General Survey of Ancient Korean Culture*), Vol. 1, Yōtoku-sha 養德社, 1946, Fig. 1: 11, 12.

(94) R. P. Hommel, *ibid.*, Fig. 91: A, B.

(95) Two or three examples are known from the Chan-kuo period but none from the Ch'un-ch'iu period.

Wang Chung-shu 王仲殊; 'Lo-yang Shao-kou fu-chin ti Chan-kuo mu-tsang' 洛陽燒溝附近的戰國墓葬 ('Tombs of the Chan-kuo Period in the Neighborhood of Shao-kou, Lo-yang'), *K'ao-ku hsŭe-pao* 考古學報 Vol. 8, 1954, Fig. 8: 2.

Ho-nan-shêng Wên-wu-kung-tsu-tui 河南省文物工作隊; 'Chang-sha Hêng-yang ch'ü-tu Chan-kuo-shih-tai ti t'ie-ch'ü' 長沙, 衡陽出土戰國時代的鐵器 ('Iron Implements of the Chan-kuo Period Unearthed at Chang-sha and Hêng-yang'), *K'ao-ku t'ung-hsün* 考古通訊, 1956, Vol. 1, Fig. 18: 1.

hole unless the main body of the hoe is appreciably thick. From this, it may be surmised that the blade of a hoe of this type did not contribute to the formation of *pu*-coins because of the obstruction of the frame.

It will be generally accepted, no doubt, that 'two-pronged' *pu*-coins preserve the shape and structure of the *lei*. Criticism, however, may be directed against the view that the *ssũ* was the ancestral form of the 'crescent-base' *pu*-coin, and that there is a lack of conclusive evidence. But the following observations offer further support to this view. A kind of a 'socketed' *pu*-coin reproduced in Fig. 830 in Vol. 3 of the *Ku-ch'ien ta-tz'ũ-tien* 古錢大辭典 edited by Ting Fu-pao 丁福保 (Fig. 18) seems to have belonged to the most primitive

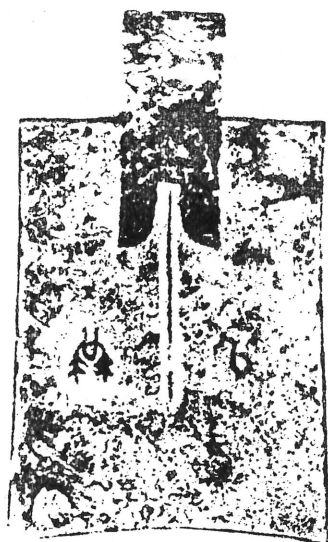


Fig. 18. An early style 'socketed' *pu*-coin with an inscription which in modern characters reads 益, 呂 (2/3). (After *Ku-ch'ien ta-tz'ũ-tien*)

of shapes amongst the 'crescent-base' *pu*-coins. The deep extension of the socket into the body of the *pu*-coin shows its resemblance to the actual implement, as is apparent upon comparison with the *ch'an*-spade 鏟. The standard type of 'socketed' *pu*-coin with square shoulders and crescent base mentioned before (Fig. 16, left) has obviously evolved from this, and its shoulders are leveled down to the base of the socketed neck. The base of the neck of such a type of digging implement, if it existed, would be easily broken. This primitive 'socketed' *pu*-coin has an inscription decipherable as the character *yi* 益 on the left surface of the body, and another graph on the right. The latter is to be read *ssũ* 呂=耜. This offers us particularly worthy evidence of the fact that the implements of 'crescent-base' type from which 'crescent-base' *pu*-coins stemmed were called *ssũ*. Judging from the fact that the names of places were often inscribed on *pu*-coins in later years, *yi* 益 also may be the name of a place.

This character is inscribed also on some of the standard-sized 'socketed' *pu*-coins of the 'square-shoulder crescent-base' type (Fig. 19), there is, however, no way of locating the ancient site of Yi. In spite of some such problems, there is no room for doubt that *Yi-ssü* means 'a *ssü*-shaped coin minted at a place called Yi'. It was a common practice to inscribe the locations of the foundries and the names of the tools on their bronze products, such as *Chin-yang-k'é* 晉陽戈, *Kao-tu-chien* 高都劍 and *Chai-yang-mao* 宅陽矛.

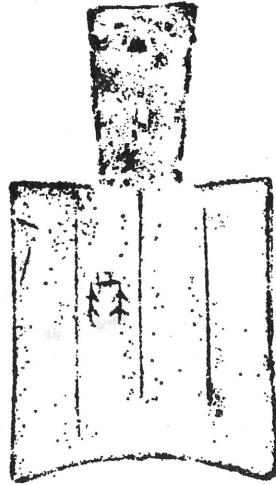


Fig. 19. The 'square-shoulder crescent-base' *pu*-coin with the character 益 (2/3). (After *Ku-ch'ien ta-tz'ü-tien*)

According to the calligraphic classifications discussed in the previous chapter, the character 吕 is to be regarded as a horizontal type which indicates the form of a hoe-shaped digging tool with its blade turned downwards, and the handle extended aslant to the left, forwards or backwards. It may be due to rust that the tip of the handle seems to be bent downwards. The character *ssü*, closest to this form, is found both on the *San-shih-p'an* 散氏盤 in the reign of *Li-wang* 厲王 and on the *Mao-kung-ting* 毛公鼎 in the reign of *Hsüan-wang* 宣王 in the latter part of Western Chou. As already mentioned, among the characters 吕 in bronze inscriptions, those of the longitudinal type persisted to the end of the *Chan-kuo* period, but those of the horizontal type ceased to exist in the end of Western Chou. Therefore, judging from the character form alone, this primitive 'socketed' *pu*-coin possibly dates back to the Western Chou period, especially to its latter half. But, the changes of the writing style in bronze inscriptions would not always correspond to the changes of character forms on coins, and the latter half of the Western Chou period seems too early for the appearance of bronze coins in China. So, I am of the view that this 'socketed' *pu*-coin dates back at the earliest to the middle of the *Ch'un-ch'iu* period, in relation to the appearance of iron digging tools from which it de-

rived. Anyway, it is sufficient here to prove that the 'crescent-base' *pu*-coins stemmed from the *ssü*, a hoe-shaped implement.

To conclude, two representative digging implements of pre-Ch'in times, the *lei* and the *ssü*, both retained their traces in 'two-pronged' *pu*-coins and 'crescent-base' *pu*-coins respectively. This view would seem to be better supported than that of Hsü who sought a prototype of *pu*-coins only in the *lei*, and did not realize that so-called chime-coins or bridge-coins really are not coins and have no relations with the *ssü*.

## VI

### THE DISTRIBUTION OF THE SHARP-PRONGED *PU*-COINS

Now that the relationship of the *pu*-coin to the *lei*-*ssü* has been clarified, let us investigate the probable areas of circulation of the *lei* and the *ssü* through the distribution of *pu*-coins. It is reasonable to suppose that the digging tools most popularly used in a given district at a given time were used as the model for the *pu*-coins concerned. In this respect, it is noteworthy that Hsü estimated the area of circulation of the *lei* from the distribution of *pu*-coins on the assumption that all the *pu*-coins stemmed from the *lei*. *Pu*-coins, however, comprise two types: those derived from the *lei* and those derived from the *ssü*. For this reason, Hsü's view is not entirely tenable. Another problem with his view is that there is the possibility that the *pu*-coins were circulated more extensively than the original digging tools. For instance, it is not to be assumed casually that the main digging implement in the Liao-tung Peninsula 遼東半島 was a *lei* simply because from there square-shoulder square-pronged 'Hsiang-p'ing' *pu*-coins 襄平布 were discovered. Therefore, in order to know the areas of circulation of the *lei* and the *ssü*, it is necessary to study the distribution of 'socketed' *pu*-coins most similar to the shapes of the *lei* and the *ssü*, the most primitive form of *pu*-coin. In other words, an investigation is called for concerning in what districts of China the *lei* evolved into 'two-pronged' *pu*-coins and the *ssü* into 'crescent-base' *pu*-coins.

The area of circulation of the 'socketed' *pu*-coins is difficult to define because the places they were discovered are almost unknown and only a few inscriptions on them incorporate place names. The following passages illustrate where the 'socketed' *pu*-coins (*ch'an-pi* 鑄幣 or *ch'an-pu* 鑄布) were discovered but they do not distinguish between the 'sharp-pronged' ones and the 'crescent-base' ones.

*Ch'an*-coins have been discovered mainly in Chung-chou 中州.<sup>(96)</sup>

(96) *Ku-ch'üan-hui* 古泉匯, Section 'yüan' 元 10.

'Ch'an-shaped' *pu*-coins have been discovered in Chung-chou.<sup>(97)</sup>

Recently many 'socketed' *pu*-coins were found in Chung-chou.<sup>(98)</sup>

Many *pu*-coins with square socket have been found in Yü-shêng 豫省.<sup>(99)</sup>

Old coin merchants from Honan bring 'socketed' *pu*-coins, 'An-yi' *pu* 安邑布, bronze shell money, etc.<sup>(100)</sup>

As both Chung-chou and Yü-shêng are popular names of Honan, it is probable that the 'socketed' *pu*-coins were found mainly in this area. Another record reads as follows:

Recently many *ch'an*-coins have been found in Chung-chou but nowhere else. Sometimes, however, a few appear in Shan-yu 山右.<sup>(101)</sup>

This record is noteworthy because it mentions Shan-yu, that is, Shansi, as the area where the 'socketed' *pu*-coins were discovered.

The next question is the area of circulation of the 'socketed' *pu*-coins with sharp shoulders and sharp prongs, the ancestors of the 'two-pronged' *pu*-coins. Among the 'socketed' *pu*-coins of this kind some have no inscriptions at all and others with only numerals inscribed on them. With the exception of Han-tan 甘丹(邯鄲) and Lü 呂 place names rarely appear. Needless to say, Han-tan, situated in the southern corner of Hopei, is well-known as a local city of Chin 晉 in the Ch'un-ch'iu period, and also as the capital of Chao 趙 in the Chan-kuo period. Since the location of Lü is problematic, it will be discussed later. The following passage offers further information on the 'socketed' *pu*-coins with sharp shoulders and sharp prongs.

The large-sized 'socketed' *pu*-coins are five *ts'un* long, and one or two characters are inscribed on them. We find only a few examples of the *pu*-coins of this type. It is said that in Tsê-chou 澤州 of Shan-yu 山右 many of them are found.<sup>(102)</sup>

Judging from 'five *ts'un*',<sup>(103)</sup> the *pu*-coins indicated in the above passage must be the 'socketed' *pu*-coins with sharp shoulders and sharp prongs. Judging also from the sentence 'we find only a few examples', the above passage does

(97) *Kuan-ku-ko ch'üan-shuo* 觀古閣泉說.

(98) *Yi-ch'ieh-lu* 遺篋錄 chap. 1, former part.

(99) *Ku-chin-ch'ien-lüe* 古今錢略.

(100) 'Ku-ch'ien chi-san-chi' 古錢集散記 ('A Record of Gathering and Dispersion of the Old Coins'), an appendix to the *Ku-ch'ien ta-tz'ü-tien* 古錢大辭典.

(101) *Chi-chin so-chien-lu* 吉金所見錄 chap. 2.

(102) *Kuan-ku-ko hsü-ch'üan-shuo* 觀古閣續泉說.

(103) The standard-sized 'socketed' *pu*-coins with sharp shoulders and sharp prongs are seven *ts'un* (126 mm.) long by the shorter measure (180 mm.) of the Chan-kuo period. Sekino Takeshi; 'Chūgoku kodai no shakudo ni tsuite' 中國古代の尺度について ('Concerning Linear Measure of Ancient China'), *Chūgoku kōkōgaku kenkyū* 中國考古學研究, p. 383. The *Kuan-ku-ko hsü-ch'üan-shuo* 觀古閣續泉說 (in the *Kuan-ku-ko ts'ung-k'o* 觀古閣叢刻) was published by Pao K'ang 鮑康 in the years of T'ung-chih 同治 at the end of the Ch'ing 清 period. According to Wu Ch'êng-lo's 吳承洛 *Chung-kuo tu-liang-hêng-shih* 中國度量衡史 (*A History of Weights and Measures in China*), Shang-wu Yin-shu-kuan 商務印書館, 1936, Fig. 20, the *li-pu tū-ch'ih* 禮部律尺, the formal measure at that time corresponds to 252 mm. So five *ts'un* by this measure is equal to 126 mm.

not seem to refer to the 'socketed' *pu*-coins with square shoulders and crescent base, for the number of this type of *pu*-coins that have been found is far larger than the 'socketed' *pu*-coins of another types. Tsê-chou of Shan-yu is supposed to be Chin-ch'êng 晉城 in the southeast corner of Shansi. So, the relevant passage from the *Chi-chin so-chien-lu* 吉金所見錄 quoted above seems fairly reliable.

In August, 1935, 674 'socketed' *pu*-coins with sharp shoulders and sharp prongs without any inscriptions, weighing 9.906 kg.,<sup>(104)</sup> were found from Tomb No. 1 at Shan-piao-chên, Chi-hsien 汲縣山彪鎮 in the north of Honan. Also, in 1959 twelve *pu*-coins of the same type were excavated 1 km. northwest of Hou-ma-shih 侯馬市 in the southwest of Shansi.<sup>(105)</sup> Of the twelve only one piece had characters not yet deciphered. Up to the present, these are the only examples of this kind of *pu*-coins scientifically excavated.

The 'socketed' *pu*-coins with sharp shoulders and sharp prongs thus circulated in such places as Han-tan, Chin-ch'êng, Chi-hsien and Hou-ma. But these four examples are not enough to settle the question. Another way to approach the question is to estimate the area of circulation of the 'socketed' *pu*-coins with sharp shoulders and sharp prongs upon the basis of the distribution of another type of *pu*-coins that followed them, that is, the 'solid-handle' *pu*-coins with sharp shoulders and sharp prongs (Fig. 20). We may assume that both

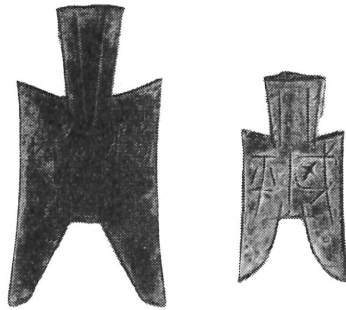


Fig. 20. The 'solid-handle' *pu*-coins with sharp shoulders and sharp prongs (1/2). (Lodged in the Bank of Japan)

of them circulated in nearly the same area because of the similarities in their forms except the neck. The 'solid-handle' *pu*-coins with sharp shoulders and sharp prongs changed to the 'solid-handle' *pu*-coins with square shoulders. But, since the 'sharp-pronged solid-handle' *pu*-coins with identical inscription

(104) Kuo Pao-chün 郭寶鈞; *Shan-piao-chên yü Liu-li-kê* 山彪鎮與琉璃閣 (K'ê-hsüe-ch'ü-pan-shê 科學出版社, 1956) pp. 36-37, pl. 31: 4, 6.

(105) Hou-ma-kung-tsuo-chan, Shan-hsi-shêng Wên-kuan-hui 山西省文管會侯馬工作站; '1959 nien Hou-ma "Niu-ts'un-ku-ch'êng" nan Tung-chou yi-chih fa-chüe chien-pao' 1959 年侯馬「牛村古城」南東周遺址發掘簡報 ('Preliminary Report on the Excavation of Eastern Chou Sites, Located to the South of Old Niu-ts'un Castle at Hou-ma, 1959'), *Wên-wu* 文物, 1960-8, 9, pp. 11-14.











elsewhere that 'crescent-base' *pu*-coins with oblique shoulders together with the 'square-shoulder square-pronged' *pu*-coins seem to have survived well into the end of the Chan-kuo period.<sup>(111)</sup> If standard-sized 'square-shoulder crescent-base' *pu*-coins were in fact used in Kuan-chung in the Western Chou period, the succeeding 'oblique-shoulder crescent-base' *pu*-coins must have existed through the 500 years from the Ch'un-ch'iu to the Chan-kuo period without any changes in their forms. Is anything like this possible? It is not, when we think of the bewildering changes that took place between 'two-pronged' *pu*-coins from the 'socketed' *pu*-coins with sharp prongs to the 'round-pronged' *pu*-coins with three holes. I find it very difficult to accept the proposition based on Lo's article alone that the 'socketed' *pu*-coins with a crescent base have been discovered in the Kuan-chung districts.

Lo says that some 'crescent-base' *pu*-coins were discovered in Lo-chung in the vicinity of Lo-yang, which may be true, for the same is recorded in another documents. On this point Lo has elaborated further as follows:

The 'socketed' *pu*-coins in Lo-chung are found mostly in the area north of the Yellow River and in the foothills of the T'ai-hang Ranges. 'Socketed' *pu*-coins recently discovered have a ㄩ-shaped inscription on their highest point near the handle. The shapes of the inscription comprise two types: round and square. Dealers of old coins have never seen such a kind of *pu*-coin. This kind is found only in the area south of the Yellow River, some tens of *li* 里 distant from Lo-yang.<sup>(112)</sup>

The 'socketed *pu*-coin with a ㄩ-shaped inscription' is a kind of standard-sized 'square-shoulder crescent-base' *pu*-coin, and it is neither small-sized nor one with oblique shoulders. The above passage is, therefore, contradictory to the previous one about the discovery of standard-sized 'square-shoulder crescent-base' *pu*-coins. Even if it is a fact that some 'crescent-base' *pu*-coins were discovered in Lo-chung, the details about the places concerned are not always correct, as is shown by the various examples that will be mentioned later.

Lo's exposition on the places of the discovery of the 'socketed' *pu*-coins, then, lacks accuracy, and we cannot accept it without reservation. If anything, only the point that some 'crescent-base' *pu*-coins were discovered in Lo-chung is tenable.

The 'socketed' *pu*-coins of the 'crescent-base' type are broadly divided into two categories: those with square shoulders and those with oblique shoulders. Those with square shoulders are further subdivided into three groups according to the size: large size, standard size and small size. The areas of circulation of each of those *pu*-coins are as follows:

(1) The Large-sized Square-shoulder Crescent-base *Pu*-coin (Fig. 21):

This especially large one is 18 cm. long and 10 cm. wide. Only one example is known, which is shown in Fig. 824 in Vol. 3 of *Ku-ch'ien ta-tz'ü-tien* 古錢大辭典.

(111) Cf. Note 91.

(112) *Yung-lu jih-cha*

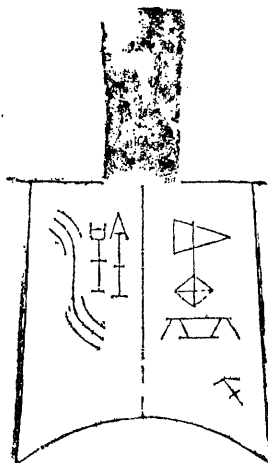


Fig. 21. The large-sized 'square-shoulder crescent-base' *pu*-coin (1/3).  
(After *Ku-ch'ien ta-tz'ü-tien*)

It has an inscription deciphered as 'Lu-shih nieh-chin' 盧氏涅金, the first two characters of which correspond to present Lu-shih 盧氏 in Honan.

(2) The Standard-sized Square-shoulder Crescent-base *Pu*-coin (Fig. 16, left): Though this type of *pu*-coin is so numerous as to account for the greater part of 'crescent-base' *pu*-coins, not even a single piece has actually been excavated. The inscriptions on 'crescent-base' *pu*-coins of this kind are usually one character except in a few cases of two or four characters. One example of a four-characters inscription is deciphered as *chi-fu-shao-hua* 棘甫小匕, but the first two characters are not certain. Examples of two characters are *fu-chin* 郚鉞<sup>(113)</sup> and *tan-han* 丹甘, and if the latter is an inverted writing of Han-tan 甘丹, as is more probable than not, it corresponds to 'Han-tan' inscribed on the 'sharp-pronged' *pu*-coins. Han-tan is a most interesting place from the view point of the history of coins, where they issued also the 'round-head' *tao*-coin 𠔁首刀 with an inscription of 甘丹 which is popularly called 'Han-tan' *tao*-coin 甘丹刀. This place lay across two areas of distribution of *tao*-coins and *pu*-coins, and the *pu*-coins found there comprise two main types: 'sharp-pronged' and 'crescent-base'. This is a peculiar phenomenon found only in Han-tan, and it is noteworthy because it shows the cosmopolitan nature of Han-tan as a market.

Single character inscriptions comprise numerals, *kan-chih* 干支 and other miscellaneous characters. It is not easy to judge whether each character indicates the name of a place. According to various books on old coins, *wên* 文

(113) The character *chin* 鉞 is found on the 'round-shoulder square-pronged' *pu*-coins as 'An-yi' *chin-pu* 安邑鉞布 and also on the round coins as 'Chang-yüan' *yi-chin-ch'ien* 長垣一鉞錢. Both of them date back to the middle of the Chan-kuo period. They offer us a clue to the time when the 'socketed' *pu*-coins with the inscription of *fu-chin* 郚鉞 appeared.

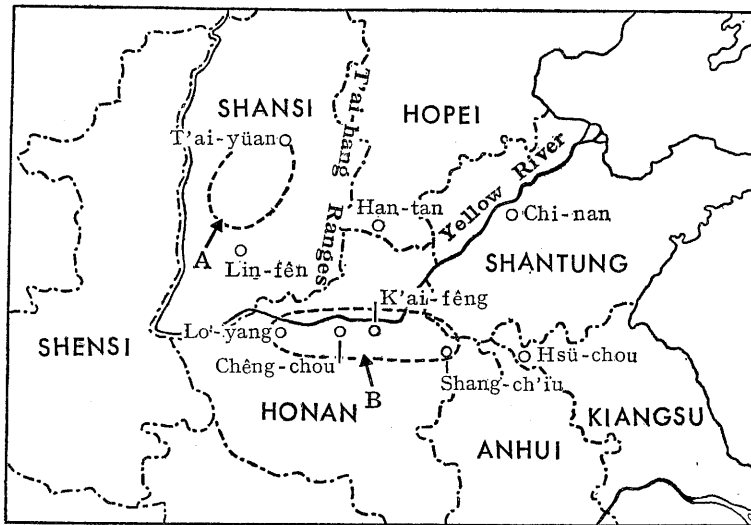












Map. 1. Centre of the spade cultivation area (A) and of the hoe cultivation area (B).

there is a possibility that one of them was mainly used for one reason or another. Therefore, neither spade cultivation nor hoe cultivation means an exclusive use of either the spade or of the hoe, but simply means a greater use of one or the other. Why should there be such a variation? First to be considered is the difference of the soils of the Shansi Plateau and of the Honan Plain. The nature of soil is a determinant of the types of agricultural implements, and F. Petrie, for one, pointed out as follows:

In the light volcanic-ash soil of Pompeii the hoe was the usual tool, taking the place of a spade in heavier soil.<sup>(126)</sup>

Carl Sauer and G. Hatt mentioned the relation between a heavy soil and a hoe, respectively referring to the Indians in Peru<sup>(127)</sup> and the Galla tribe in Abyssinia.<sup>(128)</sup> In a similar way, we may seek to explain the differences in the distributions of the *lei* and the *ssŭ* from the viewpoint of soil-geography. I am indebted to Tada Fumio 多田文男 for the following valuable information:

The Shansi Plateau comprises accumulations of primary deposits of loess. According to the 'histograms of loess and allied deposits'<sup>(129)</sup> drawn by

eigentlich nur von einer solchen sprechen.

According to the above quotation, in China there are areas of soil soft enough to cultivate with a hoe. And in North China of pre-Ch'in times there were practically no ricefields.

(126) F. Petrie; op. cit., p. 54.

(127) Carl Sauer; 'American Agricultural Origins, a Consideration of Nature and Culture', (*Essays in Anthropology, Presented to A.L. Kroeber*, 1936) pp. 279-311.

(128) E. C. Curwen & G. Hatt; op. cit., p. 283.

(129) George B. Barbour; 'Recent Observations on the Loess of North China', (*The Geographical Journal*, Vol. 86, 1935) Fig. B.

G. B. Barbour, particles of loess in T'ai-ku 太谷 and Lin-hsien 臨縣<sup>(130)</sup> are small and consistent; in other words, the soil is heavy and sticky. In Shansi the layer of loess is rather thin with rocky deposits beneath, and its weathered soil is also sticky. This kind of land is suited to digging by a spade rather than by a hoe.

The Honan Plain comprises accumulations of secondary deposits of loess which include sand particles and pebbles, because the deposits were produced by the streams of the river. As shown in Barbour's histogram the alluvial loess of this kind is porous, light, and the particles are inconsistent in the size; in other words, it is light-coarse, swollen-supple, and fragile. This kind of soil is easily cultivated by a hoe.

A similar phenomenon is seen in Japan. For instance, the Kantō loam is of heavy and sticky consistency requiring digging by a spade (the so-called Kantō spade).

According to James Thorp's survey, the soils of the Shansi Plateau are 'imperfectly developed light and very light chestnut earths' and those of the Yellow River Plain 'calcareous alluvium' and 'buried shachiang soils'.<sup>(131)</sup> These are consistent with Tada's analysis. Such an association of the *lei* and the *ssū* in terms of function in relation to the soil-types would seem to offer convincing support to my contention as to their early distribution.

At the beginning of the Ch'un-ch'iu period Chin 晉 began to rise in the southern half of Shansi, and, in the eastern half of Honan, Chêng 鄭 and Sung 宋 wielded power. At about the same time Chou moved to the east. According to the *Tsuo-chuan* (Yin-kung 隱公 7th year: 716 B.C.): Hêi-chien 黑肩, the Duke of Chou said to Huan-wang 桓王 of Chou that 'Chou moved eastwards under the protection of Chin and Chêng'. This indicates that Chin and Chêng were the two most powerful states in Chung-yüan 中原.<sup>(132)</sup> As ironware came into existence in the former half of the Ch'un-ch'iu period, such agricultural implements as the *lei* and the *ssū* began to be made of iron. And in a short span of time, there appeared bronze *pu*-coins made after the pattern of these iron agricultural implements. The increase of agricultural productivity and the development of commerce and industry brought about the rise of the cities and gave wealth and power to the states. This precipitated a great change in the history of the country which had long since been stagnant. What are the relations between this state of affairs and cultivation by spades or hoes? Briefly it may be stated as follows:

In the Shansi area, spade cultivation provided the economic basis for the rise of large and small cities and spade-shaped 'sharp-pronged' *pu*-coins

(130) T'ai-ku and Lin-hsien are respectively 50 km. south and 140 km. west of T'ai-yüan 太原.

(131) James Thorp; *Geography of the Soils of China*, Nanking, 1936, pp. 125-128, 147-175, Generalized Soil Map of China.

(132) The area drained by the middle reaches of the Yellow River.

were used as currency. Chin was one of these cities, and the most successful one to wield power. On the other hand, in Honan hoe cultivation gave rise to many cities and their currency was the hoe-shaped 'crescent-base' *pu*-coins. Of these cities, Chêng and Sung gained power. Situated between these two areas, Wei 衛 was embraced by both areas of spade cultivation and hoe cultivation, and used both 'sharp-pronged' *pu*-coins and 'crescent-base' *pu*-coins.

The conclusion here is tentative pending completion of my current research on the relations between the states and the cities in those days.<sup>(133)</sup>

The problem of plough cultivation now remains to be discussed. Now, if the view that the plough evolved from the *lei* is correct, there is a considerable possibility that the plough originated in the Shansi region, the area of spade cultivation. There are several possible reasons for Chin's rapid rise to power in the Ch'un-ch'iu period, with one of her rulers, the great Wên-kung 文公 (reigned from 635 to 628 B.C.), becoming one of the five Hegemons. Or may it be that Chin's rise was due to her use of ploughs drawn by man power 'with efficiency three times as large as that of ordinary treaed-spades'? But this is uncertain. Rather it was the ox-drawn plough which evolved from the plough drawn by man power that seems to be related to the rise of the Three Chin 三晉 (Han 韓, Wei 魏 and Chao 趙). From the end of the Ch'un-ch'iu period to the beginning of the Chan-kuo period, three clans, Han, Wei and Chao, extended their power. Especially noteworthy are Han and Wei that proceeded south and conquered the Yellow River Plain. In the reign of the Emperor Ching-hou 景侯 (about 408–404 B.C.) Han transferred her capital from Ping-yang 平陽 (Lin-fên in Shansi 山西省臨汾) to Yang-ti 陽翟 (Yü-hsien in Honan 河南省禹縣). In the 2nd year of Wên-hou 文侯 (385 B.C.), Han fought against Chêng 鄭 and seized Yang-ch'êng 陽城 (T'êng-fêng in Honan 河南省登封), and further proceeded to P'êng-ch'êng 彭城 (Hsü-chou in Kiangsu 江蘇省徐州) to fight against Sung and capture Hsiu-kung 休公, the king of Sung. And at last, in the 2nd year of Ai-kung 哀公 (375 B.C.), Han destroyed Chêng and established her capital in Hsin-chêng 新鄭 (Hsin-chêng in Honan 河南省新鄭). On the other hand, in the 32nd year of Wên-hou (393 B.C.), after defeating Chêng, Wei built a fortress in Suan-tsao 酸棗 (Yen-chin in Honan 河南省延津). In the 6th year of Hui-wang 惠王 (365 B.C.), Wei attacked Sung and took over Yi-t'ai 儀臺 (Ning-ling in Honan 河南省寧陵). In the 31st year of Hui-wang (340 B.C.) Wei transferred her capital from An-yi 安邑 (Hsia-hsien in Shansi 山西省夏縣) to Ta-liang 大梁 (K'ai-fêng in Honan 河南省開封) in order to avoid Ch'in's 秦 attacks. In the 10th year of Chao-wang 昭王 (286 B.C.) Wei destroyed Sung in alliance with Ch'i 齊 and Ch'u 楚 and divided her domain into three parts.<sup>(134)</sup>

(133) It will be entitled: 'Sen-shin jidai no chihō-toshi' 先秦時代の地方都市 ('Local Cities in Pre-Ch'in Times').

(134) These are quoted from the descriptions by Han-shih-chia 韓世家, Wei-shih-chia 魏世家, Chêng-shih-chia 鄭世家 and Sung-wei-tzū-shih-chia 宋微子世家 in the *Shih-chi* 史記.

Other small states like Wei 衛 and Eastern Chou existed in name only. Thus, the Yellow River Plain fell under the new rulers of Han 韓 and Wei 魏. Also, it is worthy of notice that her southward movement being checked by Han and Wei, Chao 趙 extended her territory to the north by adopting the Hsiung-nu's 匈奴 tactics. In the background of this remarkable rise of the Three Chin and the fall of Chêng and Sung, was the popularization of the ox-drawn plough in the Three Chin accompanied by the increase of agricultural productivity.

The following facts are in support of this conclusion.

- (1) The Shansi region, the original territory of Three Chin, belonged to the area of spade cultivation where the plough is supposed to have originated.
- (2) Even today in the Lu-an 潞安 district in Shansi, people use the most primitive ploughs drawn by man power called the *ch'iang-li* 鋤犁.<sup>(135)</sup>
- (3) In the Chin-yü 晉語 of the *Kuo-yü*, we read T'ou-ch'ou 竇犢, a minister of Chin said to Chao Chien-tzŭ 趙簡子 as follows:

Since the clans of Fan 范 and Chung-hang-shih 中行氏 did not heed the people's hardships, and ruled the state of Chin as they liked, their descendants are falling into peasantry under the rule of Ch'i 齊. This is just like the oxen respected as a sacrifice to *mausoleum* being degraded to animals for agricultural works.<sup>(136)</sup>

Judging from this, oxen were already used for agriculture in Chin at the end of the Ch'un-ch'iu period. This is probably the oldest and the most reliable document to refer to the use of oxen for cultivation.<sup>(137)</sup>

- (4) An iron *li-kuan* produced at the end of the Chan-kuo period was discovered from Hui-hsien 輝縣 in Honan which is supposed to be Kung-yi 共邑 of Wei.<sup>(138)</sup> Therefore, at least in the territory of Wei the cultivation by the ox-drawn plough must have been practised.
- (5) Li-k'uei's 李悝 *Chin-ti-li-chih-chiao* 盡地力之教 ('Instructions on how to utilize fully the productivity of the land'), the unique theory of agricultural policies in pre-Ch'in times, if it is not a forgery, was probably based on the cultivation by the ox-drawn plough; it would have been impossible to cultivate

(135) Cf. pp. 28-29.

(136) 宗廟之犧，為畎畝之勤。

(137) It is natural to suppose that when oxen work in the fields, they usually draw a plough. We read 'li-niu 犁牛' in the Yung-yeh-p'ien 雍也篇 of the *Lun-yü* 論語, 'Jan Kêng's 冉耕 pseudonym is Po-niu 伯牛', and 'Ssü-ma Kêng's 司馬耕 pseudonym is Tzŭ-niu 子牛' in the Chung-ni ti-tzŭ lieh-chuan 仲尼弟子列傳 of the *Shih-chi* 史記. But it is not yet certain whether these words mean an ox to draw a plough or not. *T'u niu* 土牛 in the Chi-tung-chi 季冬紀 of the *Lü-shih ch'un-ch'iu* 呂氏春秋 and also in the Yüeh-ling 月令 of the *Li-chi* 禮記 has no connection with agriculture as far as we can judge through their sentence structures.

Cf. Notes 52, 54.

(138) Cf. pp. 25-26.

two-thirds of the entire territory without ox-drawn ploughs.<sup>(139)</sup>

Even though cultivation by the ox-drawn plough existed in the Three Chin, we cannot attribute their rise exclusively to this type of cultivation, if it existed in other countries as well. We have often explained the Chan-kuo period by the formula 'with the appearance of ironware, cultivation by the ox-drawn plough begins, productivity increases, and culture prospers.' However, the available documents and archaeological remains are too scanty to allow this type of generalization about the Chan-kuo period. Therefore, there still remain some doubts as to the degree of popularization of the ox-drawn plough. It seems that it was not so high as is usually supposed nowadays, and that it varied from region to region. And this variation may have been the main factor accelerating the differentiation of classes within a state and the precipitation of conflicts amongst the states. In the *Shih-chi* (43. Chao-shih-chia 趙世家: Hsiao-ch'êng-wang 孝成王 4th year: 262 B.C.) we read that Chao-pao 趙豹 said in reply to the king: 'In Ch'in 秦 people cultivate the fields with oxen, and transport food by waterways.' This passage might well lead other scholars to consider the ox-drawn plough to be a factor leading to the ascendancy of Ch'in—I would probably be in agreement, for quite likely such may have been the case with Ch'in. The important question is at what point in history cultivation by the ox-drawn plough appeared. There were probably regional differences in the time of its appearance, and, to be near truth, the date should best be established for each individual case, rather than a vague generalization in the manner of traditional theories.

To digress, I will point out some problems concerning iron digging implements in the Chan-kuo period. Chêng Hsüan 鄭玄 in his commentary on a paragraph of the Chiang-jên in the *K'ao-kung-chi* observes:

In ancient times the *ssü* was single-edged, and two men worked side by side in turning over the soil with it..... The present-day *ssü* is two-pronged and has metal tips on the end of each prong.

The *ssü* in the above quotation indicates that the metal tips were set on the end of the implement. In the Latter Han period such two-pronged digging tools might have been used. On the stone bas-reliefs in Wu-shih-tz'ü are carved figures of Shên-nung-shih and others holding a digging tool like a 'square-shoulder square-pronged' *pu*-coin. Also among the articles associated with a wooden figure found in a tomb at Chang-sha 長沙 datable in the latter half of the Former Han period, there is a model of a wooden two-pronged digging

(139) As Nishiyama Takeichi pointed out, in the *Shih-huo-chih* 食貨志 of the *Ch'ien-han-shu* 前漢書, we read as follows: 'Li K'uei 李愷 of Wei 魏 thought out for Wên-hou 文侯 the way to give full play to the productivity of the land. According to him one state is one hundred *li* 里 square and whole area is about 90,000 *ch'ing* 頃. The area of mountains, marshes and villages is one-third of the whole area, so the whole arable land is 6,000,000 *mu* 畝, that is, 60,000 *ch'ing*'.

Nishiyama Takeichi; 'Amano-shi no hihan o yunde' 天野氏の批判を読んで ('Reading Amano's Comments'), *Chûgoku kenkyû* 中國研究, Vol. 15, 1952, p. 59.

implement.<sup>(140)</sup> These two examples provide further evidence for the above hypothesis. The iron spade-tip from which a 'socketed' *pu*-coin with sharp shoulders and sharp prongs evolved must have been sharply two-pronged. Therefore, we can suppose with reason the existence of the digging implement of two-prongs type in the Chan-kuo period. But, strangely enough, we do not find such implements among the remains of iron digging implements in the Chan-kuo period. To use my old classification,<sup>(141)</sup> iron digging implements in the Chan-kuo period comprise three kinds: those apparently identifiable as hoe-tips, those that could be used either as spade-tips or hoe-tips depending on how the handles are set, and the *li-kuan* used for the cultivation by the ox-drawn plough. All of them are single-edged (Fig. 23). Then, did people not use two-pronged digging implements at all?

The real features of the iron spade-tips are uncertain, for not a single tip of this kind has so far been discovered, but, the two-pronged digging implement

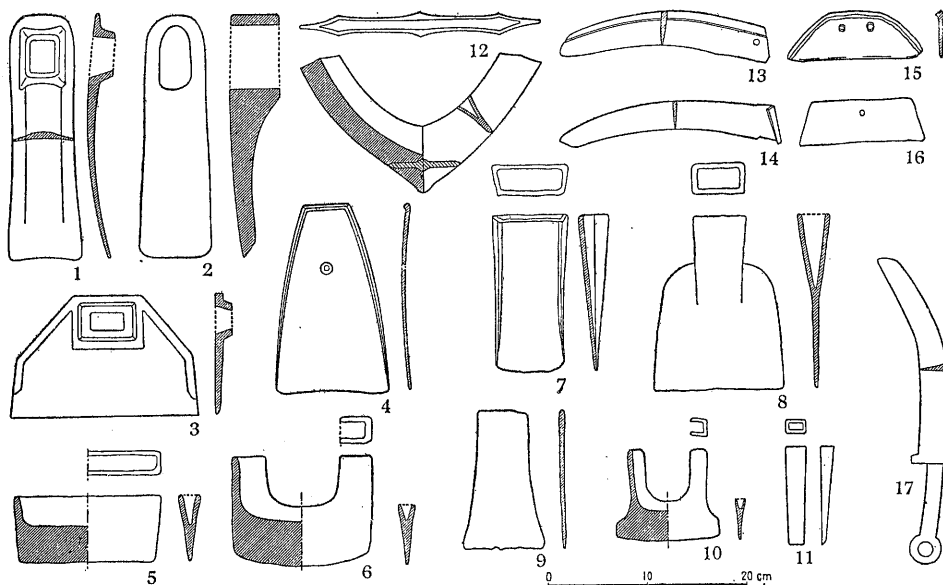


Fig. 23. Iron implements of the Chan-kuo period.

1. hoe i, 2. hoe ii, 3. hoe iii, 4. hoe or spade i, 5. hoe or spade ii, 6. hoe or spade iii, 7. hoe or spade iv, axe i, 8. hoe or spade v, axe iv, 9. axe ii, 10. axe iii, 11. chisel, 12. plough-share, 13. sickle i, 14. sickle ii, 15. perforated harvesting knife i, 16. perforated harvesting knife ii, 17. knife.

(140) K'ao-ku-yen-chiu-so, Chung-kuo-k'ê-hsüe-yuan; 中國科學院考古研究所; *Chang-sha fa-chüe pao-kao* 長沙發掘報告 (*Report on the Excavation at Chang-sha*), K'ê-hsüe-ch'u-pan-shê 科學出版社, 1957, Fig. 88: 3.

(141) Sekino Takeshi; 'Tekki no shutsugen to seisan no kakudai—seisan-yōgu, 鐵器の出現と生産の擴大——生産用具' ('The Appearance of Ironware and the Increase of Productivity—Implements for Production'), *Sekai kōkōgaku taikei* 世界考古學大系 Vol. 6, East Asia 2, Heibon-sha 平凡社, 1958, pp. 143-144.









