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SHANG KO

A study of the characteristic weapon
of the Bronze Age in China in the
period 1311-1039 B. C.

by

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SHANG KO

Part II

Synthesis of Conclusions

1.

MATERIALS AND TECHNIQUE OF MANUFACTURE

STONE AND JADE

A. The material and its provenance.

Most of the common stones used in the tools and weapons found at Anyang came from the T'ai Hang Mountains or their foothills. The main range extends north and south about fifty miles west of the waste of Yin, but the foothills are not more than fifteen miles distant. The geological formations along this range yield many different kinds of stone and mineral, suited to the use of the stone and "jade" craftsman: slate suitable for sickles, whetstone and harder stones for grinding, polishing and sharpening, have been found near Anyang. Some ornamental marbles, serpentine marbles, and other minerals classed in the western trade lists as ornamental building stones, but suitable in ancient times for making thin blades, have been found in the T'ai Hang range within ordinary carrying distance. Some stone materials may have come from the T'ai Shan mountain complex in Shantung.

The real problem concerns the many well authenticated examples of mineral substances, such as nephrite, which have not yet been found by the geological survey of China in localities inside the Great Wall of China. The problem has been complicated by references to jade, yu, in the most ancient classical literature. Many of these references remain valid, after being submitted to the most rigorous literary criticism. This has led many scholars to conclude that Jade must have been found in ancient times within easy reach of Anyang, Loyang and Sian, the early capitals of ancient China. In the classics the terms "jadestone", yu shih, and "jade", yu, were used to design-

nate not only nephrite and the rarer ancient jadeite, but also other jade-like stones. In Chinese literature, therefore, the word jade, yd, cannot be restricted to nephrite and jadeite as used in modern mineralogy.¹

1. Mr. H. T. Chang of the Geological Survey of China has discussed the references to jade in Chinese literature from a mineralogical point of view (Lapidarium Sincum, Peking 1931, see edit. 1927, pp. 111-156. Chinese text). While these references in literature cannot be ignored, it is evident from Mr. Chang's discussion that the definiteness of the term jade, yd, makes them insufficient in themselves to determine whether true jade was ever found in the places indicated. All the scientific investigations carried on in the areas now identified with those place names have failed to yield any traces of nephrite or jadeite in situ. Some of the kinds of stone called jadestone, yd shih, used in the Shang Dynasty, are illustrated in sickle No. 5, Ho nos. 10-22, 26-29, 36, 37, 62, 63 and 80. The article on "jade" in the Encyclopaedia Britannica, 14th edit. by G. F. Kunz, gives the best summary of the many minerals mistaken for jade, nephrite and jadeite, and those commonly used as substitutes for them in China. Kunz made an exhaustive study of jade as a mineral for H. R. Bishop's Investigations and Studies in Jade, New York, 1906. Even the white marble, which came from Ting Tsien in Kopei province, used in Ho Nos. 25, 26 and 27, was called jade, yd, in the inscriptions on sculptured figures made of this same marble about A.D. 500. Marble figures of Buddha were inscribed "Jade Buddha, yd fo".

The craftsmen of the Shang Dynasty used many different minerals to manufacture the "jadestone" Ho and other "jade" objects found at the Waste of Yin, Anyang. A geological map showing the quarries where these minerals were found indicate the great distances to which the trade in beautiful stones had extended at that time. True jade or nephrite was one of the rarer stones. It was used in the manufacture of sickle Ho. 5 and jade Ho Nos. 10, 11, 14, 15, 17, 22, 28, 30, 31, 32 and 33.² The more beautiful pieces

2. These have not been determined to be nephrite by a specialist in mineralogy, but the writer believes them to be such. There are many other Shang Dynasty jade Ho both of ordinary and miniature sizes preserved in public and private collections in China, Europe and America. It would add materially to this evidence if these jade Ho could be examined by competent mineralogists to determine

how many of them are made of nephrite, which is a silicate of calcium and magnesium, $\text{Ca Mg}_3(\text{SiO}_3)_4$. Jadeite, fei ts'ui, is a silicate of sodium and aluminum, $\text{Na Al}(\text{SiO}_3)_2$, found in Burma. It has been commonly used in China since the end of the eighteenth century, when it was imported into Canton by sea. Before that time it was brought overland through Yunnan in small quantities. It is sometimes spoken of as coming from Yunnan, but it has not been found in situ there. Yunnan traders "discovered" it in Burma in the thirteenth century. Lo Chen-yü possessed a sword pommel made of fei ts'ui said to have been unearthed at Loyang. Judging from its design it belonged to the second century B.C., when trading missions are known to have entered China via the Burma Road. Photographs of this object may be seen in Lapidarium opposite p. 134, Plate III. In western countries Burmese jadeite, of bright green and snow white colour, is believed to be Imperial Chinese jade, but the Chinese themselves did not consider it to be real jade, yu, for they called it by a different name, fei ts'ui. Pelliot, Toung Pao, Serie II, Vol. 13, p. 436, quoting the scholar Chi Yün (A.D. 1724-1805) Yueh Wei Ts'ao T'ang Li Chi, ch. 15, says that jadeite, fei ts'ui, from Yunnan, was not true jade, yu. Its value, however, was greater than that of true jade when Chi Yün was a youth, ca. 1750. Some jadeite is said to be found in the Kunlun mountains, but the writer has not recognized any among the many Shang Dynasty jades he has examined.

notably of the white, light green, yellow and gray varieties, were used to make scribes' engraving knives, pendants and other ornaments.

1. Two engraving knives, made in the form of a fish with the tail sharpened, one of pure milk white colour four and a half inches long and the other of typical mutton-fat nephrite from Khotan, about two inches long, were obtained at Anyang by the writer in 1930 and are in his collection in Toronto. Many other jade ornaments from Anyang are scattered in public and private collections. Some of them have been published in exhibition catalogues and elsewhere. The best authenticated group is that published by Karlbeck, Orvar, "Some Archaic Jade Pendants and their Dating" The Burlington Magazine, London, Vol. LXXIII, No. CDLXV, August 1938, pp. 68-74, Plates I and II, who says inter alia, "Twenty-one of the Anyang objects that illustrate the article were obtained by me in China. Some of them I saw in Anyang". A number of these pendants were typical Shang Dynasty scribes' engraving knives. These should all be examined by competent mineralogists to determine how many of the Anyang jades are nephrite. The characteristic Shang Dynasty designs and the scientific determination of the mineral composition would be additional proof of the presence of nephrite at Anyang in the Shang Dynasty.

The only source of the white varieties of nephrite was in the Kunlun mountains south of Khotan, Lat. 37°, Long. 80°, in the extreme

south west corner of Sinkiang or Chinese Turkestan.¹ The fact that

1. Pelliot, P., "Les Pretendus Jades de Sou-Tcheou (Kou-Sou)" Toung Pao, Serie II, Vol. 14, pp. 258-360. Laufer, Jade, p. 25, quotes the Kan Su T'ung Chih, ch. 20, p. 7b. "Jade is obtained from the river Hung Shui Pa in Su Chou". Pelliot, Toung Pao, Serie II, Vol. 15, p. 436, in a review of this book, says "Je connais cette pierre qu'on travaille dans la region; c'est un marbre verte assez finement viené et non un jade". Later Pelliot saw Joseph Martin's letter to M. Daubrèe written 3 January 1891 published in La Geographic, Bulletin de la Society de Geographic, Vol. 26, 1902, pp. 376-398, which reported Martin's discovery of nephrite in the Man Shan mountains near Su Chou. Pelliot then requested M. L. Cayeux, Professor of Geology in the College de France, to examine one of the objects manufactured in Su Chou which he himself had brought back from there. Professor Cayeux informed him that the object was "Ni du jade, ni de la jadéite, mais la serpentine". Cayeux remarked to Pelliot that serpentine capable of being worked, while not very common, was much less rare than jade (nephrite) and jadeite. Pelliot then ends his careful note with the finding "Le premier gisement de vrai jade reste donc encore a découvrir dans la Chine propre". Laufer, Jade, p. 24, says that Lu Sung (A.T. 1020-1101), positively stated that in his time jade, yu, was carried only in Khotan or Yü T'ien. H. T. Chang, representing the Geological Survey of China, after reviewing the whole situation in 1927, came to the same conclusion. Lapidarium;

much jade was found in Khotan or Yü T'ien was well known in the second century B.C.² This was recorded by Ssu-ma Ch'ien in book

2. Ancient Yü T'ien was at Khotan, not at Keriya which is now called Yü T'ien, see Ancient Khotan, p. 135, note 18.
3. Ssu-ma
3. Frederick Hirth's translation of this statement may be consulted in the Journal of the American Oriental Society, Vol. 37, 1917, paragraph 25. This paragraph will bear re-study. It reads "In the west part of Yü T'ien all waters run west flowing into the western sea". This has usually been interpreted to mean the waters west of the city of Khotan which of course do not run west up the Pamir mountains or flow into the western sea. The difficulty has often been noted. See Ancient Khotan p. 137, note 6. The writer suggests that this statement, instead of being considered incorrect, may indicate the upper reaches of the Indus River on the other side of the Karakoram pass at the head waters of the Karakash river. The Shui Ching Chu, our most accurate early geographical text, says "On top of the mountains south of Yü T'ien much jade-stone is found". S.W. Bushell, Chinese Art, sec. edit., 1909, Vol. 1, p. 124, says "The principal rivers regularly fished for jade pebbles are the upper waters of the Yarkand, Aria and the

Yurung Mash, "White Jade", and Karakash, "Black Jade", rivers of Khotan". Fa Hsien, the earliest Chinese Buddhist priest to leave a record of his journey to India, describes the gorges of the Indus river on the other side of the range, and it may well be that this is what Chang Ch'ien reported when he described the country of Yü T'ien. If this be so it may well indicate a way of contact between the ancient civilizations of the Indus valley and those of Ancient China. This brief description of Yü T'ien continues "In the east part of it water runs east flowing into the Salt Marsh (Lob Nor). The salt marsh seeps away underground. In the south part of it is the source from which the Yellow River, Ho, flows into the Middle Kingdom, Chung Kuo, while the city of Lou nan Ku shih has its city walls bordering on the Salt Marsh about five thousand li (sixteen hundred and sixty-six English miles) distant from

Chiang An (Sian)". The usual interpretation of this passage gives two cities Lou Lan and Lu Shih, but the writer suggests that one only was intended. The ancient site of Lou Lan has been discovered by Aurel Stein at Lat. 40°30' Long. 90°. R. A. Smith "The Stone Age in Chinese Turkestan", Man, Vol. XI, 1911, p. 81 sqq article No. 52 and plate, describes 140 stone age artifacts found at this Lou Lan site. Some of these are nephrite, while others are jasper. This palaeolithic industry has striking similarities to that found by Licent and Teilhard in the Ordos desert in 1923. See "On the Discovery of a Palaeolithic Industry in Northern China", Bulletin of the Geological Society of China, Vol. 3 p. 45-50, Peking 1924. The same industry was found in the Yellow River basin between Shensi and Shansi in 1928. See Teilhard and C. C. Young, "Preliminary Observations on the Pre-loessic and Post Pontian Formations in Western Shansi and Northern Shensi", Memoirs of the Geological Survey of China, Series A, No. 8, pp. 34-35, Peiping 1930. The ancient site^{Lou Lan} was visited twice by Aurel Stein, and some excavations were carried on there. His reports are given in Serindia and Innermost Asia. This site of Lou Lan seems to offer the best opportunity known to the writer to discover a sequence of cultures extending from the time of Christ right back to the palaeolithic age. This is represented by sixty knife blades of jasper "with single or double ridges showing that they were struck by people who understood the art of detaching regular two edged flakes"; see Serindia p. 357 and Plate XXX. The willow-leaf shaped arrow-head(?) of jasper, Cl22.0054, is very similar to a much worn blade of flint or jasper obtained by the writer at Anyang from a peasant from Hsiao T'un village, who said he found it among oracle bones and other artifacts at the Waste of Yin. This is the only chipped implement the writer has seen that was said to come from Anyang. Its similarity to those found at Lou Lan suggests that it may have been brought from that place in the Shang Dynasty. Innermost Asia p. 265, Stein describes some graves found at Lou Lan. These were well preserved and represent the people of Lou Lan. The grave LF.3 was of a young girl, with oval face and hair cut round the forehead. It contained a large jade bead, green, 9/16 ins. by 3/8 ins diam., numbered LF.3.04. This is figured on plate XXIV with bone pin LF.3.03. The bead is elsewhere described as "greenish, translucent, glass-like, tubular". Photograph Fig. 173 p. 263 shows a man with high bridge, aquiline nose and abundant dark hair on head and round the chin and mouth; the head was dolichocephalous; Stein calls him Homo Alpinus, similar to people noted by him in the Hindu Kush and the Pamirs. The purpose of this long note on Ssu-ma Ch'ien's record of "Much jade found in Yu T'ien" is to show how well his account of this area accords with geography and with archaeologically ascertained facts. It also shows that he was right in including the people of Yu T'ien, which extended as far east as Lou Lan and Lob nor, along with the peoples of Ferghana on the other side of the Pamirs.

These same people may have existed on Lou Lan since Palaeolithic times, and extended as far east as the Yellow River basin between Shensi and Shansi.

Ch'ien's History was completed in 99 B.C., and the description of Yü T'ien was based on Ambassador Chang Ch'ien's field explorations made in the Western Regions before 128 B.C.

In modern times Chinese and European geologists and geographers, with scientific training, have searched in vain for nephrite and jadeite in situ within the confines of the former eighteen provinces inside the Great Wall. It follows from this evidence that the jade merchants of the Shang Dynasty, 1311-1039 B.C., had trade relations with jade producing places outside the Great Wall.¹ For two thousand years the nephrite used in

1. The word Shang of "Shang Dynasty" means "merchant", more particularly "travelling merchant". Dr. Hu Shih has spoken of the scattering of the "merchant people" Shang jen among the states after the rise of the Chou Dynasty, but it seems probable that travelling in search of merchandise was characteristic of the Shang people before the fall of that dynasty. Some white nephrite from Khotan, as well as "dark, lustrous, indigo nephrite" from Europe, reached Troy in the Aegean in the time of the first, second third and fifth cities which have been excavated by Schliemann. This white jade probably came over a northern route, and not through the ancient centres of civilization in Iran and Mesopotamia. These ancient cities, and those of India, were nearer the mountains southwest of Khotan than was the capital of the Shang Dynasty at Anyang, yet this source of jade supply was not tapped by them, but by Shang Dynasty merchants who valued jade much more highly than they did, for a large number of jades worked in the second millenium B.C. have been found in China, but very few in the ancient Near East. It seems probable, from the archaeological evidence available, that the territory outside the Great Wall was occupied from ancient times by non-Chinese peoples, but that in this trade the selection and valuation of jade boulders was always carried on by Chinese jade connoisseurs at the source of supply.

China has been reported to have come from the Kunlun mountains, most of it forwarded from the most westerly cities of Khotan, Yarkand and Kashgar. Since the fourth century A.D. the southern trade route along the foot of the Kunlun range has not been much

used, but it seems possible that it was used in the Shang Dynasty, for neolithic jade celts as well as boulders have been found along this route as far east as the deserted ancient city of Loulan on the shores of Lob Nor.

Nephrite is found also in the neighbourhood of Manas, north of the T'ien Shan in northern Sinkiang. This locality yields a jade dark spinach green in colour, and does not appear to have been the source of any Shang Dynasty jade. It was from this place that the great monolith of Amerlane at Samarkand was brought ca. A.D. 1405. Outside the political boundaries of China, the region west of Lake Baikal in Siberia and the Sayan mountains north of Tannu Tuva both produce some nephrite, but the colours of these jades are not duplicated among the Shang Dynasty pieces. The jadeite, fei Ts'ui, of Burma comes from the extreme northwest of that country, Lat. 25°45', Long. 96°15'. It has not been recognized among Shang Dynasty objects. All these nephrite and jade materials are now common on the jade markets of Peiping and Shanghai, and great care must be exercised to avoid modern forgeries of ancient objects made from them.

The varieties of jade most highly prized in the Shang and early Chou dynasties are revealed by an examination of the pendants and other jade objects from Anyang, Hsün Hsien, Loyang and Sian.¹

1. T'ien Yeh Ka'o Lu Pao Kao, Shanghai, No.1, 1936, p.200, plates 7, 8 and 9. The eighty-five jade objects excavated from the Hsün Hsien Tombs by the Academia Sinica, some of which are illustrated in these plates, include two miniatures similar to No 28-31. Reiliet, F., Jades Archaïques de Chine were said to come from Loyang. Laufer, B., Archaic Chinese Jades were also said to come from Loyang. Harlbeck, Orvar, "Some Archaic Chinese Jade Pendants and their Dating" distinguishes clearly the provenance of his pieces whether from Anyang or Loyang. The Field Museum, Chicago, possesses some early jades brought back from Sian by Dr. Laufer, while the Treer Gallery Houses the two great jade No. 16; No. 17 and its fellow from Fighting Cock Terrace west of Sian.

Among the objects from these sites a cloudy to translucent jade of very fine texture in several colourations stands out as the most beautiful. The most distinctive colours are a light green and a yellow. There is also an opaque milk white variety somewhat different from the white nephrite from Lhotan. In the Royal Ontario Museum of Archaeology Jade Ko Nos. 14 and 15 and miniature Ko No. 31 are classed as yellow. Ko Nos. 14 and 15 were said to have been found together with yellow jade eagle KB.4039. At Anyang the writer obtained a small pierced square ornament of yellow jade which came from the Waste of Yin. This yellow jade is so distinctive that it should not be difficult to identify the quarries from which it came.

S. W. Bushell, in his Chinese Art, 3rd edit. 1909, reprinted 1924, Vol. 1, p. 124, states, "Nephrite has been found to occur in many other rivers flowing from the Kunlun Mountains, the traditional source of jade as far east as Lake Lob. It was discovered by Russian geologists in situ in 1891 still further east in the province of Kansu on the north of the Kunlun range between Kuku Nor (Koko Nor) and the Nan Shan Mountains where the nephrite was cloudy to translucent and of light green, milk-white or sulphur yellow colour. This is interesting as the first record of yellow jade in situ".¹

1. This discovery of yellow jade in situ by Russian geologists in 1891 has been quoted many times. The original source reference used by Bushell does not appear to have been available to those who quote his statement:- F. W. Rudler, Encyclopaedia Britannica, 9th edit., "Jade"; Una Pope-Hennessy, Early Chinese Jade, p. 5; H. T. Chang, Lapidarium, p. 122; Pelliot ignores Bushell's statement in his discussion of Su Chou "Serpentine" reported by Joseph Martin as "nephrite" in 1891. Martin was French and not Russian, but his specimens of jade were sent to the Société de Géographie de Petersbourg, after his death in Central Asia and this confusion resulted. Pelliot fails to report Martin's description of the jade, he says "II y en a de toutes les couleurs; vert mat, vert d'eau, blanc mat, blanc de lait même très transparent, jaune de soufre, etc. etc." This accords so well with Bushell's description that there can be little doubt that the same source of jade is being described, whether by the same discoverer or not. In the absence of

101

102 • 103 • 104 • 105

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110

definite scientific determination of the mineral composition of the specimens sent to Russia and in view of the analysis made by Professor Cayeux of Pelliot's specimens from Sou Chou as "serpentine", the question of the accuracy of the statement that the yellow jade of Nan Shan is nephrite must be left sub judice.

It seems possible that the yellow jade of Ko Nos. 14, 15 and 31, as well as many other Shang Dynasty jade ornaments, may have come from this source in the Nan Shan Mountains near Su Chou. The identity of the material of the jade from Anyang with the jade from the Nan Shan Mountains can only be proved by a careful comparison not only of their colour and physical appearance but also of the mineral composition. The question of whether they are both "nephrite" or both ^{"serpentine"} "serpentine" does not alter the evidence for the trade in jade _{or beautiful stones} between the capital of the Shang Dynasty and the Kansu Corridor provided they are both alike.

Yellow jade has always been prized in China and the same type appears to have been available in at least three widely separated and important periods of time; in the Shang Dynasty, 1311-1038 B.C.; in the Late Chou and Han Dynasties 481 B.C. - 220 . . . and in the recent past. It may be seen in the Royal Ontario Museum of Archaeology Collection in objects of all three periods. Besides the Shang Dynasty jades, No 14, 15 and 31 and jade eagle NB.4039, it is found in sword pommel disc NB.4887, said to be from Tomb A of the Tomb of Li Jiyang at Chin Ts'un. The beautiful jade pendant, No. 347 "of light yellowish green jade in the form of a long-tailed bird - could do, catching itself by its hind paw" approximates in coloration and texture jade No. 11. ¹ Recently lined

1. Tombs of Old Boyan, p. 14, plate C.VII, o. 1.b.

yellow jade is found in rotunda circlet No. 1970. This is similar in size and shape to a yellow jade circlet once in the possession of Ku-shêng, and was probably made of

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the basis of his drawing and description published in 1889.¹

1. Ku yü T'u Kao pp. 52-54. He precariously identified it as "an astronomical instrument", suan chi, and the yellow jade as the "gem from the wild tribes of the east" yi yü, mentioned in the "Testamentary Charge" Legge III p. 354. Ku Index 42, 0325. Laufer Jade p. 104-112 Fig. 38. Wu Ta-chêng had personally secured an ornament of yellow jade said to come from the Yi Wu Lü mountains west of Mukden on one of his official visits to the place. He recognized the substance to be similar to that in his jade circlet and on this ground alone he identified it as the "gem from the wild tribes of the east". Laufer, Jade pp. 108-110. H. T. Chang, Lapidarium p. 123 note says that this mineral substance is not true jade but "serpentine". This raises the question of a second source for modern yellow jade in the mountains west of Mukden, but this can only effect the modern jade, for the source in the Fan Shan was on the direct line of the regular jade trade route, while that in the north was not accessible before the time of Christ.

It thus appears that these "yellow jade" quarries in the Fan Shan near Su Chou have produced "jade" in the Shang Dynasty, in the late Chou and Han Dynasties, and that they are still open and producing yellow jade today. They have much the same history as the jade mines at Khotan, except that they produce less material and are located several thousand li nearer to the ancient centre of Chinese civilization at Fighting Cock Terrace and Sian. This trade in jade from Khotan was noted in the Han Dynasty by the travellers to the West, by the early Buddhist travellers to India, by Marco Polo, Benedict Goetz and a host of others, all down the ages.²

2. Ancient Khotan, p.87, note 10 and pp.132 f.; Yule, Marco Polo Vol. I, pp. 191, 193, note; Yule, S. thuy and the Way Thither II, p. 564.

In 1915 the writer found on the site of the Waste of Yin a fragment of a large jade ko similar to No. 17.³ The mineral struc-

3. NB.1812 deposited by the writer in the Royal Ontario Museum of Archaeology in 1916.

ture of this fragment is very similar to that of Jade Ko No. 17, from Fighting Cock Terrace, Shensi, which the writer examined carefully in Washington. The material

in this fragment is also

ed. 1964. 1965. 1966. 1967. 1968. 1969. 1970. 1971. 1972. 1973. 1974. 1975. 1976. 1977. 1978. 1979. 1980. 1981. 1982. 1983. 1984. 1985. 1986. 1987. 1988. 1989. 1990. 1991. 1992. 1993. 1994. 1995. 1996. 1997. 1998. 1999. 2000. 2001. 2002. 2003. 2004. 2005. 2006. 2007. 2008. 2009. 2010. 2011. 2012. 2013. 2014. 2015. 2016. 2017. 2018. 2019. 2020. 2021. 2022. 2023. 2024. 2025.

similar to that of a large jade no. 1 in Cheeloo University Museum, Tsinan, Shantung, which was probably found in the neighbourhood of Wei Hsien or Ch'ing Chou Fu, half way between Tsinan and the sea coast of Tsing Tao. The same material occurs again in the large Shang Dynasty jade no. No. 53, later reshaped into a knei and obtained in Kaifeng. The distribution of this one type of nephrite peculiar in structure and colour, all made into the same kind of very large jade no. suggests the east and west line of one of the Shang Dynasty jade trade routes, which may be traced from the ancient Shang sites in Shantung and North Honan as far west as Fighting Cock Terrace in Shensi and may ^{yet} be traced even further when the source of this particular type of nephrite can be more exactly located in the Lunlun mountains.

We may sum up the implications of the foregoing study of the materials and their provenance as follows:

Waterworn pebbles and boulders of distinctive white nephrite were accessible to primitive man as they lay along the banks of the Yurung Kash (White Jade River) at the western end of the Tarim basin north of Tibet. Other distinctive and attractive stones such as yellow nephrite (or precious serpentine) were also available at the eastern end nearer China. Trade in this beautiful stone material had already developed in neolithic times. The fibrous tough nature of jade, as well as the lustrous polish and patination which it took on, attracted the aesthetic appreciation of early Chinese craftsmen and connoisseurs. They saw the latent artistic possibilities in this medium. The passion of the Chinese for jade drew the trade in it as far as the capital of the Shang Dynasty in North Honan, and to the eastern limits of the land at the shores of the "Northern Sea" in Shantung.¹ This trade in jade was carried

1. The Northern Sea, or Ho Hai, which was the ancient name of the sea on the northern side of the Shantung promontory.

on in spite of the intervening physical and ethnic barriers, and is attested by the presence of nephrite not only in the excavations at Anyang, but also in sporadic finds in many other places in this area.² While this trade extended to the very borders of

2. An ancient literary tradition handed down before the burning of the books in 213 B.C. records that "Yu King captured from the Shang Dynasty fourteen thousand pieces of ancient precious jade and a hundred and eighty thousand pieces of pendant jades". See Chavannes Les Mémoires Historiques Vol. V, p.457 note 1 on the date and importance of the Yi Chou Shu. This tradition would account for the presence of many of the jade pendants found in the Chou Dynasty cemetery at Hsün Hsien and others reputed to come from Loyang and Sian, which appear from their designs to be of Shang Dynasty workmanship. The adjective 'precious' seems to indicate jade Ho used in the ritual services. Two main features in the graph pao are "jade under a roof". Jade Ho and pendants are the two natural divisions of Shang Dynasty jade.

ancient Iran and India, this does not imply that the Chinese learned the art of carving jade from Iran, India or Mesopotamia. No jade Ho, scribes' engraving knives, or jade pendants carved with characteristic Shang Dynasty designs have been found in the Tarim basin by such careful observers and collectors as Sven Hedin or Aurel Stein, who have both covered the area thoroughly a number of times. Neither of these jade objects, the Ho and the diviner's knife for inscribing oracle bones, or the designs characteristic of the jade pendants, are found in these Middle and Near Eastern civilizations. Indeed, the people of these civilizations valued lapis lazuli and gold rather than jade, while the most ancient Chinese set little value on these "valuables", if we may judge by their absence from Shang Dynasty sites. The place of origin of the Shang Dynasty culture complex, which developed the jade Ho, and extended its search so far west for the materials from which to make them, was centred in the east of China and not in the west. The determin-

333

ing factor ^{creating} in the Shang Dynasty jade ^{was} not the imported nephrite from which it was made, but rather the ritual and artistic conceptions in the mind of the jade craftsman who sought so far for his material and who so patiently worked it into its final forms.

B. Technique of Manufacture

The processes used in the Shang Dynasty to manufacture stone axes and adzes were merely refinements of those used in the preceding Lungshan or "Black-pottery" culture of the neolithic age. Much of the slate used at Anyang was coarse, sandy and full of "shakes". Such material did not stand much hard usage; hence the large proportion of split and broken blades found in the excavations of the Academia Sinica at that site. In the making of sickle blades, the slate was first split into flat pieces and roughly shaped with a hammer. Pieces with open seams were then rejected, sound pieces were placed on the grindstone for shaping.

Grindstone No. 4 was said to have come from Anyang. The writer has seen fragmentary grindstones on the site of the waste of Yin.¹

1. These were somewhat similar to the earlier grindstones excavated by the Academia Sinica at Lungshan, Shantung. In the English summary of the Ch'eng-tzu-yai publication it is called a "polishing stone", II, to distinguish it from a "grinding stone", no. used like an "ink slab", probably to grind abrasives". Ch'eng-tzu-yai "polishing stone" 2, drawing Pl. XXXIII, Fig. 2; photo, Rep., II. XXXVIII, Fig. 3; "grinding stone" drawing, Pl. XXXIII, Fig. 3, photograph, Pl. CVIII, Fig. 2. English text, pp. 23-24, Chinese text pp. 73-74.

The striations on the sides of the Shang Dynasty slate sickles Nos. 1, 2 and 3 were made perpendicular to the cutting edge when the sickle was first shaped on the grindstone. The

rocking movement of grinding made the sides slightly convex. The top or back of the sickle was left blunt, but the lower side was tapered to an edge. This edge was then sharpened by pushing the slate on the grindstone at an angle of 45 degrees to the cutting edge. The blade was then turned over and the other side sharpened at an angle of 45 degrees to the edge, but at a right angle to the stroke on the first side. This produced a finely serrated edge. The distance between serrations on some twenty examples measured averaged one millimetre. This edge was very efficient in cutting grain.

About one percent of the sickles found at Anyang were made not of coarse slate, but of finer varieties of slate, green-stone and even sandstone (sickle No. 9). The edges on these blades were not so definitely serrated, and conformed more closely in shape to the late neolithic types reported from North China. It is not possible without a close study of stratification to be sure of the date of stone implements found on a site such as the Waste of Yin, since they work their way to the surface of the ground whenever the earth is disturbed. It is very probable, however, that Nos. 6, 7, 8 and 9 were made in the Shang Dynasty by methods of grinding and sharpening similar to those used for coarse slate.

Once a sickle blade was hafted it could be re-sharpened in one of two ways. If a serrated edge was desired, the sickle was taken back to the large stationary grindstone at the dwelling house. Such grindstones are found today in every Chinese farmer's courtyard. In the fields, sickles were sharpened by a whetstone held in the hand and carried on the person. Stone sickle No. 8 had clearly been treated in this way. The writer has seen, on the Waste of Yin, long rounded stones like scythe stones which

had probably been used for this purpose.¹ Originally jade w

1. On a rich site like Anyang such stones are rarely preserved even by excavators. They are usually thrown away with the mass of rubble and shapeless potsherds. We must await the final reports of the Academia Sinica excavations at Anyang to learn whether any have been recorded. Five Early Chou Dynasty whetstones were excavated by the Academia Sinica from graves at K'ün Hsien but no photographs or measurements are yet available; three had holes for suspension; one had a handle grip, and one was broken. Chien-Yeh-ao-hu-Pao-kao No. 1, p. 193. Such a whetstone may have been called a 'ts'io. Giles 11770. Ch'ü 164.1 reads "Other hills have stones that can serve as whetstones". This translation is supported by the parallel line at the end of vase 2 which reads "Other hills have stones that can work jade". The R.O.C.A. has a number of finer whetstones from Anyang; NB.3365, without suspension hole; NB.3165 and NB.4981 both with suspension holes. The writer has a number of these whetstones obtained by him at Anyang. It is improbable, however, that these were used to sharpen ordinary slate sickles, for the corners are quite square and not abraded. Any abrasion marks are found on the flat sides. They were not used by farmers but probably by scribes and diviners, to sharpen the small graving knives made of jade which they used to inscribe oracle bones.

Originally jade was probably cut from the boulders with sandstone saws, in much the same way as the Indian tribes of the Fraser River Valley in British Columbia, Canada, shaped their jade tools.² Jade boulders as large as those from British Columbia³

2. The R.O.C.A. houses a collection of these tools made by Lieut. George T. Simons; axes, adzes, chisels, scrapers, and a few knives (HL.1575, HL.1576). The cores (e.g. HL.1541 and HL.1591) show what remained after long strips had been cut off. The sandstone saws (HL.1549, HL.1550, HL.1551, HL.1552, HL.1553) indicate the kind of saw to be looked for in China. Much sandstone of a similar kind, suitable for saws, was found at Anyang; sickle No. 9 is made from such material.

3. Large jade boulder from British Columbia HL.1720.

would yield strips long enough for large Shang Dynasty jade Ko. On the reverse side of Lo No. 13 a crease or uneven step in the jade indicates that the boulder was sawn from two sides, probably by a stone saw, and that the two planes were not in exact alignment. There is a similar crease on the inscribed side of jade Lo No. 19.13, which is the companion of Ko No. 17 and is now housed

in the Freer Gallery of Art, Washington. Perfect control of the planes with a stone saw was difficult to maintain; when a ridge protruded this could be ground off, but when the faulty saw cut intruded into the thickness of the blade it was difficult to grind away the depression without ruining the whole. While the bow-saw with abrasive was used in the Shang Dynasty and may have been employed to cut the long blades of jade c, yet the use of sandstone saws may well have persisted from times when more primitive methods were used. Stone saws had the important advantage of being easily procured and inexpensive to use, but it must be admitted that none have yet been recognized among the debris at Anyang.

Stone Ko Nos. 23 and 24 seem to have been cut into rough shape with saws and abrasives and then shaped into final form on a g. indstone. This method was certainly used to shape also No Nos. 25, 26, and 27, of white marble. This can be seen in the drawing of No. 27, where the straight line of the saw mark was left on the obverse side of the blade. In Peiping the present day Chinese lapidary, when sawing up jade boulders from Ahotan, uses a wire bow-saw. It is made of a simple bow of bamboo, four to six feet long, depending on the size of boulders to be cut. The wire is either single or of several fine strands twisted. This saw is operated by two persons, one drawing at each end, a third applies the abrasive sludge in the slot cut by the saw. A two man toothless iron blade saw is also used with abrasive sand.¹

1. A fragment of an iron saw 1 mm. thick was found embedded in a flat piece of stone NB.5271, said to be from Chin ts'un, see H.C.White, Tombs of Old Loyang, one of the group described under No. 344.

Bronze saws of the same sort may have been used in ancient times although the writer is aware of no definite evidence of such.

The cuttings on stone objects from Anyang prove that the bow string saw was used because of the sharp turns sawn in the open fret work.¹ Abrasives for use with saws were ground on grinding

- 1. A small stone ornament found by the writer on the ancient site in 1914-15 (NB.1813) has a cut 1 mm. wide. The corners of the cut are rounded, suggesting the round section of cat-gut, twisted cord, fine rattan or perhaps copper wire, used as bowstring saw together with abrasive sludge. Other examples in R.O.M.A. are NB.4076 and NB.4079.

stones, mo, like the one found at Lungshan. The abrasive was called "cut-through-jade-sand".² All the other essential tools

- 2. Chieh yü sha; Giles No. 1515; Lapidarium, pp. 128-130. In Peiping today powdered quartz is technically called "yellow sand", huang sha; powdered garnets "red sand", hung sha; while carborundum, a recent introduction now widely used with lap wheels, is called "black sand", hu sha. See S. W. Bushell, Chinese Art, Vol. 1, p.128-131.

now used by the jade craftsman in Peiping were probably employed in the Shang Dynasty. These tools have been briefly but adequately described by S. W. Bushell.³ The tools of the jade craftsman are

- 3. "Chinese Methods of Working Jade", Chinese Art, London, 1st edit. 1904, sec. edit. 1909. Vol. 1, pp. 128-131. For illustrations of the modern tools and process cf. H. R. Bishop, Investigations and Studies in Jade, New York, 1906, 2 folio vols.; C. S. Nott, Chinese Jade Throughout the Ages, London, 1936, New York, 1937, Pl. II; Julean Arnold, "Jade" Asia, Vol. XXXVI, 1936, pp. 14-21.

the same throughout China: Canton, Shanghai, Soochow, in Kansu province, and even in the far west at Khotan and Kashgar. It is best, however, to describe the Peiping tools, where the methods are still the same as those used when jade objects were made for the manchu court. With the exceptions of black diamond, emery and carborundum, no modern foreign materials or tools are employed that were not available two thousand years ago, when iron began to be used. Motor driven machinery has been tried and discarded by the best shops, even for the tedious work of cutting large blocks of jade. Besides the bowstring saw and the abrasives,

these tools consist mainly of drills. Drills were propelled in three different ways. The simplest type was the bow drill, developed from an arrow with a bowstring twisted around it.¹ The

1. Petrie, Tools and Weapons, London, 1917, p. 39, paragraph 103, plates XLIII, Figs. M 6 and 7; XLVIII, Figs. M 8, 9, 10 and 11; XLIII, Figs. M 12, 13, 14 and 16; LI, Fig. M 15. These all illustrate the bow drill in the ancient Near East, particularly Egypt. The Chinese bow drill was almost identical, and had much the same variations of type, according to the use to which the tool was adapted.

craftsman operated this drill with his right hand. Pressure was applied by the left hand, which held the drill cap or head-piece. If the left hand was required to manipulate the jade object, pressure was applied by special types of drill cap pressed against the breast or chin. Continuous heavy pressure was obtained by means of a heavy weight suspended from a horizontal adjustable bar to which the drill cap was fixed. Such a framework, mounted on a table, permitted the left hand to manipulate the jade object and apply the abrasive, while the right hand wielded the bow.² The

2. See Bushell's drawing Fig. 3, in Nott, Chinese Jade, Plate II.

second type of drill was the pump drill.³ This drill is used for

3. Petrie, Tools and Weapons, p. 39, paragraph 102, plate XLVIII, M 4. Petrie says that this drill was not known before Roman times. I have no definite proof of its existence in Shang times, except its simplicity and its efficient use in the hands of the jade craftsman of today. Webster's New International Dictionary, sec. edit. 1940, Drill, Fig. 4, is similar to the Chinese pump drill.

boring beads and holes of all types. It is a most efficient tool, which allows the right hand to apply little or much pressure at will, while the left hand holds the object being drilled. Most jade objects, especially those that are small or frail, are held in a hollow frame by means of wooden wedges. This permits a more solid grip, and prevents breakage. The third and most important

type of drill was the lapidary's treadle lathe, or wheel. The evidence for the use of such a wheel is the nature of the carving on jade objects excavated at Anyang. It is difficult to believe that the carving on the two sides of the jade blade of sickle No. 5 could have been done in any other way than with a lapidary's wheel. The simple treadle lathe now used in Peking is constructed in the simplest manner out of common materials. All the iron parts now used could have been replaced in the Shang Dynasty by hardwood or bronze. Indeed such a lathe could have been constructed entirely of wood in the neolithic age, with quartz points and grindstones mounted on the end of the wooden spindle. This lathe consists of a hardwood spindle or rod, about 14 inches long, placed in a horizontal position above a sloping table about two feet wide and four feet long. One end of the rod is pivoted in one of a series of holes drilled one above the other in a wooden block fixed to the high end of the table. The spindle is cradled in a bearing on an upright mount about six inches from the end to which the lap wheels or drills are attached. A simple strap around the centre of the spindle halfway between the pivot block and the bearing passes through a hole in the table and is attached to two hinged treadles. The operator, seated on a stool, revolves the wheel first forward and then in the reverse as his feet move up and down. His two hands are free to manipulate the jade object and apply the wet abrasive. The height of the drill point or wheel above the table can be adjusted by moving the pivoted end of the spindle up or down in the series of holes in the pivot block or by raising or lowering the bearing support. This revolving spindle becomes a magician's wand in the hands of a skilled workman. With it he performs artistic miracles in the hardest stone.

It is unnecessary to describe the various diamond points and wheels made of dried gourd, wood, leather, pewter and bronze. These were mounted on the end of the spindle in various ways known even in the Shang Dynasty; the simplest was to drive a mineral crystal into the end of the wooden spindle or to mount a small grindstone wheel on its squared end.¹ The large iron disc

1. For the Lapidary's lathe see Asia, XXXVI, photographs on pp. 15 and 18; Bushell's drawing in Nott, Chinese Jade, Plate II, Fig. 1, which shows the various parts and the different spindles used with the lap wheels attached.

which measures up to twelve inches in diameter is now often used instead of the more ancient bowstring saw to cut rough jade into shape. No traces of this circular saw have been found on the flat surfaces of Shang Dynasty lo. It was probably not used at that time.

The modern iron tubular drill was probably anticipated by fire-hardened reed tubes made of bamboo or other hard wood. Most tubular drillings of the Shang Dynasty slope inwards from the surface of the jade. This indicates that the outside edge of the bamboo tube was worn smaller as the drilling proceeded. An iron tubular drill bores a hole uniform in diameter from top to bottom.²

2. Stanley Casson, "Battle-axes from Troy", Antiquity, VII, 1933, pp. 337-339, two plates, describes the lapidary's technique of ornament on three nephrite and one lapis lazuli axes from Troy. Schmidt's catalogue of the Schliemann Collection, Berlin, Nos. 6055-6058. The chequer squares of ornament were made with a wheel of the type used by (near Eastern) gem cutters and the knobs of the central band were made by a very fine reed drill and abrasive. Casson says the wheel or file a very small reed drill and an abrasive point are part of not the whole of the tool box of the Babylonian seal-cutter. "The shape of the axe is purely nordic and the nephrite of which three were made is a European material". Neither this note nor the reference to near eastern drills from Petrie's Tools and Weapons is intended to suggest the origin of the Chinese craftsman's technique in Babylonia, but to indicate that similar techniques and tools were used in both civilizations. We

have not yet discovered, or at least recognized, the examples of the Chinese jade craftsman's workmanship that must have existed long before the Shang II period 1311-1039.

Unfinished tubular drillings are found on Lo No. 10, and completed holes on sickle No. 7, Lo nos. 10, 11, 13, 15, 18, 20 and 33.

A fine file of abrasive or of other material for use with abrasive powder may have been used. One must presume that a wooden straight edge and the point of a hardened stick with wet abrasive were used in decorating stone and jade with incised or raised ornament in neolithic times. The fluting lines of decoration on the butts of jade no 15, 17 and 33 may have been made in this way, but the use of the wheel is more probable. Such lines may have been made by the bow-string saw which cut the incisions at the end of the butt.

If one compares the Shang Dynasty jade craftsman's technique with the workmanship found on jade objects of succeeding periods in China, it seems probable that his kit of tools was in no way less in number than, or inferior in efficiency to, those used by his successors. His skill in the use of these tools and the expression of his artistic temperament in this most difficult but enduring medium, was even greater.



4. The Bronze Age in China.

The bronze work of the Shang dynasty in China is one of the most outstanding features of its material culture. The Shang dynasty had at least three thousand bronze ritual vessels; the Han in circulation probably as many and unadorned vessels are known. About twenty different kinds were used in preparing and serving food and drink in the ceremonies. Complete sets contained as many as ten kinds and fifteen or twenty individual vessels. But bronze was by no means restricted to ritual use; a still greater number of secular objects exist: tools such as socketed axes, adzes and chisels; chariot fittings of many kinds; horse harness; ^{trappings} ornaments and jingles; graded musical knockers and small bells; armor such as helmets, shield bosses and bronze buttons; ^{for buff coats and leather straps.} weapons such as spears, ^{points} lances, bows and arrows, broad axes, war axes and ho. This study concerns the ho only but it is impossible to understand the ho apart from its context. The technique used in making and decorating the ho was employed also on many of the implements and above all on the ritual vessels.

Some conception of the general development of the bronze age in China is necessary for an understanding of the history and the craftsmanship of the ho.

When King Wen Kung moved his capital to Yin near present-day Anyang in 1311 B.C. the bronze age in China had already reached its height. The fact that stone and jade implements were still in use at that time does not constitute it a chalcolithic age. The writer regards 1300 B.C. as the beginning of the late bronze age in China. Bronze casting technique should be considered the basis of the division of the bronze age into the three phases, Early, Middle and Late. The Early Bronze age witnessed the mastery of the essentials in the manufacture and use of the metal. In China this period



a year) to have ended about 2000 B.C., i. e.
 accepted for the close of the Shang period in fact, it
 is the point of contact of the
 cultures. The Middle Bronze Age, while it tended to have initial
 elements, covered the period of
 expansion of the use of bronze into other fields such as the decorative
 as opposed to the purely useful. At 1200 B.C. the end of this ex-
 pansion and of this period was reached, a date some 50 years later
 than the close of the corresponding age in the West.

Late bronze was the period of ^{gradual} decline. ^{From its height in 1300 BC}
 deteriorating craftsmanship led to the use of poorer materials rather
 than to the introduction of a different material such as iron. ^{Less gold, tin and copper and more impure copper and lead marked the decline in bronze composition}

the Late Bronze Age in China on the coast went to ca. 900 B.C.,
 for there seems to be no trace of iron in the archaeological
 time. Iron was introduced into the interior of China in the
 east, iron was common in the ca. 1000 B.C. and used in
 common use in China about 1000 B.C. and in the century after
 Christ. The Late Bronze Age in China, i. e. 1200 to 900 B.C. covers
 the three historical culture fields which have been called in this
 monograph Group II, Group I and Group II.

Scholars have been very slow to recognize that the Bronze Age in China
 began as early as it did. Many were reluctant even to concede that
 some of the excellent bronze ritual vessels extant belong to the
 last decades of the Shang dynasty, i. e. ^{just a few years} ca. 1000 B.C. The in-
 scriptions on them have been called "totally archaic" and "picture writing"
 which imply that they were too primitive to be given any survival at
 modern day. It is, ^{by these scholars} however, recommended that the
 the names of persons, families or tribes for whom these bronze

found vessels were... which are... convinced these legends... of the inscriptions... are found also... of the nature... if other evidence... bronze or iron... bronze-cript... on the bronze... ritual... of the ritual... the bronze... in any way.

These vessels... and give a... shortly after 1500 B.C. they... in their sets... indeed it is only... came to decorate their... the patterns they did... involved in casting... evid at that this art... for unless the reader... not yet published, the writer is aware of no objects or traces whatsoever among the many thousands of artifacts found at the... Yin that would indicate any distinctive step in the development of the art of bronze casting... its culture

complex that required the multiplicity of shapes in the bronze ritual vessels which form its major manifestation, must have been previously developed at other Chinese sites as yet undiscovered.

A very high technical skill was involved in casting these bronze ritual vessels so complex in their structure. Many have his solid feet attached to thin and rounded walls; some have movable handles and hinged grids; some have solid lugs and knobs cast (not rivetted) into position; inscriptions were cast in the most difficult places: under the handles, in the bottoms of deep, narrow-necked vessels, under the feet. These vessels were decorated with magnificent designs cast into the surface. The deep-cast crevices which formed the designs were filled with black and sometimes white *lacquer* inlay.

Many moulds used in casting these bronze vessels have been found at and near the base of Yin. Anyang Report 4 (after page 696, fig. 5) illustrates two of these moulds, excavated by the Academia Sinica. The writer has gathered many fragments of such moulds on the site of a foundry near Hsiao Min village south of Ssu T'ien No village about a mile due west of Hsiao T'un village. These fragments are all from piece moulds which were usually made in quadrants and set several tiers deep for tall vases, Ku. These sections were fitted together both horizontally and vertically by means of notches and "noses" cut into their walls. The use of such moulds was obviously the result of long experimentation. The moulds were made of well levigated loess which had been pressed in little pats against a model. The impression of the two fore fingers and thumb of the artisan may be seen on the back of these little patches. Behind these ridged pieces of finest clay, a coarser backing mixed with sand was pressed until the whole was from 1 to 3 inches thick. On the inner sur-

faces, a black powder which may have been soot or graphite was apparent. This prevented the molten metal from adhering to the mould. In the hundreds of moulds examined by the writer, covered though they were with the crevices of the designs, only one very small particle of bronze^{corrosion} has been found.

Special devices were employed in preparing moulds for complex casting. In the case of tripods and other vessels in which narrow bands of design were to appear in large plain surfaces, thin strip moulds bearing the design were made of very fine loess and were secured in sockets in the face of the master mould by means of knobs protruding from their backs. Heads which were to protrude from the surface of the vessel were added by a second cast. A hole was left in the wall of the vessel as it was cast and metal was poured from the inside through this hole into the mould for the animal head or knob which was firmly attached to the outside. The fusing temperature of the second mixture of alloy must have been lower than that for the body of the vase which would otherwise have melted in the course of the second casting. It has often been pointed out that analyses of samples of bronze taken from different parts of a vessel give different proportions of copper and tin in the alloy. Such irregularities are commonly attributed to technical crudity but it should always be noted whether the positions from which these samples are taken may not have been places where a secondary pouring was made. Such points are the junctions of knobs, lugs, handles and legs to the main body of the vessel. There will ordinarily be at least 2% ^{more tin} more tin requires this much extra tin to weld these secondary castings into position in the alloy at such places. The parts of the vessel in which the inscription was cast will also be found to be

of a better alloy than the remainder of the vessel. This is often indicated by a golden tinge in the material about the inscription. The mould for the inscription was often made separately. If the inscription were inside the vessel it was set into the core. A separate piece was also used for inscriptions under the handle. The square outline of such inset moulds can often be seen impressed into the body of the bronze vessel, although the artisan usually attempted to erase the traces by scouring the surface.¹

1. The writer has in Chooloo University Museum, China, such an inset inscription mould obtained at Anyang.

^PThe same methods as those described above for vessels, apply to the casting of the jo. Methods such as these would not have been developed had the bronze casting been restricted to the simpler jo. The elaborately decorated butts of the jo and the cast inscriptions with their borders and cartouches (cf. nos. 102-107) are applications of the bronze casting technique developed principally on the bronze vessels.



... The casting of the ho.

All ho examined by the writer show traces of having been cast in double moulds. ho 73 shows the overflow which exuded between the upper and lower parts of a flat mould. It was poured from a 'gate' at the point of the weapon. Specimen ho 144 was poured from the butt end where some of the overflow remains. The moulds used for ho must have been similar in construction to the double moulds used for casting knives which were also poured from the end as shown by knife N.O. A. N. 3976 said to be from Anyang. R.O. A. N. 3188 and Yeh Chung One S.O. 3 and parts of double moulds for ceremonial ch'iu knives to which N.O. A. N. 3913, also said to be from Anyang. These moulds are constructed in all respects like the sectional moulds for Shang ritual vessels. They were made of the same gray materials fitted together with notches and noses of the same type; and were covered on the inner surface with the same black soot or graphite.

^{characteristic} (no ^{a crucible which is} piece of the bronze caster's equipment is well represented among the artifacts excavated at Anyang. Because of its size it is called by the peasants 'a general's helmet', ch'iang ch'iu k'uei. The writer has found many fragments of these hard, reddish-coloured vessels. They are made of a special fire clay containing mica flakes and stone grits quite unlike any other clay objects from Anyang. They were found in the heart of the site of Yin near furnace sites where charcoal, burnt earth, broken clay and fragments of bronze moulds were common. The Academia excavated many fragments but none complete. One had a piece of bronze slag, t'ung hien sha, attached to it.¹ Cf. Liu Hsu-hsia's discussion of this crucible.

1. Liu Hsu-hsia, "A study of the Yin dynasty art of metal working, Yin tai ch'iu t'ung sha ch'iu yeh ch'iu, Anyang, RECOPT, III, 1956, p. 681-696, with five plates and a drawing of a "general's

helmet" reconstructed from the fragments, p. 63B and photograph, plate 2.

lien huo, based on information gained during the excavations at Anyang, marks the beginning of objective studies of excavated materials which should lead to a better understanding of the Shang dynasty bronze-caster's techniques.

The writer enclosed a "general" view of these vessels as perfectly cylindrical vessels with a flat base, not more than 0.15. (2 in.) in diameter. The inner lining was a funnel-like lining which acted as a cover to prevent oxidation into the vessel proper. The inner part was made of clay inferior to that of the outer vessel, and acted as a temporary addition. Other fragments showed traces of this inner lining which was not mentioned by Mr. Hitt. The inside of the funnel-like lining was blackened. Some of the fragments of these vessels is cracked outside. In the writer's opinion, they cannot have been crucibles placed in a furnace and filled from the outside. They may have been containers into which the alloy from the adjoining furnace was run and from which it was poured into the moulds. They would have been set in "cups" or holes in the earth near the mouth of the furnace and filled with the alloy. The exact balance would have enabled them to be set on a flat table surface if necessary. The inner, funnel-like lining would have acted as a cover to prevent oxidization. It would also have held back any intrusive slag during pouring. The lips of these vessels were well made, but there appears to have been no narrow spout to guide the molten metal when pouring. A small opening may have been made in the funnel-like lining at the lip to act as a spout for pouring.

We know little of the technique used by the Chang artisans. Experiments in their methods, based on materials like those found on the sites of their workshops, must be tried in order to determine the exact processes followed. Bronze vessels and weapons such as Ho di. are not cast perfect from the mould. The surfaces of all bronze vessels and weapons intended for practical use show traces of a finishing process. As Ho 79 shows the point and edges must have been filed off and ground down on wetstones into their finished form. Filemarks are visible on many Ho. The writer possesses a tempered bronze file which may have been used for such a purpose. Other files from the early Chou dynasty site at Hsien Hsien railway station¹ were in the Honan Provincial Museum in Kaifeng.

1. Twenty-five miles west of Hsien Hsien County town.

The surface of bronze is more ductile and more easily annealed if cooled suddenly after casting rather than allowed to cool slowly, when it becomes hard and brittle. It seems probable to the writer that, immediately the metal was poured into the mould, the whole was plunged into cold water and the sections of the mould removed as soon as possible so that they would not retain the heat. This would account for the gray colour of the moulds. Bricks made in North China are turned from yellow red to various gray by pouring water into the top of the kiln. The parts of the moulding cores left under the handles and under the bases of bronze vessels, as observed by the writer, are a reddish colour and not the gray colour of the sectional moulds. These have been "fired" red by continued contact with the hot metal. The moulds were removed before they turned red again.

Whether the writer's deductions as to skilling in water are correct or not, the many vessels and weapons show clear traces of surface manipulation. The feather-bone saw using No. 148 attests the annealing of the blade. No. 149 was the porous, lumpy surface of an unfinished weapon. No. 121-125 on the other hand, all show finished surfaces and some indication of the annealing and finishing process on which a hard polishing stone. Ritual vessels were finished by filing the seams and polishing the whole surface with a jade stone tumbler. This produced the skin-like surface which has taken on the beautiful patinations of age and which prevents the destruction of the metal by corrosion. Often the superficial corrosion flakes easily from the surface and leaves the original specular metal with the added glory of an oxide of the color in all shades and combinations of malachite green, azurite blue and silver gray. Traces of the same finishing processes are visible on the decorated bats of No.

The annealing process was probably meant by the expression "Tuan", as in Legge III, p. 622: "Temper your ho and your spears, Tuan hai ho nao". The root meaning of tuan is "to beat out fibres", e.g. of flax. It forms part of the graph for "satin cloth". Later, when iron came into use, tuan was used of hammering and forging iron.

1. Tuan was defined as "a stone" by both the Shuo Wen Dictionary and by the Ch'ien Commentary of the Han dynasty. Hence Legge (IV, 488) translated Sho 250.6, "and cuttered whetstones and iron, Ch'ü li ch'ü tuen," andaley rendered the verse "taking whetstones and bounding stones". In view of the evidence here adduced, a more probable rendering would be "taking whetted tools and annealed tools."

The laborious processes of annealing and grinding were reserved for implements intended for practical use. No trace of

such treatment is apparent on the ming-ch'i which were ready for the funeral ceremony immediately after casting.

In the English abstract of "Chemical Investigations of Ancient Weapons of China" by Y. Yamanti, T. Koizumi and Dr. S. Komatsu in Toho Gakuho, No. 11, Part 2, July, 1940, Kyoto, it is stated, "No signs of withering due to hammering or any heat treatment being observed afterward, we came to the conclusion that all must have been made by casting and not subjected to any workings or heat treatments". This observation is probably due to the fact that most of the weapons examined by the writers were ming-ch'i and not weapons suitable for use in war.

A passage in "The Speech at Pe" indicates that old weapons could be re-annealed. This was made necessary by the repeated grindings in the course of use whereby the edge receded into the thicker part of the blade. The metal was made ductile by heating and sudden cooling in cold water; the edge was then hammered out thin and the temper was restored by heating to a cherry red and by slow cooling.

Most Shang vessels and many Ko were inlaid with black lacquer some with white lacquer and some with turquoise. Lacquer inlay is clearly seen in both the design and inscription of tripod, R.O.M.A. NB.2616, and of Ko 54. Vitreous enamel is not found. The depressions for the inlay were cast and were not made by soldering or fusing bronze or copper partitions into position as in modern cloisonné, nor was the ground scooped out or engraved as in champlévé. The method of casting the body of these decorated portions of Ko was the same as that used in the casting of ritual vessels. The butts of Ko however, were usually inlaid on both sides to a depth of a millimetre or more so that a very thin plate of metal remained between. This is apparent in the large, turquoise-inlaid Ko 49 and 50. Great skill was necessary for such work. Ko 36, 37, 62, 63 and 80 have jade blades inset in bronze sockets with inlaid designs.

These also appear to have been cast, although modern repairs in soldered copper have been observed by the writer on some examples.

In the case of turquoise inlay, the pieces of stone were ground to fit the space exactly as can be seen on Ko 61 and on twenty-three bronze buttons in Toronto, said to be from Anyang, (A.C.M.A. NB.3997-4019). It is not possible to say whether the material in which the inlay now rests, seen in Ko 61, was an adhesive paste or merely the corrosion from the surrounding partitions of the design. Both the lacquer and the turquoise were keyed into position by pressing down the bronze partitions and thus expanding their tops. The surplus lacquer or turquoise was then ground away until the surface was perfectly smooth.

It seems probable that all the skill in technique of the bronze caster's art was developed before the occupation of the Waste of Yin. Undoubtedly changes in technique took place during the 273 years of the Shang II period. These changes have yet to be determined but our examination of the technique shows that some of the more difficult processes were used in what we consider the earliest examples. The well shaped sockets of Type VII and Type VIII are instances in point. These sockets are egg-shaped in section, narrow in front and rounded at the back exactly fitting a shaft which could be held easily in the hand. Ko 121-126, 130, 132, 133, 138, 141-150, 156 and many others all show this shape. No Shang dynasty socketed Ko has a round or crudely shaped socket for the shaft. Socketed or "holed" axes and war hammers from Lauristan and Minussinsk in the west which have been considered near parallels to the socketed Shang Ko, are not so well or so uniformly shaped. When the socketed

100

Ko was too thick and heavy at the fore edge of the shaft to be well balanced the Shang artisan compensated for this by leaving a hollow hidden inside the weapon in front of the socket opening. These delicate adjustments in balance occur in our earliest weapons. Again Ko 84, 92, 98, 113, 114 and many others observed by the writer have thin trunnions at the fore edge of the shaft just behind the ^{shoulder} of the blade which acts as stop ridge. The ^{split} shafts of Ko were weakened by ^{excessively} thick necks of metal under the two sides of the split top. Thin trunnions and a neck of bronze, thin in front, could be efficiently bound into position, but a delicate proportion had to be maintained between the thinness desired and the strength necessary to prevent breaking. Here again Ko 84 is of early date, indicating that this skill in designing and casting was developed early.

C. The Composition of Shang Bronze.

The chemical analyses of the following Shang Ko, which are listed as supplementary examples under the nearest type ko, which have been published elsewhere with photographs.

1. W.F. Collins: "The Corrosion of Early Chinese Bronzes", Journal of the Institute of Metals, Vol. XLV, 1931, pp. 53-55, (two specimens), Plate 1. 12 (Ko 138A) and 17 (Ko 70A). Analysis by Professor G.E. Buech of the American Copper Committee of the British Association. See Report of the British Association, 1930, p. 340: "The opportunity has been taken to analyse a number of Chinese bronzes of dates varying from Chou to P'ang periods." The present writer, judging from the photographs, considers that Plate 1, No. 2 and 17 are both of Shang date and not Chou as Mr. Collins believed them to be.

2. Tsuruatsu Dono: "On the Metal Ware Making in the Ancient China seen through Chemical Analysis", Jōhō Gakunō, No. 4, Nov. 1933, Tokyo. Three specimens, Plate 1, Ding or D4 (156A), Hu or D5 (41B), Cai or D6 (42B). These analyses have also been published in the Bulletin of the Chemical Society of Japan, Vol. 53, (1933), pp. 133-136, and have been abstracted in Technical Studies, Vol. 2, (1933), p. 112. The abstract by R.J.G.(atas) stated "Three halberds of the type of those unearthed at the Yin site in Honan province were analysed chemically. Specimen A (D4, Ko 156A) is nearly pure copper, containing only enough tin to be detected spectroscopically.

Specimen B (D5, 41B) contains 0.60 per cent tin, but it still must be classified as a copper implement. Although specimen C (D6, 42B) is of the same type as the other two it is technically of bronze since it contains 2.19 per cent tin. The author believes that specimen C (42B) was manufactured in the transitional period between the copper

and the bronze age and these halberds are representative of types of that late copper and early bronze period." It is noted that it makes no mention of the presence of lead, although the original report makes it clear that specimen A (156A) had 16.98 per cent and specimen C (43B) 9.36 per cent. Specimen A can not be called pure copper although the absence of tin may technically exclude that term "pure".

3. Tsunoyatsu Taro: "On the Copper Age in Ancient China III", Bulletin of the Zoological Society of Japan, IV (1934), p. 140-141, illus.; abstracted in Biological Bulletin, Vol. III (1934), p. 117.

Three specimens D8 (38A); D9 (40A); D10 (91A). The abstract reads: "A spear head and three halberds from the same site have been analyzed and it was proved that the spear head and two of the three halberds (D8, 38A) (D9, 40A) must be called copper implements. The other halberd (D10, 91A) contains 15.74 per cent tin and must be classed as a bronze implement. The existence of a copper age in China is thus further emphasized". The abstract does not mention that the lead content in 38A and 40A is 6.64 and 13.05 per cent respectively.

4. S. Onohara: "An Archaeological Observation on the Chemical Constituents of Bronze Weapons of Ancient China", Tohō Gakkuō, No. 11, part 3, October, 1940, plates 1-3. Kyoto; based on Y. Yamahiji, Koizumi and Dr. S. Konata. "Chemical investigations of Ancient Weapons of China", Tohō Gakkuō, No. 11, part 2, July 1940, Kyoto.

specimens U1 (Ko 116A); U2 (Ko 177A); U3 (Ko 121A); U4 (Ko 159A); U5 (Ko 48D); U6 (Ko 176A); U7 (Ko 144A); U8 (Ko 92D); U9 (Ko 60A); U10 (Ko 67A); U11 (Ko 152A); U12 (Ko 164A).

The present writer judges all these Ko to be genuine in date unless it be U2 (177A) and U6 (Ko 176A) which are on the border line

between Shan and Chou dynasties.

5. Through the good offices of the late Mr. Archie Crankston and Mr. Basil Gray, officer in charge of Oriental Antiquities at the British Museum, permission was granted to request the following unanalyzed analyses of fragments of Chinese bronze ritual vessels made by Dr. L.M. Moss of the British Museum, 1901 January, 1910. The analyses were made for Mr. Crankston who secured and labeled the specimens he loaned from definite information obtained at the time. All nine specimens are presented in order to complete the record although specimens P.M. 81, 82 and 83 are definitely of late Chou date. The present writer has carefully examined full-size photographs of the nine specimens and considers that P.M. 8, 10 and 13 are certainly of Shan date and that P.M. 14, 17 and 19^{MSW872} are very probably of Shan date.

1. The early Chou date of P.M. 17 and 19 may be correct for Mr. Crankston was an informed and careful observer. Chinese archaeology suffered a great loss through his death at Loug Koug, January 29th, 1941.

By means of these analyses the composition of alloys used in various types of ho may be compared with that of alloys used in bronze ritual vessels of the same date.

Chemical Analysis of Shang Ko

Type No.	Ref.	Brinell Hardness	Cu	Zn	Pb	Fe	Ni	As	Sb	S	Total
IIIA 38A	D.3		38.14	T	6.64	0.08	Nil	Nil	-	-	94.0
IIIA 40A	D.9		35.86	T	13.05	0.06	Nil	Nil	-	-	50.02
IIIA 41	D.5		97.60	0.60	0.58	0.00	0.04	Nil	-	-	98.93
IIIA 42B	D.6		83.85	2.15	5.35	0.78	Nil	T	-	-	97.03
IIIA 47B	U.18	52	83.05	Nil	10.11	1.07	0.07	4.72	Nil	0.44	99.46
IIIA 48D	U.13	34	78.70	0.13	14.09	1.12	0.07	1.65	Nil	0.22	99.98
IVA 60A	U.17	66	80.35	14.16	2.36	0.08	0.11	0.10	0.07	Nil	97.22
IVC 67A	U.19	64	80.49	14.40	2.81	0.11	0.06	0.08	0.05	Nil	93.00
VA 70A	C.17	-	79.06	10.67	T	T	Nil	-	-	-	90.33
VF 91A	D.10	-	84.92	13.74	0.30	0.12	Nil	T	Nil	Nil	99.12
VF 92D	U.16	77	79.45	16.58	1.72	0.17	0.03	0.07	0.04	Nil	98.11
VID 116A	U.1	79	89.93	3.33	0.09	0.72	0.09	0.04	0.07	Nil	99.57
VII B 121A	U.3	80	85.26	13.86	0.13	0.26	Nil	0.05	0.10	Nil	99.66
VIII 138A	C.2	-	93.30	T	T	1.70	Nil	-	-	-	95.00
VIII 139A	U.4	87	80.36	15.52	T	0.13	Nil	0.15	0.04	Nil	96.20
VIII F 144A	U.15	38	96.39	0.05	2.97	0.15	0.11	0.04	Nil	Nil	99.71
VIII A 152A	U.27	70	75.31	9.43	17.00	0.03	Nil	0.17	0.02	Nil	98.99
VIII D 156A	D.4	-	77.20	T	13.08	2.80	0.03	Nil	-	-	95.15
IXE 164A	U.23	62	38.89	7.09	4.38	0.02	0.09	9.12	Nil	-	100.59
XC 176A	U.14	70	81.52	10.50	6.94	0.23	0.03	0.26	0.16	Nil	99.69
XD 177A	U.2	100	84.33	14.71	T	0.20	0.07	0.03	0.07	Nil	99.41

CHEMICAL ANALYSIS OF RITUAL VESSELS.

<u>Date</u>	<u>Ref.</u>	<u>Cu.</u>	<u>Sn.</u>	<u>Pb.</u>	<u>Fe.</u>	<u>Ni.</u>	<u>As.</u>	<u>Sb.</u>	<u>Total.</u>
Shang	BM6	62.70	21.30	abs.	T	abs.	abs.	abs.	84.00
Shang	BM10	80.70	17.50	0.10	0.10	abs.	T	abs.	98.40
Shang	BM12	79.20	17.80	T	0.10	abs.	T	abs.	97.10
Shang	BM14	70.50	16.80	6.10	T	abs.	abs.	abs.	93.20
E.Chou	BM17	75.80	12.20	8.80	T	abs.	T	abs.	96.80
E.Chou	BM19	75.10	11.50	10.30	0.10	abs.	T.	abs.	97.10
L.Chou	BM21	61.10	14.70	16.20	1.50	0.10	T	T	93.60
L.Chou	BM24	59.80	7.10	30.50	0.20	0.10	T	T	97.70
L.Chou	BM25	75.70	13.90	3.10	0.50	T	T	T	93.20



2578-11-1

The twenty-one Ko may be grouped in four classes according to the composition of their alloys. In the opinion of the writer these alloys were mixed purposefully with due regard to the intended use of the particular weapon. From the chemical analyses of these alloys it may be possible to trace the sources of the tin, copper and lead ores used and to determine the status of the bronze industry at Anyang when King 'aa Ken moved to Yin.

The four classes of "bronze" are:

1. Tin-copper-bronze alloy as in 70A, 91A, 116A, 131A, 139A and 177A. This bronze was used for ko which were to form part of ritual sets and which were probably cast from the same "mix" as the associated ritual vessels (see IM 8.10.12). Such ko were used in ritual ceremonies where beauty was required but they were also strong and sharp enough for use in war. The Brinell hardness varied from 80 to 100.

2. Lead-copper mixture, as in 38A, 40A, 42B, 47B, 48B and 150A. These were king-ch'i, 'carried' by the escort at funerals and buried in the tomb. Lead was intentionally used as a cheap substitute for tin. The resulting weapons were too soft for use in war. Brinell hardness varied from 31^{to} 52.

3. Tin-lead-copper alloy, as in 60A, 67A, 92A, 152A, 174A, 176A.

This bronze appears to be somewhat similar to the pure tin-copper alloy of Group 1. It is of the same composition as ^{The metal or} ritual vessels with lead content such as IM 14, 17, 19. The addition of lead facilitated the uniform casting of those sets. It seems possible that old vessels were recast by adding lead to the earlier ^{and} pure tin-copper mix. These Ko were used in ceremonies. Brinell hardness varied from 62^{to} 97.

4. Impure copper in 138A, 144A and 41B.

The socketed Ko needed tensile strength. Only sufficient tin, lead or iron was added to secure a good cast. Ko 41B, while containing only a small quantity of tin and lead, must be classed with the lead group (2), for it is cast in the same min-ai'i mould and the blade is too thin to have been useful. The Brinell hardness of 144A is only 38 so that while it is a tough weapon it is not hard.

It is possible to learn more about the bronze technique of the Shang dynasty from a detailed study of these four classes of alloy than from later literary sources.

(Class 1.)

The tin-copper bronze alloy (Class 1) is the most important because the Ko and ritual vessels made from it are among the earliest Shang types known. This bronze is an almost pure tin-copper alloy. Ko 70A, 91A, 121A, 139A, 177A contain from 14 to 17 percent tin; Ko 116A has 3.23 percent. The small quantities of impurities must be assigned to the tin and copper ore/^{matrix}. A large lump (18.8 kilograms) of malachite, a copper oxide ore containing spots of hematite, (iron oxide), was found by the Academia Sinica at Anyang.¹ This, no doubt, had been rejected during the "ore dress-

1. Anyang Report, IV, pp 681 and 696, Plate 1.

ing process. It shows the nature of the ore used. This ore produced in its purer form a copper with 0.1 percent iron. There is a record in the Anyang Hsien Chih, Vol. 5, which quotes the Yeh Ch'êng statement that "Copper mountain, T'ung Shan, is 45 li (15 miles) north-west (of Anyang city). Copper was mined there in ancient times". The writer has visited this area and heard local stories of ancient mine shafts at the village of T'ung Yeh which means "Copper craft". These ancient mines have not been explored.

41

The rejected ore found at the waste of Yin, together with the large pieces of slag and the charcoal also found there¹ indicate

1. Anyang Report IV, p. 696, pls. 3 and 4.

that some copper was smelted at Anyang. The writer once secured at Anyang an ingot of copper in the form of a truncated cone² about

2. This was lost in 1927.

five inches in diameter and two and one half inches thick. ^{may be taken} This is evidence that the copper was smelted separately. Some copper ingots may have been imported from a distance. The Academia found ingots of tin in the ruins at the waste of Yin.³ Members of the Geological

3. P. Teilhard de Chardin and C. J. Young, "The Mammalian remains from the Archaeological site of Anyang", Palaeontologia Sinica, Series C, Vol. 12, Fasc. 1; Hankin, 1936, p. 56.

Survey of China, in referring to this material, state "An extensive trade between Anyang and southern China is proven by the discovery in the ruins of the city of ingots of tin". They are not likely to have made such a statement if there had ^{been} any knowledge of deposits of tin nearer Anyang. The early tin routes from far south_n China, where tin is mined, to Anyang in north China should be searched out. The writer believes they were cut off and discontinued shortly after the conquest of Shang by the Chou dynasty in 1033 B.C. The south land was known as Chin Ch'u State. Many inscriptions on early Chou bronzes tell of the wars against the south. The state of Ch'u was labelled barbarian. The "Elegies of Ch'u" are filled with early Shang dynasty tradition. The state of Ch'u seems to have restricted access to the supply of tin and copper for bronze. In 642 B.C. the eighteenth year of Duke Hsi, the Tso Commentary records: "When the Baron of Cheng first paid a court visit (of allegiance), Ch'ao, to the State of Ch'u, the Viscount of Ch'u, Ch'u Tzu, gave



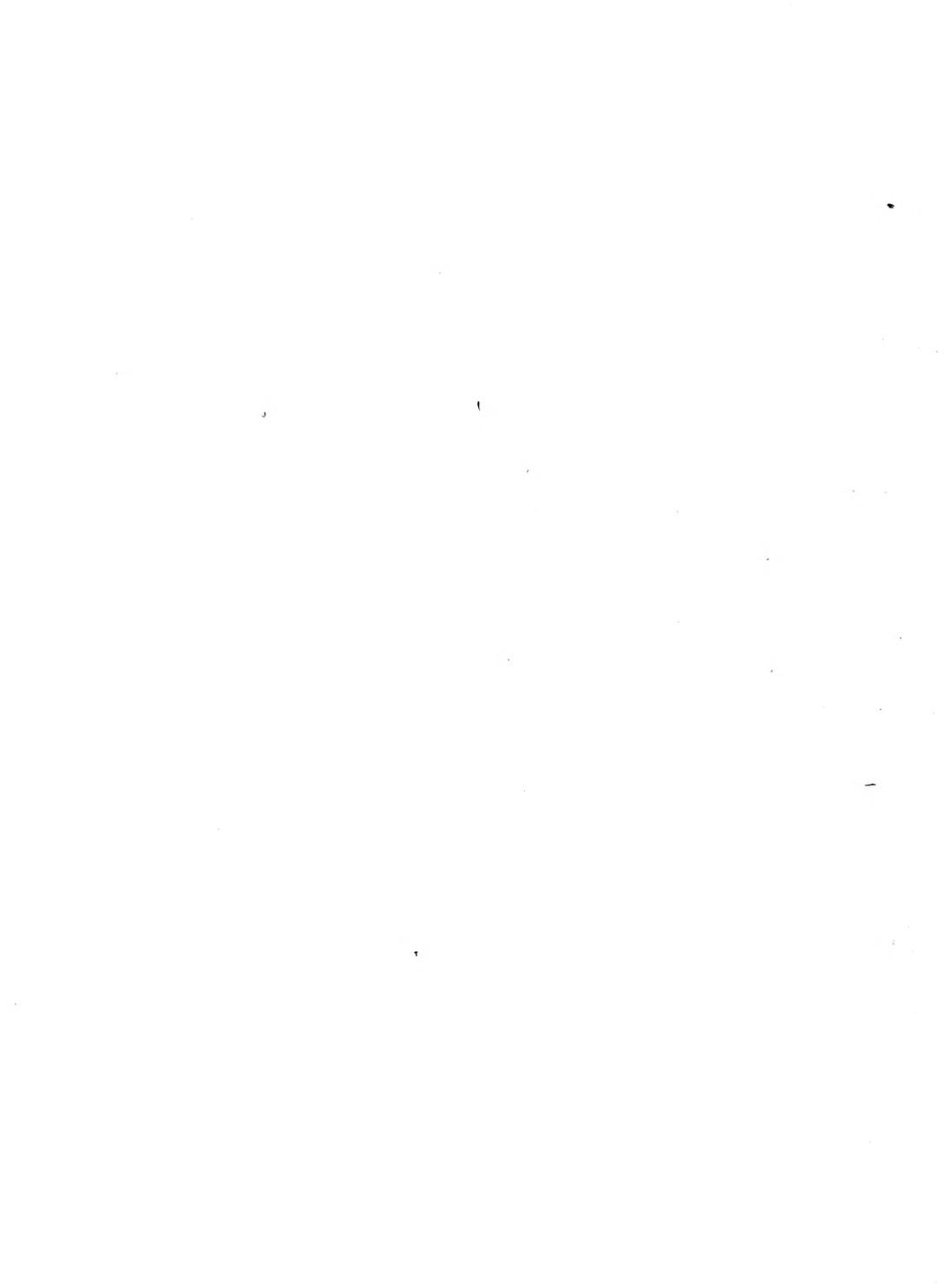
him metal, chia, as a present. After he had done so, the Viscount repented of it and made a covenant stipulating, 'It is not to be used to cast weapons, ku i chu iku'. For this reason the march of Chien cast three bells from it".

This historical reference to the attitude of Chu regarding the export of metal from the south is illuminating. Metal was very scarce in the north. About 450 B.C., for instance, when Viscount Hsiang of Chao, Chao Hsiang tzu, was living at Chin Yang (near present day P'ai yuan, capital of Shansi province) because of Tung An-ya he took the copper pillars, tung chu, of the public palace, Kuang Jung, and made them into arrows¹. When the first Emperor of Ch'in united

1. Records of the various states, Shan Kuo Ts'ie, Chao state. the six states under his sway, 221 B.C., he gathered together all the weapons in the country, Shien hsia chin ping, and melted them down to form twelve bronze man². These and many other references to the

2. Shih Chi history, Shih Hsien Ti ren chi section. melting down of old bronze in late times are common knowledge. But it is not realized that the source of bronze in the Shang dynasty was quite different and that the metal was then *obtained* by the importation of the raw materials.

The analyses of Shang dynasty tin-copper bronze are of primary importance for a study of the original sources of the raw materials. When the early mines are discovered we must search their neighbourhood for the location of the earliest Chinese metal working furnaces and casting shops. The earliest Chinese bronze work at present known consists of the Ko and the ritual vessels. These are so distinctively the product of Chinese culture that this writer concludes that the metal work of China is of indigenous origin and not an art imported



even in a primitive phase from the ancient Near East, even though bronze was in use there more than two millennia before the occupation of the Waste of Yin.

The sources of tin and copper seem to have been accessible to the Shang people from the beginning of the Shang II period (1311-1200 B.C.), which is the probable date of no 70, down to the end of the period, (1038 B.C.), which is the probable date of no 177. A pure tin-copper bronze alloy was used for most of the more important bronze ritual vessels and the war no 6, belonging to the same sets. The composition of the bronze seems to have been much the same in the ritual vessels and in the weapons. The analyses of no 70A, type V, made by Professor Desch for Mr. Collins, of no 139A, Type VII, made by the Japanese scientists for Professor Unehara, as well as of the ritual vessels no 6, 10 and 12 made by Dr. Moss of the British Museum for Mr. Archie Rankston and by Professor Carpenter for the Academia Sinica all yield an alloy of 17% tin or a proportion of about five parts copper and one part tin. This appears to be standard. Some other Chinese ritual vessels resemble in their composition speculum metal which contains 32.78 percent tin.

More analyses of important Chinese bronzes should be made, *but such* should not be restricted to broken fragments of poorer objects. When this is done a ^{complete} more _^ picture of Shang dynasty metal work should be possible. Even now we have more reliable evidence for the composition of Shang bronzes than ^{has} seems to have been available to the author of the 'ao Tun Chi which reads: "There are six classes, chi, of metal alloy, chih. Six parts copper, chi, and one part tin, nsi, is called bell-and-tripod-class metal alloy, Chun-ting chih chi. Five parts of copper and one part tin is

^{end-} called socket-axe-and-adze tool class, fu chi chi. Four parts of copper and one part tin is called Ko-and-chi-weapon class, Ko Chi chi. Three parts of copper and one part tin is called great-blade or sword class, ta jen chi. Five parts of copper and two parts tin is called knives and killing arrow class, hsiao sha shih chia chi. Copper and tin one half each is called mirror reflector class; chien sui chi."

These proportions have given rise to such discussion. In Anyang Report, IV, pages 679 and 693 the proportion five to two is interpreted as 40 per cent tin, that is two parts out of five. The proportions for Ko, four to one, is given in the Report as 25 per cent or one part out of four. An ordinary artisan, however, would more likely have taken five units of copper and added them to two of tin, so that the tin would have been two parts out of seven or 28.57 percent; while the amount of tin in the class of alloy used for Ko would have been one part out of five or 20.00 percent.

The six classes of metal alloy according to the K'ao Kung Chi should be:

	<u>Copper</u>	<u>Tin</u>
Bells and tripods, <u>Chung Ting</u>	85.71	14.29
^{End-} Socket axes and adzes, <u>Fu Chi</u>	83.33	16.67
<u>Ko</u> and <u>Chi</u> weapons, <u>Ko Chi</u>	80.00	20.00
Great blades (swords), <u>Ta jen</u>	75.00	25.00
Knives and arrows, <u>hsiao sha shih chia</u>	71.43	28.57
Mirrors and reflectors, <u>Chien sui</u>	50.00	50.00

One may judge the age of the K'ao Kung chi by this table of alloy specifications. The very names of the objects place it at the end of Chou III period, because mirrors, chien, reflectors, sui, swords ta jen, and the chi weapon are all imitations into China, ^{most of them} dating after 300 B.C. The poorest alloy mentioned is

for bells and tripods. In the earlier Chou and Shang dynasties tripods were the most important objects and ^{Show} a high content of tin; *clapperless* bells, shung, were ^{and on bell} not common until Chou II, 770-481 B.C.

These tables of the K'ao Tung Chi have been taken too seriously by students of bronze technique.¹ The text is clear but it gives

- 2. Tetts in Lambergopoulos Bronzes, p. 34 presents no portions different from those of the K'ao Tung Chi and attributes them to Biot's translation. They are quite wrong for they link the name of each alloy to the proportions of the one following.

almost no clue to the metal lurgy of the Shang dynasty except to suggest the mixture of metals and not ores. It also uses one word, in, hsi, to cover all the metals added to copper. These include lead, iron, nickel, arsenic, antimony and, at a later than date, zinc. The word hsi, translated "tin" is often used in classical writings and bronze inscriptions as a loan word for the homophone "to give" or "bestow". Thus the original meaning of hsi seems to mean "That which is added". It covers both tin and lead and also other metals such as nickel, arsenic, antimony, added to copper to make bronze. The Lu Chia Chia records, "Copper is soft, tin is soft, unite the two softs and they become hard". Other texts which appear to offer clues to the understanding of bronze-casting technique are also vague and unsatisfactory. This writer, therefore, believes that the proper method of research is to examine objectively all the traces of early technique on the objects themselves and in the archaeological strata where they are found. When this data has been studied, we may then seek to construe ancient texts in the light of archaeological facts rather than vice versa.

The results achieved by the Shang dynasty metal workers show a mastery of technique but the reading of ancient texts, ^{such as the Kao Tung Chi} leads only to confusion about the methods used.

Class 2

The metal of Class 2 is a "mixture" of lead and copper₁ with *little or no impurities added.*

1. The word "mixture" is used out of deference to those metallurgists who restrict the use of the term bronze to a tin-copper alloy.

alloy. Huei Man tzu in the section on lessons from the customs of the state of Ch'i, Ch'i Hsu hsdn, says, "Lead must not be used in making blades", Ch'ien pu k'o yi wei jen". Lead was considered "black tin". The yu n'ien dictionary says "lead is black tin", Ch'ien wei ho hsi. The whole question of nomenclature for metals is very confused not only in China but also in western languages right down to modern times. It would be quite wrong to judge from the confusion of terms used for metals in classical and Han times in China, that early metallurgists could not distinguish between tin and lead. Lead was apparently cheap. Many ming-ch'i ritual vessels, such as ^{the} lead goblet, chi, R.O.M.A. NB.2722, have been found at Anyang. The objects listed in this class contain from 7 to 18 percent lead and no tin. Ho 42B is an exception to this since it has 2.19 percent tin. This can be explained as the tin content of older scrap metal used. 41B also has a very small content of lead (0.58 percent) and tin (0.60 percent). These two metals even in this quantity are assured an easy flow and cast. We may suppose that all these specimens were made of poor cheap scrap material. 47B and 48D have an arsenic and sulphur content. The Japanese analyst suggests that the addition of arsenic sulphide indicates a "magic" use of orpiment or realgar both of which were often used by Han dynasty alchemists. This writer considers that the lead ore matrix had arsenic sulphide mixed with it and that the sulphide was not entirely removed in the "ore dressing" since the material used was cheap. Some of the ore apparently, contained

also small quantities of nickel and antimony.

In this writer's opinion, the chemical analyses of these two classes, the tin-copper bronze and the lead-copper mixture give us the data for identifying the ore bodies which supplied these materials. The sources of copper are common to both these groups but the tin and the lead are quite separated in the early Shang dynasty specimens. ^{Class 3.} ^{Class 3} later, for ^{Class 3} ore waste was used, ^{Class 4.} ^{Class 4} the impure copper of Class 4 offers no clue as to its source as yet. ^{Class 4.} ^{Class 4} the content could not so easily be assigned to its source. ^{of the tin-copper bronze}

An examination of ^{Class 1} suggests several observations:

1. The copper came from malachite, i.e. copper oxide ore with which some iron oxide as hematite was associated. This beautiful green and blue ore would be easily recognized. Some of the copper used no doubt originated ^{near Anyang} in the north as we learn from waste materials discovered at Anyang. On the other hand, we have ^{reports of} mineralogical ^{reports of} the existence of similar copper ores in the south in the vicinity of the tin where we must suppose the bronze industry to have begun. These copper ores were not sulphides but oxides which were reduced in charcoal furnaces.

2. The tin in these Shang bronzes seems to derive from a very pure ore body, possibly "stream tin" such as is common in the far south. This tin was shipped north in ingots. No tin deposits are known in the north. The mines in the Altai mountains do not seem to have been the source of any Shang tin. Some of the tin-copper bronze Mo (116A, 177A) contain small quantities of nickel; some do not (70A, 91A, 121A, 139A). It should be possible for expert mineralogists to determine where this tin originated.

An examination of the lead-copper "mixture" of Class 2 suggests:

3. The lead ore body apparently is associated with some orpiment or realgar, i.e. arsenic sulphide. No doubt this was

excluded from the better articles but cheap, min-qi did not require great care and so these materials, which did not hinder the flow in the moulds were tolerated. Had it been included for its magical powers, it would no doubt be found in other than the poorest min-qi.

The traces of nickel and antimony and the minute quantities of gold and silver found by Lo seem to have been mixed with the lead ore.

Tests for zinc, according to Dr. Ross, had negative results. Zinc was not used until the Yan dynasty although Chinese Pan was imported into Europe ^{in 18th century} and had a content of copper 40.4, nickel 51.0, iron 2.6, and zinc 25.4 percent.



THE DECORATION OF THE BOWTIE ON BRONZE

Animal style formed the basis of all Shang Dynasty design. Foliage and flowers had no part in it.¹ Shang Dynasty animal

1. The so-called plantain leaf or "blade" is in reality an isosceles triangle projected upwards or downwards into the plain spaces ~~an~~ the bronzes. These triangles are filled with conventionalized animal forms and scrolls of the cloud or thunder patterns. The square or angular "scrolls" are called by the Chinese thunder patterns, lei wen, and are supposed to represent the rumbling and crashing of thunder as well as the flashing of forked lightning. The rounded scrolls are called cloud patterns yun wen, and are supposed to represent the whirling storm or the misty floating clouds. When these scrolls are united in bands they may be called a meander in English, but to the Chinese they still remain cloud and thunder.

style was not like the later Scythian animal style, which depicts the hunted animals of the northern steppes and their cruel struggle for life.² The conventionalized animal style found on the decor-

2. Branches of this same art are called Sino-Siberian and Ordos. Among the most striking and frequent motifs are fighting stallions, animals biting each other in combat, the vulture, the wolf, rows of deer on the horizon, the ibex, the goat and the ox.

ative bands of design on most bronze ritual vessels of the Shang Dynasty reflects the memories of a still more ancient past, when these animals were more naturalistically portrayed.³

3. Animals were often pictured naturalistically on the Shang Dynasty gravy-boat-like bronze vessels called hu. See the elephant on the A.O.S. example NB.4027, Wang Trübner, Yu and Wang, Berlin, 1929 and other examples scattered in various collections. Shang Dynasty wine ladle NB.4024 has pairs of tigers, elephants, water buffalo, deer, snakes, boar, hare and birds placed in realistic apposition on the grip of the handle, and a selection of three of them (tigers, water buffalo and deer) placed back to back on the base that adjoins the bowl. Nestled at the bottom of the ^{top group} is a very lively horned dragon in high relief.

were depicted as restful, but powerfully alive, enveloped in a background of whirling cloud and rolling thunder patterns. The dominant feature of the style was exaggerated round eyes of the



animal, which were often shaped like the stylized human Chinese eye.¹ These eyes look out of the design as a tiger might look out

1. This eye is a common graph in Shang Dynasty inscriptions on oracle bones, and bronzes, where it means the servant or minister who keeps his eye on things for his master^{the king} of his lair at a man. The artist was so absorbed in the eyes and fore part of the beast that the body behind the eyes, jaws and fore legs was always subordinated and often omitted. The animal face was so conventionalized in the Shang Dynasty that it was difficult to identify what type of animal was intended.² The face of the

2. This design has often been called a mask, but the eyes convey the impression of a living animal and not the inanimate skin of a dead one. The writer prefers to call it an animal face; shou mien; since the Sung Dynasty To Lu T'u was published ca. A.D. 1125, Chinese authors have used the term t'ao t'ieh to describe this animal face. This name was apparently based on a wrong interpretation of a chance description of a design on a bronze tripod mentioned in the hi Shih Ch'un Ch'iu compiled under the supervision of Tu Ch'woe (280-235 B.C.), a thousand years after this Shang Dynasty design was common. This description of the design describes a man being devoured, a parently similar to the motif on the Sumitomo wine pail figured in the London Exhibition Catalogue No. 238, or its companion in the Cornuschi Museum, Paris, No. 243. This same motif is found on the handles of kuei, the legs and handles of kuang, and elsewhere. It is quite distinct from the animal face on the decorative bands of design found sometimes on these same vessels and now popularly called t'ao t'ieh by both European and Chinese writers and collectors.

tiger seems to have been dominant in the mind of the artist, but the horns, ears or snout of other animals were also present in variations of the theme of decoration.

The design did not portray the features of any particular animal, but the great eyes rather produced the feeling of the powerful throbbing life common to all the great animals and birds that surrounded the artist originator in his early Chinese environment.³ Shang Dynasty sites producing typical Shang bronzes have

3. These great animals were the tiger, the elephant, the water buffalo, the dragon, whose body seems to reflect the crocodile, the python or boa and other smaller snakes,

the owl, the eagle with hooked beak, the rook or common bird and the pheasant or phoenix with its elaborate tail feathers. The ox, the ram, the wild boar or pig, and the swan, deer were animals slaughtered for the ceremonial feast whose free heads protruded from, rather than formed part of, the tracery design on the vessels. One must add to these the tortoise, the frog, the tadpole, the silk-worm, the cicada, several varieties of fish, the bear, the hare, the monkey, the horse, mule or donkey, for these animals are found on small ornaments made of jade or bronze. The Shang artist was not restricted in his repertory of animals, but the habitat of these animals, reptiles, birds and fishes calls for a warmer and wetter climate than is common now in the dry and dusty region of Anyang, which Dr. V. L. Ting (see Bibliography general) of the Geological Survey considered to have much the same climatic environment in the Shang Dynasty as it has today. If this be true then we must look much farther south for the habitat which produced these animal designs. See Han Yu (AD 768-824)

"The sacrifice to the crocodile", trans. Evan Morgan, *Wen's Styles and Chinese Ideals*, Shanghai, 1912, edit. 1931 pp. 112-115. Giles' *Biog. Dict.* pp. 254-256. Written at Ching-shan north of Swatow

not yet been discovered along the Yangtze river south of it, but the writer considers that the designs common on the Shang bronzes reflect memories of this area. Chü Yuan's poem "The Greater Calling Back of the Soul", Ta Chao, written about 300 B.C. describes "the south" in contradistinction to the east and west and north, which he also describes. The writer was then resident at Chang Sha, or near Hankow. I have translated one verse freely, yet with due regard to the animals and climatic environment:

"Oh thou my soul, thou must not wander to the south,
 The south's a flaming fire O.
 For full a thousand miles of slithering, sliny, serpent's way
 It stretches on and on O,
 O'er mountains high and forests deep and dangerous precipices steep,
 Tigris and panthers prowl O.
 Here goblins, ghouls shriek, and short fox fairies flit,
 Ling python lifts his head, O.
 Oh thou my soul, thou must not wander to the south
 Where vampires spit disease, O."

This southern animal habitat described in words 300 B.C. is very similar to the one depicted in the Shang animal design on the flat bands of decoration of the bronze ritual vessels. The

writer considers this highly conventionalized animal style of decoration to be handed down from a period previous to 1111 B.C. while the free style animals on the wine ladle and small bronzes represent animals copied direct from nature. The horse heads of the Shang dynasty horse jingles picture the horses living at Anyang 1311-1039^{bc}. They do not form part of the conventionalized animalistyle. The tigers, panthers, elephants, water buffalos, pythons, snakes, crocodiles, alligators (dragons), cock fowls, pheasants (phoenix), owls and other animals, birds and reptiles that combine to make up the conventionalized animal patterns with the decorative designs, were taken from a southern climate.¹ The

1. The word south has three distinct meanings or usages in literature. In Chinese classical literature written from the point of view of Sian or Loyang, south always meant the area north of the Yangtse valley. Somewhere in late classical times, 500-200 B.C., south was very vague, and seems to have meant all states south of Loyang and the Yellow River. In early European literature south China meant Canton in contradistinction to North China, which began at Shanghai. In recent times when school geographies are common, Central China means the Hunkow-Chang area together with the Yangtse valley. North China means the territory north of the Yellow River in particular, and South China the provinces of Fu Kien, Kwang Tung, Kwang si, Kueilin and Yunnan, the latter being often included in West China, and not called south. In the writer's opinion the climatic habitat of the Shang conventionalized designs was south of the Yangtse valley area, but Chinese classical references to "the south" are properly interpreted as any territory south of the Yellow River basin. See *Chün ku Lu* 3.1.14 for ^{the} bronze inscription mentioning the south country for ^{the} *DRAC* 174, secp 25. This was probably Chu state.

des gns on the butts of the Ho used in the ritual, especially types III and IV, were similar to those on vessels used in these ceremonies. The full face of the animal design on the vessels divided down the middle in such a way that each half was complete in itself and portrayed the animal from th side. These complete half designs each filled one section of the mould used for casting. Four or six sections of this mould placed nose to nose and tail to tail formed a complete round of two or three animal faces.

The designs on the moulds for each side of the butt of the Ko were similar to those on the vessel sections, but the outline was adapted to the shape of the butt. The nose or open mouth of the animal and the beak or claw of the bird were so oriented as to face the shaft of the Ko when hafted, and leave the impression of the blade issuing from the design.

This peculiar conventionalized animal design filled every part of the area to be ornamented with linear curves and scrolls. The graceful lines were equally spaced to permit the inlay of bands of lacquer or turquoise mosaic. The distinguishing feature of Shang Dynasty design was a sense of line effect, which appears perfectly free from restraint in spite of the rigorous controls exercised by the medium used and the shapes of the butt of the Ko. The artist craftsman knew his materials and used them to preserve in unalterable form the beauty of his line. There was such an affinity between the lines of design and the script on the bone and bronze in the Shang Dynasty that it seems evident they were drawn by the same persons. The diviners were the writers, the writers were the historians, and the same writers of script were also the artist designers who carried the memories of the animals in a more luxuriant climate into the ornamenting of the bronze ritual vessels and ceremonial Ko which were used in memorial services for their ancestors.

The decorative designs on the butts of the Ko were much more restricted in scope than those on the bronze ritual vessels and other objects found at Anyang. Animals depicted from nature are rarely found on them.¹ On ceremonial Ko Types III $\bar{1}$ and IV the

1. The horse on Ko 117 is a name graph, not a design. A horse head occurs as a knife handle finial and on harness jingle ends. These horse heads have not been found on Shang Ko.

animal designs were of the conventionalized variety, compressed into the shape of the butt. The designs retained a lively realism suited to the ritual symbolism of the war dance, Ja wa, or court ceremony. Designs similar to those on the Ho are found on carved bone hairpins from Anyang. The relation of the decorated part of the hairpin protruding from the wearer's head to the pin inserted in the hair is similar to that of the decorated butt of the Ho to its blade. The vigorous design of the coiled dragon on Ho 49-52 is also found on bone hairpins from Anyang. The blade or pin is held between the exposed teeth and proceeds out of the dragon's mouth.¹ The word pro-

1. The dragon, lung design appears to the writer to be inspired by the crocodile. These monsters were still rampant at Ch'ao Chou Fu in Kiangtung province north of Swatow ca. Lat. 23°, Long 117° when Han Yd was magistrate there ca. A.D. 820. The writer has seen the mugger (Giles 3888, in the ponds of Indian princes. His movements in the water and his wide open jaws, devouring the large pieces of meat thrown to him by the keeper, suggested the dragon design on Ho Nos 49-52. The presence of the crocodile in the south land was well known in ancient China. In the Han Dynasty an ambassador was sent to Fan Hsun, king of Fu Nan, a country occupying the lower basin of the Mekong river in the region of Saigon, Indo China. The king had crocodiles in a pond in a valley. It was believed that they had power to distinguish guilty persons from innocent ones. The crocodiles devoured the guilty alive but merely rubbed the innocent with their noses and allowed them to go free. The record says that crocodiles measure 30-50 feet (1 foot Han measure corresponds to 231 mm.) They have 4 feet like a house lizard. See Tao Lung p. 233. The blade of the Ho with the dragon design brings death to the guilty in the same manner as the crocodile in the pond. On the oracle bones the word 'to punish', fa, depicts a Ho striking the neck of a man. Dragon designs changed as time went on. J.C. White, Tomb Tile Pictures of Ancient China, plate LXXI and LXXII, appears to depict the dragon described by Han Fei Tzu (280-233 B.C.). In his book, Chapter III near the end, he says "Now the dragon is a reptile so gentle that he may be patted and mounted to ride. Nevertheless underneath his throat are contrary scales which stick out a whole foot. If anyone knocks against them the dragon will certainly kill that man. Dictators of men also have contrary scales. If a scholar can discuss without knocking against the contrary scales of the dictators of men he must be astute indeed". The "contrary scales" are depicted on Plate LXXI; the rider on plates LXXI and LXXII. This dragon was still a killer of men when angry but had lost his original crocodile-like body, as pictured on the bronze designs of the Shang dynasty or in the oracle bone script (variation 1) Meng-pies 660; 3236, Ch'ien-tien 4.54.3, 5.38.3; Hou-pien 3.6.15; Ching-hua II.3; Chien-shou 5.15. same as Hsu-pien 1.31.5; Shih-yi 1.5; F'ei-pien 466. Three other forms have been identified with dragons which

seem to the writer to represent different graphs. Variation 2, Ch'ien pien 6.19.5; 6.43.3; 6.59.4 same as Hayashi 2.25.15; Shih-yi 3.7; Hayashi 2.23.17; Ts'ang kuei 109.3 same as Hsu pien 6.25.6 and joins Hsi pien 3.33.6, same as T'ien-jang 88. Chien shou 8.12. same as Hsu pien 5.25.5; 46.3 same as Hsu pien 5.25.5. Ts'ui pien 1231; 1260. Variation 3 Menzies 127 1409; 1861; 2138; Ts'ang-kuei 62.3; Yi-ts'un 234; 907. Variation 4 is crowned with the graph "to judge and punish" hsing Menzies 2143; Ch'ien pien 4.25.3; 4.29.4; 4.54.1; 4.54.2; 4.53.4; 7.21.3; Hou-pien 1.9.5; 1.30.5; 2.33.4; Ts'ang kuei 105.3; 163.4; Yenching 30; 34; 590; 646; Yi-Ts'un 386; 747; 973; Shih-yi 5.5; Hsu-pien 5.20.2; Chien-pien 6.46.2 and Yi Ts'un 958 picture this dragon led by a hand placed at its head. Other graphs into which the dragon of variation 4 enters are Kung "with two hands below" and piang "under a roof". These appear to be place names.

Ko 53 depicts an eagle or an owl standing on the butt as though the blade were held in its talons. The head of the bird was pointed away from the blade.¹ The other bird motifs were disposed on the

1. Because this Ko had a semblance of tassel prongs it was classified as Type III c.

butt in such a way that the blade appears to symbolize the striking power of the beak or claw. The head of the birds face the blade. The cock-fight which is now so common in China, Indo-China and all the Malay peninsula was well known in the Shang Dynasty. This suggests an interpretation of the 3 different bird designs grouped under Type IV as subtypes A, B and C: (1) Type A (Ko 54-60) and Type VIII D (Ko 156); a cock with claw outstretched below the beak: (2) Type IV B (Ko 61-64); a cock with claw upraised in front of the head, with faces the blade: (3) Type IV C (Ko 65-68) a cock with claw upraised in front of a head turned away from the blade. All 3 designs are attitudes assumed by cocks in combat. They seem to symbolize victory and the death of the enemy.

The writer considers that these 2 designs, the dragon and the bird, do not represent a male and female symbolism. This idea came into Chinese thought with the dualistic Yin Yang school in the Warring States or Chou III period 481-206 B.C. The bird represents the the struggle between equals combatants in the cock-pit, while the dragon-crocodile suggests the justice and power of the great animals carrying out the will of over ruling Nature. The designs also indicate the dread in which such animals were

neld in a tropical land like the tin country of south China and the Malay peninsula. The horned python on Ko 157, a design well known also on Shang ritual vessels, adds another killer from the south.

On the square butts of flat socketed ^{of} Ko, Type V and Type VII there are full-face ^{animal} masks (Ko 88, 92, 133). These are usually grouped under the title P'ao-f'ieh, often translated "glutton". Giles, Dictionary, ll 159 suggests that "the face of an animal and no body on bronze vessels is to be interpreted as a warning against "gluttony". To the writer these masks whether of tiger, ^{water} buffalo, ^{or ox} dragon or python appear rather to represent "devourers" bringing death.

The most common type of design on funereal ko is found on Type IIIA, e.g. Ko 34-46. Compare also the butt of jade sickle No 5. The writer has called this a three-animal design. It pictures the head of an elephant with monoloid eye, curved trunk, tusks and open mouth; below this appear the wing, foreclaw and tail of a headless bird seated upon the horizontal shaft of the ko. On the top of the elephant's head a tiger head with pointed ear faces ^m the opposite direction from the elephant's trunk. Above these again are two tassel prongs which have no symbolic connection with the design. ^x [Traces of the tassel may be part of the encrustation on Ko 39]. Many Ko with this design have been very poorly cast and the elements of it have not been clear but ³⁵ Ko 36, 37 and other similar ko now recorded here clearly show the ^{different} parts of these three animals.

The significance of this design on many ling-ch'i Ko seems important for the symbolism used in funeral rites. The writer has not been able to find any straight-forward and satisfactory interpretation. ^{in Chinese literature} The design is found clearly portrayed on Ko 35 which is

inscribed with the two graphs "the great rainmaker", ta yu. The set of vessels and weapons similarly inscribed has been discussed under Ho 35. The date is apparently about 1300 A.D. The origin of this custom must be very early, possibly before the formation of the taste of tin in China. It has been over a thousand years after this the Li Chia Chia Chia section Li Chia Chia records "upon the mountain of ... er was a great ... t'iao t'ieh. It had a head but no body. It was devouring a man but had not swallowed him down, when destruction reached its body. San tin and t'iao t'ieh, yu shou yu shou, shih jen wei yen, hai chi chi shen". The design on Ho 35 and on all of type IIIA fits this description. The devourer without body is the elephant, the devourer is a bird, not a man; the tiger on the head of the elephant brings destruction to its body.

This term t'iao t'ieh seems to have been associated with the tradition of an ancient people in China called the "Three Sprouts" or San Miao. Tzu-t'ung Dictionary, p. 2467, quotes the comment on San Miao in Wei chih tzu, shu yu section: "t'iao t'ieh means the posterity of the three tribes san tsu who are therefore called the

"Three Sprouts" san miao." The Tzu t'ung also quotes under t'iao t'ieh two words of somewhat similar sound ^{tsao-pai} from the Classic of Document 38, "Numerous Regions To tsao-pai" ^{Asia daily honoured the devotees of the people} cf. Legge II, p. 147

1. Yu Index no. 1100-39 gives the two Chinese characters.

translates "(Asia) daily honoured the devotees of the deity." This document belongs to the beginning of the Chou dynasty. The inscription (hou i-ti B.20.16) dating about 1200 A.D. records the words "order the three tribes san tsu". All this suggests that the idea of t'iao t'ieh, ^{meaning} as a cruel devourer associated with three tribes san tsu of the Chou dynasty ^{and} relates to some symbolic



meaning of the three-animal design on Ko 34-49 of Type IIIA.

This design may have to do with three tribes of the ancient east such as the elephant tribe devoured the bird tribe and was in turn destroyed by the tiger tribe. All three tribes have remnants left which are called the "three sprouts" or San Miao. In the Chou dynasty the San Miao were and may be totemistic in its symbolism. The design may only ^{not of Chou race.}

symbolize the devouring of death. The term ^{Tiao Tieh} has been very much misused by scholars in descriptions of these animal masks. The tiao tieh devouring on bronze ^{of bronze} vessels is much more vividly pictured. ^{than simple masks.} It is found on the handles of bronze ritual vessels. The so-called "Chou hook" often shows the claw and tail of the bird being devoured. The body and wings of the bird form the handle. The devouring head is sometimes an elephant but more often it is another animal. Some of these ritual vessels have early Chou dynasty inscriptions. This does not indicate that this devouring design begins in the Chou dynasty but points to the continuation of the design from early Shang II into the early Chou dynasty.

We must, however, look to the Shang dynasty culture complex for the origins of this three animal devouring design in Chinese art. The ideas expressed were symbolic and not realistic for the elephant is not carnivorous. Ko 36, 37 and sickle 5 have jade blades with this three-animal design on the butt in bronze inlaid with turquoise. These were fit for ceremonies in the royal court as were the elaborate ritual vessels having handles with similar design. The fear of animals is often vividly portrayed in the collection of southern poems called the Epics of Ch'u, ^{Ch'u Tzu} and it is to this southern region we must look for the atmosphere of the symbolism. Here too, is the traditional home of the ancient San Miao.

The square butted Ko of Type V and Type VII are often

inscribed with the graph of the owner's name. A pair of small dragons with open mouths facing ^{toward} the blade are placed on each side of the graph as in Ko 73, 82, 127, 131 and 131. Headless dragon ^{forms} flank the graphs on Ko 72, 75, 76, 79, 81, 83, 84, 132 and 133.

Triangular Ko 168 presents an intricate design in various planes which is a three-dimensional puzzle task. In the design are two dragons, lung, viewed sideways, with ^{water buffalo or ox} bos occupying the middle portion of the design. The whole ensemble suggests the tiger mask.

Ordinary Shang dynasty full face mask ^{on ritual bronzes} can be divided into two halves down the middle so that one half suggests a side view of the animal. In this example, however, the bos forms the central part while the side view of the dragons form the open jaws. This may be only a model, the problem being to distinguish the dragon, the bos and the tiger in the design.

The designs of little men with pointed caps on Ko 168, 169 and 170 present a different problem. These Ko have been dated to Chou III or the Han dynasty. The provenance of Ko 169 is Tafo Mine. The shape of the blades conform to the tradition of the Shang dynasty and are ^{quite} different ^{from} the type of Ko which prevailed in Chou III or the Han dynasty. The human figure it must be remembered was not absolutely debarred from Shang design. A typical Shang dynasty figure, for instance shows two figures with elaborate hair dressing and bent arms, ^{which suggest the little}

1. C. C. Luo, An exhibition of Chinese bronzes, 1939, plate XXII, No. 5.

squatting men on Ko 168 169 and 170, which appear to be Late in date but to carry on the shape and meaning of the Shang Ko.

TABLE I Inscribed Ko in this monograph's catalogue.
Comparative frequency of inscriptions on various types of Shang Ko

Type	Hafting	Butt	<u>Ko Cat. No.</u>	Types. No. of examples	No. of different inscriptions
VII	socket	square	117-124	84	17
V	flat	square	70-87	13	15
VI	flat	rounded	95-112 and 115	19	13
VIII	socket	rounded	151-155	5	5
			<u>Total</u>	<u>126</u>	<u>50</u>
<i>Group B Infrequently inscribed types.</i>					
III	flat	tasseled	35 and 11-16	4	2
IX	flat	two slots	159	1	1
II	jade <u>Ko</u>		16	$\frac{1}{6}$	$\frac{1}{4}$

Graph on Fo 15⁰¹⁵ is now suspect and not listed. Graphs on Ko 171-174 are believed false and not listed.

TABLE II Additional inscribed ko not in this monograph
List of the more important inscriptions on Shang Ko omitted from the plates in this monograph for lack of blade snare and measurements. The type of Ko can often be determined from the rubbing of the butt near the socket ridge, or the hole at the back edge of the shaft.

1. Hsu Yin 2.80.5; socketed Type VII; same graph as Ko 154 (Type VII socketed)
2. Hsu Yin 2.80.7; socketed Type VII; same graph as Ko 84 (Type V flat)
3. Hsu Yin 2.80.8; socketed Type VII; additional graph.
4. Hsu Yin 2.80.9; socketed Type VII; same graph as Ko 31 (Type V flat)
5. Hsu Yin 2.41.1 and 2; flat Type V; same graph as Ko 84 (Type V flat) It is possible that this Ko is of Type VII. The rubbing does not give a clear indication.
6. Hsu Yin 2.81.4 and 5, same as San-tai 19.7.10 and 9; flat Type V; additional graph.
7. Hsu Yin 2.82.8 and 9, same as San-tai 19.7.9 and 8; flat Type V; additional graph.

Table of inscribed Ko combining those of Tables I and II.

Group A Frequently inscribed Types.

<u>Type</u>	<u>Hafting</u>	<u>Butt shape</u>	<u>No. of examples</u>	<u>No. of different inscriptions</u>
VII	socket	square	28	13
V	flat	square	30	16
VI	flat	rounded	20	14
VIII	socket	rounded	5	5
Total Types V, VI, VII, VIII			<u>73</u>	<u>53</u>

Group B Infrequently inscribed Types

III	flat	tasseled	1	1
IX	flat	two slots	4	2
II	flat	jade	1	1
Total types II, III, IX			<u>6</u>	<u>4</u>

As more complete information about Shang Ko becomes available, ^{other} additions will be made to these numbers. The writer has omitted many other Ko of which he was doubtful; ^{and} some of these may ^{ultimately} be proved *authentic*. The above tables represent present knowledge and the writer considers that the comparative results will prove valid for any future additions. These additions show that "Group A" was still more numerous than "Group B"

Among ^{The specimens here catalogued} inscribed

sixty-six Ko and fifty different inscriptions belong to

Group A
Types V, VI, VII and VIII.

These four types appear to form a group on which inscriptions of a similar nature, ^{that is with the owners' family name,} were much more

frequent than on other types. Only six Ko and four different

inscriptions belong to ^{Group B} Types II, III and IX. No example of

Ko Type IV with the lobed butt was found to be inscribed. Ko

with square butts were most frequently inscribed. Types V and

VII have between them forty two examples with thirty-two dif-

ferent inscriptions. ^{Socketed Ko Type VII are more frequent than Flat Ko Type V.} As seen in the individual studies of their

inscriptions, many of these socketed Ko were dated early in the

Shang II period. This fact seems to indicate that the socketed

Ko was well developed before the move to Yin in 1311 B.C. and

suggests that it had been commonly inscribed before that date.

A great many uninscribed socketed Ko of this type have been

found in many parts of China ^{but} almost no archaeological evidence

regarding them is available. Ten examples in the Royal Ontario

Museum of Archaeology (Ko 141-150) have been included in this

monograph. These common socketed Ko should be studied in their

archaeological settings to determine whether they are of the

same early date as the inscribed examples.

Date of inscriptions on Types V, VI, VII and VIII.

It is impossible to place the origin of any one of these four types, V, VI, VII or VIII, late in the Shang II period, for

some inscriptions in each type are definitely of the early part

of that period. The earliest inscriptions are found on the best

examples, best, that is, in alloy, ^{in form} in ^{decorative} design, and in having

inscriptions inlaid with turquoise. All four types V, VI, VII

and VIII were in common use together soon after the move to Yin, Ko 75 of Type V with a square butt has the same graph as Ko 95 of Type VI with a rounded butt and sharp spur. This is definite proof that these two types existed at the same time and the graph is bone-script period I in date, 1300-1197 B.C.

From the evidence of inscriptions now available the following observations may be advanced as a basis for further study. At the beginning of the Shang II period the socketed Ko of Type VII was commonly used in war by ordinary soldiers and was also the most frequently inscribed weapon placed with the sets of bronze ritual vessels belonging to important persons.

Flat Ko of types V and VI were both equally common but those with square butts may have been more common in early times. According to bone inscriptions the graph on socketed Ko 154 with a rounded butt and a spur at the bottom edge was of early Shang II date. It seems possible that both square and rounded types of butt were in use at the same time during the Shang II period.

Proper sequence in reading the obverse and reverse graphs on the Shang Ko.

In compiling the catalogue, the writer grouped the Ko into subdivisions of types according to the position of the graph on the Ko; i.e. according as it occurred on the obverse, or on the reverse or on both sides. The study has not revealed any evolutionary basis for this subdivision. From the point of view of typology, however, this seems to be the most logical arrangement. It is retained in the hope that future study may discover some explanation for the placing of the graphs.



There is no established practice to indicate which side of the Ko is obverse and which reverse. The inscribed side of the Ko, no matter which side the inscription is on, is now usually called the obverse. This type of ambiguity should be avoided. The writer has therefore adopted the following distinction: the obverse of a Ko is drawn on the face as though the reader were holding the weapon in his right hand with the shaft upright and the point facing left.

Different graphs are cast on the opposite sides of Ko 70, 71, 117, 118, 119 and 151. It is important to know which side should be read first for this reason. These graphs are probably the names of the owner. In oracle bone inscriptions the tribal or estate name precedes the name of a man's office or personal name. This order probably should apply on the Ko inscriptions. It is difficult, however, to be certain of this, for on Ko 117 the graph Ko is inscribed on the reverse while on Ko 118 the same graph "Ko" is on the obverse. It is possible, however, that the graph "Ko" did not mean the same thing on these two weapons. In Ko 117 "verse" may be the tribal name and "Ko" the office of the owner. Now in the oracle bone inscriptions "Ko" is sometimes a tribal name so that on Ko 118, "Ko" may be the tribal name and "Announcer" Kao the office of the owner.

Of the Ko that are inscribed only on one side, about one half have the graph on the obverse and about one half on the reverse. It might be suggested that these Ko were inscribed for right and left stations in the temple service or for a right and left file of an escort of Ko bearers. This does not seem to be so, however,

For the Ko in the sets cited under Ko 35, 44-46, 102-107 all ^{and} have the graph east on the same side.

The orientation of graphs east on Shang Ko.

In most cases the inscriptions on Ko do consist of one graph east on the butt. The orientation of this single graph is significant for the custom varied in subsequent ^{Culture} periods. All the examples in this monograph, except Ko 10 and three apparent exceptions to be noted later, follow one rule. The Ko was upright and normally read when the shaft was held by the right hand in a horizontal position with the ^{down so that the graph appears} point ^Λ to be based on the shaft. When the shaft was held thus, the point of the blade should be held in the left hand with the left hand and the concave edge to the right hand. In this position the graph on the obverse of the blade will be in the proper position for reading. When this rule is not followed, these single inscriptions are often misunderstood as has been the case with Ko 137. The graph on this specimen really shows a man standing on his feet and not, as has been thought, a man standing on his feet, two quite different ideas.

The graph "to" for the web on itself appears to be an exception to the rule of orientation. It is found on Ko 110, 117 and 111. The drawing of the Ko blade follows that is of the actual blade and the shaft is drawn parallel to the actual shaft, as though the person striking a blow with the Ko viewed the drawing of the Ko to be pointed in the direction of the blow. In this case the feeling for congruity in art design overrules the ordinary custom.

Ko 110 has only the single graph but Ko 117 and 118 have each another graph cast on the opposite side of the butt. Each of these other graphs is placed in the customary way. The graph "Announcer" Pao on ko 11 is based on the shaft as it should be. On Ko 117 the horse's head faces the point in the direction of the blow being struck and thus at first glance appears to be another exception. But it is to be noted that the graph for "horse" in Chinese is never read as though the horse's feet were standing on the horizontal plane of the ground. In oracle bone sentences such as Sh'ia' tien 3.10.2, in the succeeding bronze inscriptions and in present day writing the graph "horse" is drawn as though walking on the perpendicular line of graphs, head up and tail down. Had he been represented in this attitude on Ko 117, the horse, which is possibly a tribal or family name, would have appeared to be running away from the battle instead of following the Ko into action. Here again the regard for continuity in design overruled the ordinary practice. In the oracle bone sentences and in the succeeding bronze inscriptions the orientation of the graph "Ko" does not differ from that of other graphs; it always stands upright in the perpendicular line of the sentences¹. From these apparent

1. See Sh'ia' tien 6.31.5; 7.12.1; 4.33.1 and 15'ui rien 1165.

exceptions we learn that Chinese art design and Chinese calligraphy were closely associated at the beginning of the Shang II period if not before. Ko 117 and 118 may even antedate 1311 B.C. These two Ko are old finds of early Shang Ko from unknown sites. Their graphs are done in the style of bone script of Period I.

Early in the Chou I period single graphs continued to be cast on the butts of Ho. A few followed the old Shang tradition.¹

1. San-tai 19.31.2; 19.33.2; 19.36.1.

On the reverse the graph ho is cast when the shaft was held perpendicular.² This rule seems to have predominated, but not all others

2. San-tai 19.34.2; 19.35.3; 19.35.7; 19.35.11; 19.34.3
 and a number of vessels excavated by the Academia Sinica at the early Chou site near Tsun-shien railway station.

the graph was oriented in a direction opposite to that of the shaft. The position of the blade, vertical and the carelessness of the Chou are nicely illustrated by this minor point. Later in Chou II and Chou III long or inscriptions were cast on the ho or curved part of the blade at the fore-side of the shaft. In late Chou III and Han times inscriptions were cast on the reverse after they had been cast. Inscriptions on the blade such as those on Ho 173-174 were not found in any period of antiquity.

The meaning of the graphs.

The graphs cast on these ho were the names of their owners. These persons were important figures in the life of the Chou dynasty. Some of their names have been found on oracle bone inscriptions. This suggests that they were the names of which these persons were called during their life time. In the Chou dynasty we know that the temple names were given after death. A Chou ho was known as ho ^{qichao?} name day and preceded by a temple title in references to him by his descendants after the generation of his sons and grandsons who used the common intimate family names father and grand father.

The names found on the Ho appear also on sets of bronze ritual vessels with which the Ho were associated. Thus Ho 35 and five

others were found in the same pit with a number of ritual vessels similarly inscribed. Some of these sets of ritual vessels have the temple names of ancestors in addition to the "living" name of the owner. These vessels were made for the owner in honour of his father, fu, mother, mu, elder brother, shung, grandfather, tau, or grandmother, pi. On the oracle bones the names of these fathers, mothers, elder brothers, grandfathers, grandmothers and other titles are restricted to the royal family. Inscriptions from more than twenty thousand oracle bone inscriptions have been examined without this restriction being observed, it being possible that similar ancestral names cast on the bronze ritual vessels which likewise were used in ancestral ceremonies, which had been restricted to the royal family. Most scholars believe that bronze ritual vessels inscribed with "father" followed by ^{Cyclical} name day might belong to anyone and little attention has been paid to them as a source of royal genealogical record. The writer considers that inscriptions on bronze ritual vessels are the actual records of royal relationships. Most of these inscriptions consist of only three items: (1) a "living" name of the owner which he will designate as, (2) a relationship for which we will use "father" and (3) ^{Cyclical} day, one of the cycle of ten days on which the "father" is taken over, possibly the day of his birth.

Consider a hypothetical set of ritual vessels. The "living" name of the owner χ is cast on each article. The set includes o, spears, mao; horse jingles, luun; socketed axe, fu; butcher knife, tao; liquor ladles, yi; four-osted torii stand; cups, chia; vases, ku; liquor pails, yu; large beakers, tsun; small beakers, chin; square ritual cooking pots, fang ting; large round-bottomed cooking pots, ta ting; small-footed cooking pots, li ting; hollow-legged cooking pots, li; food bowls, kuei; animal-covered gravy-boat, kuang; large liquor heater, chia; steamer, hsien; tall liquor jars, nu; large liquor jar, lei; ^{round liquor jar, β bo and high food stand or basin, β ang.} Most of these articles have only χ the "living" name of the owner inscribed on them. Some vessels however, have additional graphs such as "X father Chia", "X father Keng", "X father Hsin", "X father Yi", "X father Kuei", "X father Chi", "X mother Keng", " χ grand father Tsu ting", "elder brother ku", "X elder brother ling".

This appears to be a mad medley of names without rhyme or reason, but actually such a set might well have belonged to King Wu Ting or to ^{another royal person} χ of his generation. Father Chia is King Hsiang (Yang) Chia; Father Keng is King P'an Keng; Father Hsin is King Hsiao Hsin; Father Yi is King Hsiao Yi; Mother Keng is the wife of King Hsiao Yi; Ancestor Ting is King Tsu Ting; elder brothers ku and ling are known from oracle bone inscriptions; Father Chi also is known from an oracle bone¹ and Father Kuei is known to be his

1. Ch'ien pien 1.27.1 and 3.23.4. Father Chi belonged to the generation of King P'an Keng. This is proved by a broken scapula bone, two fragments of which have been joined: Ch'ien pien 1.27.1 and 3.23.4. The diviner is Yün 1.9 of the first bone script period, 1255-1197 B.C. The bone belongs to King Wu Ting's reign. In the inscription he addresses an uncle as Father Chi associated with ancestor Tsu Hsin, 14th generation, and ancestor Tsu Ting, 15th generation. Father Chi cannot be Tsu Chi of the 15th generation, since that would put the bone inscription in

the 19th generation of King Lin Hsin and 'an-tsu King 1186-1143 B.C. By this time the script had altered materially and Diviner Yün I.9 was long since dead. The script of this bone has some similarity with that of oracle bone ko-pien 1.25.9 which lists in order Father Chia (Hsiang-Yan-Chia); Father Keng (P'an Keng) and Father Hsin (Hsiao Hsin) side by side. These three kings were called fathers in this order therefore they were the brother kings named. This suggested the method of dating oracle bone inscriptions and also of dividing them into bone script periods.

brother from bronze inscriptions of which a number are cited under the individual studies of the Ko.

The important fact to note here, however, is that W is the living name of King Wu Ting or other royal person of his generation, sons of his father or his father's brothers. Thus we may say that all those "living" names inscribed on Ko which can be linked with ancestral names on ritual sets belong to the Shang royal family. These "living" names were inscribed even on Ming-ch'i sets and buried with the owner in his tomb. This interpretation of Shang dynasty inscriptions explains the variety of ancestral relationships found on one and the same set of ritual vessels. *All the instances cited under the individual Ko seem to conform to it.*

On the oracle bones the king is called simply "the King", wang. He would, of course, have had a private name while still prince or son before becoming king. Many such names have been found. They are prefaced by the word "Son". The graphs following "Son" however seem to be the names of offices. The writer has gathered more than forty of them from the oracle bones. A number of these are also inscribed on the Ko, e.g. 70, 71, 75, 78, 79, 81, 86, ^{111.} Other graphs on the bones, apparently names of generals are found also on Ko 72, ¹⁸⁷ 98, 112, 129, 136, ¹³⁷ and 139. Several diviners' names found on the bones were also cast on the Ko, e.g. 76, 111,

and 127. The same is true of names of tribes or nations, e.g. Ko 30, River people; Ko 117, horse; Ko 120, cattle man; names of officials, e.g. Ko 153, is orian; Ko 122, Prime Minister; Ko 124, Protector; Ko 128, Son; names of places, e.g. Ko 25, 26, 27, 119-125; names of women's families, e.g. Ko 154, Fruit-tree, Ko 110, 118¹; Ko 80, River.²

1. Ko is sometimes written on the oracle bones with a graph for woman beside the Ko, e.g. Sh'ien pien C.26.8, indicating that the woman's family name was "Ko".
2. River is also written with woman on bone—Ts'ui pien 1483.

In the Tao Suan, eighth year of Duke Yin we read, "hen the Son of Heaven chose out virtuous men he gave them surnames, hsing, according to their origin by birth. He granted them land and chartered them, ming, with a title, shih."³ The study of surnames,

3. Legge, V, p. 24, Chinese text, line 11, English, p. 25 translates—"when the Son of Heaven would enoble the virtuous he gives them surnames, hsing, from the birth places of their ancestors, yin shang; he rewards them with territory and the name of it becomes their clan name, shih." shih is now translated "clan" but in the beginning it was a title or office conferred as distinct from origin by birth.

hsing, and clan names, shih, has given rise to an immense literature in Chinese. It attempts to give the origins of these names in the time of the Yellow Emperor, Huangti, and the model emperors Yao, Shün, and Yü. It is quite beyond the range of this study to do more than indicate that the names on the Shang Ko are one source that should be used in the study of the names of people in the Shang dynasty.⁴ More

4. The History Sui Chi, Yin Fen Chi section records, "Emperor Hsün chartered Ch'i, enfeoffing him with Shang, and giving him "Son" as a surname, Sui hsing tzu Ch'i". The graph "Son" both alone and in combination with woman is common on bone and bronze inscriptions of the Shang dynasty, Ts'ang Hwei 127.1 et al. The surname "Son" Szu of the Shang Royal Family and the descendant state of Sung, may originate in the peculiar use of "Son" in the Shang dynasty. See Ko 138.

than fifty names cast on the Ko have been gathered together into one co-ordinated group.

These names are also found on oracle bone inscriptions in definite contexts which will bring to light still other names of Shang persons. These can easily be distinguished from place names by the context. Most important of all, the names of the owners cast on sets of ritual bronzes yield many more names of the same type. From this great number of names, possibly reaching a thousand in all, a new study of the prosopography of the Shang dynasty should be possible. These names are not restricted to surnames, hsing, or clan names, shih. They include tribal names, Tsu, state names, Kuo, regional names, Fang, names of office, Kuan; temple names, ranks, titles of estates, place names and ordinary names, ming, tzu, and hao. The names on the ritual sets of bronzes and on the Ko should however be of a similar nature since they are used in a similar way. They include the important name of the owner by which he was known when living. This name was cast on his Ko and his ritual vessels for use in ceremonies and these were buried with him when he died. Four types of ornamental Ko rarely inscribed.

Jade Ko were manifestly intended for use in ceremonial and not for use in war and it was probably for this reason that they were not commonly inscribed. Their beauty and value lay in the jade itself which was very rare. Stone ming-ch'i imitating jade Ko were used for funerals and possibly for some ceremonies. Jade Ko 16 has an inscription of ten graphs carved at the fore-edge of the shaft. The graphs are in the oracle bone script of period V which in this writer's opinion might be dated a hundred years before the fall of the dynasty in the reign of Wu Tsu Yi, 1142-1139 B.C. This inscription mentions the founder of the Shang dynasty, Ta Yi also known in literature as Ch'eng T'ang. It is therefore definitely of Shang date for no person of the Chou dynasty would

have recorded a ceremonial dance to the memory of a Shang ancestor. This inscription might be thought to have been reproduced from an oracle bone but the writer examined it in New York and does not consider it suspect. The last graph shows a man resting on his heels in the dance holding a Ko aloft in his two hands.

In recent years a number of long Shang dynasty inscriptions of this type have been found on bone spatulae and on bronze ritual vessels. Mr. H. Yu reports a long inscription of thirty-seven graphs on a pail, yu, in honour of Father Ting which this writer considers to be K'ang Tsu Ting, 1150-1143 B.C.

Shuang Chien Yi Chi Yin Chi Pien Chih Paiping 1940 p. 4

In the inscription mention is made of an elder brother whose ^{cyclical} name is obscured. This writer suggests that it may be Kuei, elder brother of King Wu Tsu/1142-1139 B.C., who made the vessel in his second year 1141 B.C. This bronze inscription almost parallels the inscription on Ko 16 in that the ceremony is offered to Fa Yi and it ends with the same graph for "dancing" with the addition of the three words "before God above", Wu Yu Shang Ti. This recent acquisition from Anyang is a striking confirmation of the genuineness of the inscription on jade Ko 16. That Ko appears to have been inscribed for use in a special ceremony, possibly about the same time as the pail, yu, 1141 B.C.

Only four different inscriptions have been found on Ko of Types II, III, IV and IX. Ko of types III and IV all have ornamented butts for use in ceremonies. Many are twin end frail ning-ch'i for use at funerals. No example of Type IV has been found inscribed. Two sets of Ko belonging to Type III, one of them Ko 35 with six examples, have two different inscriptions inserted in the design on the butt. The individual studies of Ko 35 and 44



110

indicate that the owners had names somewhat different from those of the single graphs of Types V, VI, VII and VIII. The two graphs on Ko 35 "Great rain maker, Ta Yu", are also found on a large set of ritual vessels and spears. "Great rain maker" must be considered the name of the owner as is the case with other sets of ritual vessels and Ko of Type V, VI, VII and VIII. The "Great Rain Maker" set of vessels has only the name Ta Yu without any additional ancestral relationships. This person may not have belonged to the royal family. He may have been the leader of the wizards who danced before God in prayer for rain. There are many reasons for considering that Ko 35 is to be dated early in the Shang II period. Ko of Type III were made in great numbers for use in ceremonies and for funeral use. Possibly they were carried by court functionaries dressed in ritual robes at temple ceremonies. The Ming-ch'i would have been carried by a retinue of servants dressed in mourning clothes escorting the funeral chariot. Types III and IV are not suited for use by soldiers or for the personal use of live generals or nobles. They may therefore parallel Types V, VI, VII and VIII in date. Inscriptions seem reserved for real weapons of war. But wizards like "Great Rain Maker", Ta Yu, and "Great Fire Chief", Ta Muo, and their followers whose profession was the ceremonial dance had their ceremonial Ko inscribed along with their ritual vessels and buried in their tombs.

Ko 159 of Type IX bears the inscription "Island in the midst of a river, Chou". This name seems to belong to the same group of names as those found on Types V, VI, VII and VIII. Oracle bone inscription Ts'ui pien 262 of the Bone script period I,

diviners Nan I.1 and Pin I.4, mentions "The minister of the island in the midst of the river, Chou ch'en". This inscription dates from the beginning of the Shang II period. On the other hand the Eumorfopoulos Bronzes, Vol. 1, Plate XIV, A.17 includes Chou as one of the regions whose people were granted to a noble at the beginning of the Chou dynasty. The writer has obtained a triangular Ko of the same type as Ko 159, at Anyang, and prefers to consider Ko 159 of Shang date rather than early Chou. This single inscription on a Ko of Type IX argues for the existence of this type all through the Shang II period even though the designs on them are very much conventionalized and are placed on the blade of the weapon. This triangular weapon seems to the writer to be more of a pointed axe than a Ko and may have been called by another name, such as K'uei. The slots for hafting are also found on the wide blades of Shang axes, yueh, such as the inscribed axe, a companion piece to Ko 71¹ and the inscribed axe associated with Ko 134². These axes both have decoration on the axe blade as does another example.³ These considerations all confirm the

- 1. Yeh Chung Two 2.19.
- 2. Yeh Chung One 2.9.
- 3. Yeh Chung One 2.8.

writer's opinion that the inscription Chou on Ko 159 refers to the same person as Ts'ui pien 262 and that Ko of Type IX were made at the beginning of Shang II period.

Composition
Composition in the Shang dynasty.

It is often assumed that the Shang dynasty scribes could not write long and connected sentences. The series of single graphs cast on Ko and the brief inscriptions on bronze ritual vessels seem to support this view. The Shang dynasty artisan

did not wish to expose the inscriptions cast on his bronzes. He hid them under handles and under the bases of tall vases. In food bowls and cooking pots he concealed them inside the vessels. He inscribed the lids as well as the vessels so ^{that} they could not be mislaid, but ^{Tendency} ~~he~~ ^{was} not write verbose inscriptions for the sake of saying many words. It was sufficient on a ritual bronze to cast the name of the owner and the temple name of his father if he were honouring him. The ^{cyclical} name day kept the ancestral remembrance clearly in view to avoid mistakes. Sentences on the oracle bones are often long and connected by relative particles showing that a previous sentence is assumed to have been read. Recently, longer sentences on bronzes have been noted. Inscriptions on bone spatulae, and even the skulls of animals as found by the Academia Sinica, show that the art of composition was practised. It is very probable that longer historical documents on wood have perished. That writing was done with a brush, even in the Shang dynasty is proven by examples of artisan's placement notes on stone ornaments in the R.C.M.A. ^{and} the Academia Sinica has also found brush writing on bone.

The single graphs cast on bronze to of the Shang dynasty and the laconic inscriptions on their ritual vessels simply illustrate the austerity of the Shang people and do not prove their inability to compose longer inscriptions.



4.

THE USES OF THE KO ILLUSTRATED BY LITERATURE

A. Uses in war.

The ko appears to have had its origin in the beaked sickle (No. 1, 2, 3). This implement was usually made of slate or greenstone and was apparently still used by the peasant farmers of the Han dynasty, for more than a thousand examples have been found in the excavations at Anyang by the Academia Sinica. The origins of the stone sickle are much earlier ^{than the Shang dynasty}. It was in common use in the Neolithic cultures of North China, wherever grain was harvested (see No. 1). A sickle of the same form but with a blade of jade and haft of bronze inlaid with turquoise was used in Shang dynasty ceremonial. The royal example ^{now} in the Freer Gallery of Art in Washington (No. 5) may well have belonged to the King. A sickle of similar type, though made of iron, remains the most commonly used implement in North China today.

The stone sickle was sharpened only on the lower cutting edge, but the upper edge of the point was thinned down for easy entry when the stalks of standing grain. Because it was always near at hand, this implement was often used for personal defense and in individual combat. When the whole upper edge was sharpened (see No. 4) it was more efficient as a piercing weapon and was called the ko. Except for the rounding of the point the ko has retained much of the "beaked" form of the stone sickle. The evolution of the ko from the sickle as here suggested could not have taken place in the Shang II period, 1033 B.C., but must have occurred long before. The slate ^{or} greenstone sickle persisted as a cheap and efficient tool even when the ordinary Shang soldier was armed with an excellent bronze fo (see Nos. 55, 56, 90).

If the ho as a weapon was similar in construction to the ho, then, in its early history at least, it might be supposed to have a short haft like the sickle. In the absence of any report of the direct measurement of scientifically excavated ho blades (which no doubt will soon be published by the Academia Sinica from several of the many ho and shu graves excavated at Anyang) a shaft length of 470 mm. (18 1/2 ins.) is suggested for the following arguments:

1. 470 mm. (18 1/2 ins.) is the length of sickle ho blades of the same material. The error in the size of the sickle blade would vary in about this same length.

2. The shafts of Nos. 15, 16 and 17 have been restored at 470 mm. in plates XV, XVI, and XVII, which are drawn to scale from photographs of the skeletons and objects taken in situ by the Academia Sinica. The ends of the shafts are within one yard of the soldiers' hands. Long shafts, 1500 mm. (49 1/2 ins.) or more, the ancient Chinese, on measure, would not be conspicuous in these graves.

According to the photographs taken in situ the blade if hafted with a long shaft would project into the solid wall of the graves.

3. The ho is not strictly a spear, but is only twice the length of the blade which is about 9 ins. long. It is not a spear, and in the ho the blade is held in one hand. Picture the ho held by the end of a short shaft, e.g. Ssu-tai 12.7; 12.17.3; 14.3.3, and a ho of 1500 mm. length in the hand of a boy with a ho on his shoulder, "Ho"¹ (Giles No. 1000)

1. This interpretation seems more plausible than that of those suggested by Fetsi, in Sino-Oriental Research, 1, p. 23, fig. 19. The graph may be written 行 or 行 or 行 the first is primitive. These set consists of:
 (1) read 行, G. 3217, (2) read 行, G. 3218, (3) read 行, G. 3219, (4) read 行, G. 3220, (5) read 行, G. 3221, (6) read 行, G. 3222, (7) read 行, G. 3223, (8) read 行, G. 3224, (9) read 行, G. 3225, (10) read 行, G. 3226, (11) read 行, G. 3227, (12 and 13) No others, (14) read 行, noted ⁱⁿ possession of a curio merchant in Anyang, (14) read 行, G. 3228

6 ins., i.e. ca. 1825 mm. such weapons are seen on the tomb tiles, e.g. site, Tomb III, pictures of ancient China, no. XVII, XL, XLII, LXVI, LXVII. But between the Han period and the time of this document (with which the tomb tiles may be approximately contemporary) the sword and spear had come into use in China and had supplanted the ko for close combat. The soldiers on the tomb tiles carry swords instead of short-handled ko and in place of spears, and the spear long-handled weapons which are inscribed on the weapons they use, sometimes as ko.

The ko was the ordinary weapon of offence used by the Chinese soldier of the Han dynasty. It is the only one ^{so far reported} known in the records of individual soldiers (nos. 58, 59 and 60). Very literary records go back to the Han dynasty and therefore there is little evidence from contemporary literature, apart from the brief inscriptions on bells and bronzes. ^{Because} considerable changes no doubt took place in the uses ^{and shape} of the ko down through the ages, it is therefore precarious to employ ^{the following} later literary references to explain Han dynasty customs. Nevertheless there are several early Chou documents which may carry over the earlier tradition. In the Classic of History, Yu Ching, we find the graph "ko" used 3 times.¹

Documents 17 and 33 are written, ko, and should not be noted as being written in the Shang Dynasty or the beginning of the Chou.

²⁰¹ Of the five, ^{references} two are concerned with war and the other three are all from "The Testamentary Chances" which has to do with court and ritual use. Let us consider the references to war.

Hu index, 23.0074; Legge III 301: King Wen of Chou made a speech at Yu before his troops attacked Chan. He said, "Lift up your ko, try out your shields, set up your spears, sh'ang sh'ang, li kan, li kan, mao".

Legge translates "lift up your lances, ko, join your shields, kan, raise your spears, mao".

This was the order to the men to prepare their weapons and stand at attention during the speech. How a soldier with two hands carried out these three operations with three different weapons at the same time has puzzled the writer. The difficulty does not arise with the Ko or the spear. The spear was a long-range weapon. The Po was for close combat, both were necessary. The terms a piece to the Ko and the spear are quite different. For the Po it is "Lift li, Ch'eng", for the spear it is "Set up on end, li". The writer has wondered if the word Kan, usually translated "shield", really means "shaft". It often does so when used alone and may mean this when associated with the brand Ko. The two words would then mean "shafted Ko". In this quotation where they are used separately the second operation is ordinarily translated "lay out your shields", and would then mean "measure the reach of your shafts". The full operation of coming to attention would then be: with the right hand grasp the Ko (by the end of its handle), lift it high, measuring the reach of the shaft; with the left hand grasp the spear, mao, setting it straight up with the butt resting on the ground. A long line of these bronze-age soldiers must have been an impressive sight as they shook their weapons in defiance before the battle.

The second pertinent quotation from the Classic of History is Ku Index 49.0037; ^{p622} ku 11.11: "Temper your ko and spears! kuu nai ko nao."¹

1. Legge translates "Temper your lances and spears".

This document is much later than the first but may still be considered early by comparison with most classical references. The word translated "temper" has to do with the process of resharpening blunted weapons by thinning out the edges. It has been discussed under 10 1.2.

In the Odes there are four instances of the use of ko:

Ode 133.1: "I prepare ^{are} ko and spear" tsi shi ko ko. ko ko (IV, 201) translates, "I will prepare by lance and spear"; ko ko (14), "I have lance and spear, both are and spear".

Ode 151.1: "I hold a ko on service" ko ko shi ko ko (IV, 201) translates, "have their carriage of lance and spear"; ko ko (25), "have lance and spear".

I have rendered the second two words of the second line in ko ko (see Ode 133, p. 118) and likewise in all ko ko.

Ode 250.1: "Cherted ko flange to ether, ko ko all ko, ko ko (IV, 254), renders "it is lance and spear and axes large and small", ko ko (10), "shield and dagger, lance and battle axe." The second two words are certainly descriptive of the first two as they are in the preceding line ko ko and ko ko at the end of ko ko shi ko ko. This line is reminiscent of the warrior ko ko for the ko ko at ko, ready to ko ko ko ko.

Ode 270: "Put under ko ko the shafted ko, tsi shi ko ko, ko ko (IV, 270), "I have lance in shield and spear", ko ko (331), "I have put away your shield and spear". This line is parallel to the following line "Put into the river your lance and arrows".

I have given new renderings to these quotations because of the wrong impressions given in the Chinese commentators' notes and the consequent faulty translations. One often welcomes Mr.aley's fresh renderings but Legge is more consistent. Surely it is straining literary license to render ko by "axe" in Ode 133; by "halbard" in Ode 151; by "dagger" in Ode 250; and by "axe" in Ode 270.

The close parallel in ideas between the lines of poetry of Odes 133 and 200 and the two prose quotations from the Classic of History confirm one another. Odes 151 and 273 show the ^{carried} ko on the shoulder, ^{when} on service and under the crozier of the arm when battle is over. The ko is seen in its proper environment ^{when} the complete Odes ^{are read} and not isolated and over-emphasized as part of the case in a monograph of this sort.

B. The use of the Ko in Ceremonies

The Testamentary Charge¹ portrays ceremonies at the time

1. Leave III, p. 544-561, Ku Index #2.

of the death of King Ch'eng (1056-996 B.C.) and the investiture of King Liang (986-970 B.C.). This document appears to be as nearly as possible correct and is preserved in a number of literary texts transmitted from a time so early. It has undoubtedly undergone some, but not a great deal, of alterations. Archaeological evidence is not as abundant as the archaeological, but the Testamentary Charge has preserved much of the social setting which con-
 justice from the objects alone can never supply. The entire text may be read in the author's translation which represents the orthodox Chinese interpretation. The following identifications of the ko and its uses in the text are based on a study of all the known Shang weapons² as well as the various types of ko considered in this monograph. The interpretations of commentators ancient and modern have been consulted, and they have been quoted secondary to the archaeological evidence.

A study of this passage in the Testamentary Charge enables us to visualize the place of the ko in ceremonies at the beginning of the Chou dynasty^{in the year} 1122 B.C. The ceremony described fits well into what we know of the Shang-dynasty ritual from the oracle-bone inscriptions. It is possible that it portrays an actual Shang ceremony modified only by a few new features introduced by the Chou people. Seven different types of ko as included in this monograph appear to be mentioned in the text sometimes by other

names than Ko.

1. Symbols of authority held by the personal body guard of the King. When King Ch'eng was about to die he called the officers of his court to him and issued the Testamentary Charge for the succession to pass to his eldest son Ch'ao. The great historian T'ai Shin recorded the edict on tablets. The great protector T'ai Pao acted as regent in charge of the installation of the new King. He ordered the Marquis of Ch'i to take two officers bearing Ko (Zu Index 13.0207) and a hundred men of the guard, mu pên wei jen, and turn back "Son Ch'ao" (the heir apparent later installed as King Wang) outside the South gate and conduct him to the mourning room to dwell there mourning for the clan's loss". In this case only two Ko-bearers are mentioned while the guard numbers a hundred men. I have denoted those who carried the Ko as officers; the two men may have been the personal body guards of the deceased King. In any case the pair of them are clearly distinguished by their weapons from the general body of the guard. Ko 49 and 50, 51 and 52, may be two pairs of such symbolic Ko; Ko 53, 54, 61, 64 and 66 may be isolated examples of the same sort. All are so outstanding by reason of their substantial construction, their large size and fine quality, as to suggest that they had been used in royal service. It is to be remembered that these Ko are all of Shang date and that some may antedate the literary text quoted by more than two hundred years.

2. Certain Ko belonged to the personal accoutrement of the King. According to the Testamentary Charge, when the new King had arrived at the royal court for mourning, the ancestral temple



fu te kuo ya.¹ This definition, while late, seems to refer

1. The peasants at Anyang today pronounce ko as if it were Kuo.

to the pointed Ko of the Shang dynasty such as Type V or VI as opposed to the more hooked Chou dynasty Ko with a long ku.

The King's weapons were "The pointed Ko, the composite bow and the drooping wing arrows". These are all Shang weapons appropriate to ^{warriors use in} chariots. In the courtyard at the ceremony four chariots were placed ready. The state carried the curtained sleeping or travelling carriage, and a first and second chariot².

2. Ku Index 42.0358-633.

No shield was needed nor were other weapons mentioned. There is no dagger or sword and no spear or war axe. The Ko then seems to be appropriate for a King to carry in a chariot along with his bow and arrows.³

3. In the Near East a short war axe was used in chariots.

3. Jade Ko were symbols of rank at court." Among the objects spread out in the east part of the hall was a great jade, ta yü⁴. In classical times it was not known that jade blades had

4. Ku Index 42.0324.

been hafted as Ko. Yet the hafting marks on Ko 13, 14, 15, 16, 17, 18 and 19 are all evident. Apparently jade Ko were called "great jades, ta yü," because of their size and because of the value of the jade. Those two graphs were misinterpreted as two other graphs, chieh kuei, which were slight distortions of ta yü. Many jade Ko of the Shang dynasty have been found at

but no "great mace", Shien kuei. The maces described by Lu Hsiang-shan in his Ku Yu ku 1193 ^{whose interpretation was} and followed by Dr. . Laufer in his book made are either of late Chou and Han dates or are fabrications of recent times. Ko 33 in this monograph was recut in late Chou III or Han times from a "great jade" Ko, 390 m. (15 3/8 ins.) long. Even in its present form it reveals the lines of the original ko shape. A microscopic examination has shown that the original and recut surfaces are weathered alike so that the blade must have been reshaped in ancient times. ^{probably the Han Dynasty} The graph Fuei is found in the Tribute of Yu¹.

1. Ku Index 00.1193)

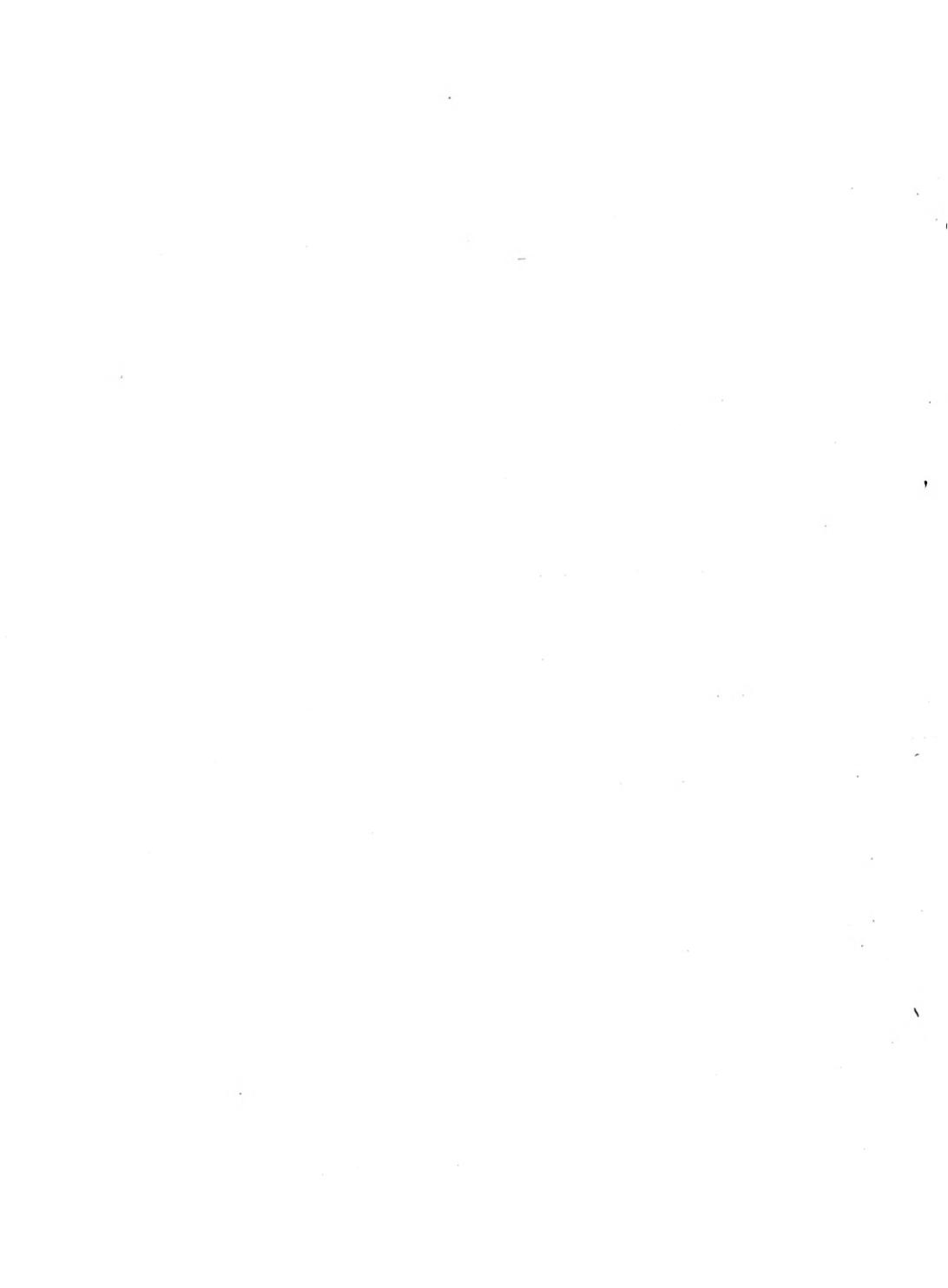
The date of composition of this important document has been much disputed. It is considered to be later than 770 B.C. and perhaps of Chou III period, 481-206 B.C. The substitution of the kuei ^{shape} for the ^{original} jade Ko as a symbol of rank probably occurred about at the time of writing of the Tribute of Yu. In any case the word kuei was not in use in 995 B.C. The graphs shien kuei, however, are found in the Testamentary Charge² and can only be explained as a later editor's

2. Ku Index 42. 480.

alteration from the original great jade fa-yü, to conform to later ideas. Fortunately the editor did not change the words for the great jade fa-yü which was laid out in the east part of the hall³

3. Ku Index 42.0324.

along with other ritual objects which he could not explain. Wang Kuo-wel in his essay on these jade objects, Ch'en Pao shuo in Kuan T'ang Chi Lin, Vol. 1, confused the matter by suggesting that the red knife shih tao laid out in the west part of the hall was similar to the great jade Ko 17 (840 mm. 33 ins. long). ^{This knife was probably a ceremonial butcher knife of bronze. A number have been found at Anyang.} One fact regarding the ceremonial use of the jade Ko stands out amidst all



this confusion. The great jade ko was the symbol or rank used in the ancestral ceremonies. When the celebrant advanced to the altar to present his offering, chi the jade ko was placed upon the altar. In later classical times this was called the "ere t'ance", chieh k'uei and pictured as similar to ko 33 recut. With it was associated a round jade disk, pi. kuo- pi implies that the great teachings of Wen and Wu were written on ^{the jade disk,} pi.¹ The Metal Bound Coffin records

1. Ku Index 42.0314-317. This was possibly like the jade disk in the London Exhibition, no. 612, which was inscribed with an imperial poem of the Ch'ien Lung period. Disks similar to this have been found at Anyang. They differ from the orthodox flat pi by having a wide central band projecting on each side above the flat disk. However none of those found so far have been inscribed.

that Chou Kung placed a jade pi and jade kuei on the altar when he prayed.² If we are to identify these national jade treasures among

2. Ku Index 26.0054-57, 26.0183-185; 26.0197-199).

the jade objects found at Anyang, then this writer considers that the K'uei can only be the later classical name derived from the original graphs "great jade" ta yu and ^{that} the object can only ^{have} been the great jade ko similar to ko 15-27 and the originals of ko 32 and 35. The miniature jade ko 28-31 were more probably used as ling-ch'i in ancestral ceremonies on the altar rather than as amulets to be worn as ornaments on the person. The wearing of a miniature jade ko on the person may however have had the same ritual purpose as carrying a large jade ko in the hands.

We are now in a position to describe the ceremony of investiture as recorded in the Eastern Han Shih-chi. The hall was prepared and the guard set. The new King entered the hall by the "west" steps for he was not yet crowned. The Prime Minister and the rulers of states, kuang ch'iu took places in the court. The ceremony was conducted by three persons robed in red, and not in mourning. The

three libations and setting down the ritual vessels three times. The Senior Officer of the Ancestral Temple announced, "They (the ancestors) have departed." The three objects used in this ceremony symbolized the three phases of Chinese life and, of course, the no stood for family authority and military power, the kuai for law and civil authority, the ch'ang for ancestral religion.

The Grand Protector received the ritual vessel, removed from the grill, ceremonially, washed his hands and again proceeded to the hall with another ritual vessel of the same type, the kuai "half-mace", ch'ang, in his hand¹ in order to make the responsive sacrifice.

1. kuai Index 17.1090.

He then gave the ritual vessel to the Family Altar. He made obeisance to the King. The King then used the oblations. The Great Protector demanded² from the King. The King's gift had been handed over. All the nobles went out of the hall together and waited outside for the new king.

The King went out and stood inside the Gate of Green Jade. The Grand Protector, who had now resumed his ordinary place as a prince of the realm, stood on the left with all the nobles of the West Regions. The nobles of the East Regions stood on the right; all with their horses and chariots. "The guests presented jade and other presents, jin ch'ang k'ang ch'ang pi."²

2. Here again the word jade, yu, should replace the word "mace", kuai, in the text; many jade ornaments have been found in the Shang tombs at Anyang, but no mace, kuai.

4. The Great Protector carried a "half-mace", ch'ang when he made the responsive sacrifice. The jade objects answering to the classical "half-mace", ch'ang have been found at Anyang but only

smaller jade Ko such as ko 10, 11, 12, 20 and 21 and marble ming-er'i like Ko 25, 26 and 27. The writer suggests that the classical word half mace, chang, in the text is an intrusion of a later date to replace the word for an ordinary jade Ko, yu ko. If this be so, then the length of the jade ko in some way indicated the rank of the owner, but the jade Ko of this monograph do not fall into regular series of uniform lengths. The half mace, chang, does not seem to exist as a well defined jade symbol of rank in Shang or early Chou times. The symbol used by the Great Protector in the ceremony was probably a jade Ko of ordinary size such as ko 10, 12, 19 and 20. The only half jade Ko are Ko 36, 67, 62, 65, 80 and 116, but these might well be accounted royal in their perfection and in no way inferior to the great jades, ta yu, Ko 13, 14, 15, 16, 17, 18 and 19. Because they are made half of jade and half of bronze they may have suggested the classical commentator's definition of a chang as a half mace."

5. The guard in the ancestral temple numbered eleven men. Two soldiers inside the gate carried spears called hui¹. One officer

- 1. Ku Index 42.0389.

at the back steps also held a pointed lance, jui,². These two types

- 2. Ku Index 42.0448.

of spear possibly correspond to the two types described under ko 35. One, probably the hui, is a wide-winged spear and the other a lance point with loops on each side of the bronze shaft. One officer who stood in the west of the hall held an axe, yueh³ such as the one

- 3. Ku Index 42.0421.

described under Ko 71. One officer who stood in the east of the

hall held a cleaver, ^{liu¹} these were apparently two headsmen, one

1. Ku Index 42.0413.

with a Shang weapon, the axe, and one with a Chou weapon, the cleaver.² It is probable that a Shang court had two officers with

2. A cleaver in the Freer Gallery of Art, Washington, No. 34:6, inscribed "Marquis of 'ang", K'ang³ hou is said to have been found south of the Ch'i river at Ts'ang-hsien near the village of Lu⁴ Ch'iu'an.

axes. Under the eaves stood two other officers, the one on the west carrying a ku⁵. If interpretations of this weapon as a socketed ko are correct, then Type VII, Ko 117-136 and Type VIII, Ko 151-156 were carried by officers of the guard rather than soldiers. This socketed axe is a typical Shang weapon dating from the occupation of the Waste of Yin. Ko 119-133 are similarly inscribed and other examples with the same ^{graph} are known to exist. Ordinary examples like Ko 141-150 also seem to indicate its common use in Shang times, but it is possible that in the Chou dynasty it had already become rare. No socketed Ko were found by the Academia Sinica in the excavations at the early Chou site at Tsun-hsien station. The ceremonial use of this Shang ku⁵ in a Chou ceremony seems to indicate the fusion of the two cultures in state ceremonies. On the west side of the hall, opposite the place where the Chou king ascended, the weapons of the officers guard were of Shang type, viz. the axe, yu⁶ and socketed Ko, ku⁵.

3. On the east side under the eaves, a fourth officer stood bearing a ku³. This weapon is probably best identified as a

3. Ku Index 42.0430.

triangular Ko of Type IX, Ko 157-167. The Han commentator Cheng K'ang-ch'êng states "the K'uei and the ku⁵ must be the three-pointed spear of today". This is wide of the mark. But the

tradition of three sides may be ancient. These three-sided Ko of Type IV are Shang dynasty in date; none was found at Hsiahsien. But their appearance on the east side of the hall may indicate that they were also well known in the Chou dynasty. Certainly Ko 138, 139, 170, do not conform to Shang canons in their decorative design. In later classical times this graph ko was written with a usual ko signification and not a Ko. This graph is inscribed as the name of the Chou III weapon on the Kin of Yen's ko which has a ko ku. It is possible ^{or downward extension of the lower cutting edge along the shaft}

1. ko-tai 13.50.1.

therefore that a ko is a Shou ko with a ku. It might even be one of those peculiar Shou weapons called ku found at Hsiahsien, for they have four points, viz. the blade, the lance point, the butt and the long ku or lance handle. The bronze ku on alone without the haft has four points like the bone graph for ku (Giles 6453), the tooth stem in cycle of days. This weapon, called by modern writers a Shou ku, ku, is not found at the Shang site of Anyang but is very common in the Chou site of Hsiahsien.

7. Four men in spotted deer-skin caps held Ko on their shoulders with blades pointing upwards ready for action. They were stationed

2. ku index 42.04.1.

on the south platform of the ancestral temple, one on each side of the two sets of steps leading up to it, and near the four chariots which stood at the foot of the steps. They may have been the outrunners before the horses, ku ku, who always carried Ko.

3. See discussion under Ko 35 and Ko 117.

From this placing of four men bearing Ko at the very front of the temple we can see that the Ko held an important place in the ceremony and it is possible that the artificer who made many of the

ornamental Ko of this monograph had in mind such ceremonies as the one described in the Testamentary Charge. The Ko occupied the same position in the ceremonial dress of ancient China as the sword did in recent European court dress. No officer was properly dressed without it. The Stories of the States¹ records "Duke Yu put his curved ko on his shoulder and went out to meet the ambassador, Mr. Kuang heng tiao ho, ch'u chien shih etc.

1. Kuo Yu, Chin state, Chin pu, ninth chapter.

This is a late survival of a bronze dynasty custom such as is vividly pictured on the YC and perhaps even more clearly on a set of bronze vessels ^{now in the R. S. M. A.} This set was found in a brick kiln near Anyang, railway station ^{seen there by the writer} and was ^{and} called the "box with the halberd set". In the inscription on these vessels the halberd is held point up as described in the Testamentary Charge. It is of interest to note that scholastic commentators applied this phrase "trapped a Ko point up", shih ko shang ian, to a spear with an extra point turned up at one side. Yang, III, p. 556, so interpreted it and most Chinese dictionaries still show pictures of ko carried like spears. No wonder a modern interpreter places more confidence in archaeological evidence rather than in ancient scholastic notes.

3. While not actually mentioned, the presence of the dancing ko is implied in the Testamentary Charge. According to the text, the hereditary dancing costumes, the crane, tortoise shell, and the great drum were placed in the west room. The war-dances ^{Ts'ung} of the Chou ritual celebrated in six movements the conquest of the Shang dynasty and the pacification of the country. The war-dance, involving the use of the Ko did not originate with the Chou dynasty; it was used already in the Shang ritual. ^{see Chien pien 1.18.4 et al} The dancing costumes

referred to were handed down from the past. The name Yin which describes them is not the name of the maker as Han commentators supposed, but rather "hereditary" as used in the Day of Supplementary Sacrifice.

To sum up: Ko were used in ceremonies mentioned in the Testamentary Charge in eight ways which are also representative of its ceremonial use generally.

1. Two special Ko were carried by the King's body guards as symbols of authority.

2. The large jade Ko wrongly called Chien-t'uei in the text was the symbol of kinship rank presented to the King at his investiture. It was carried by him in the ancestral ceremonies and as one of the national treasures from the past, it was laid out in the Ancestral hall where it was called great jade, Ta Yi.

3. The Great Protector carried a smaller jade Ko to the hall when he offered sacrifice on his own right. This is called in the text Chang and defined as half a t'uei. From this and other references we know that nobles carried jade Ko of different sizes as symbols of their rank. Since however, the lengths of jade Ko of the Shang period are not uniformly graded, the jade blade with bronze hafting is possibly to be identified with the Shang half-jade Ko or Chang.

4. The King carried as his personal equipment a Ko and bow and arrows. This Ko was a short, well made and beautifully decorated weapon called "a pointed Mo", tui chin Ko.

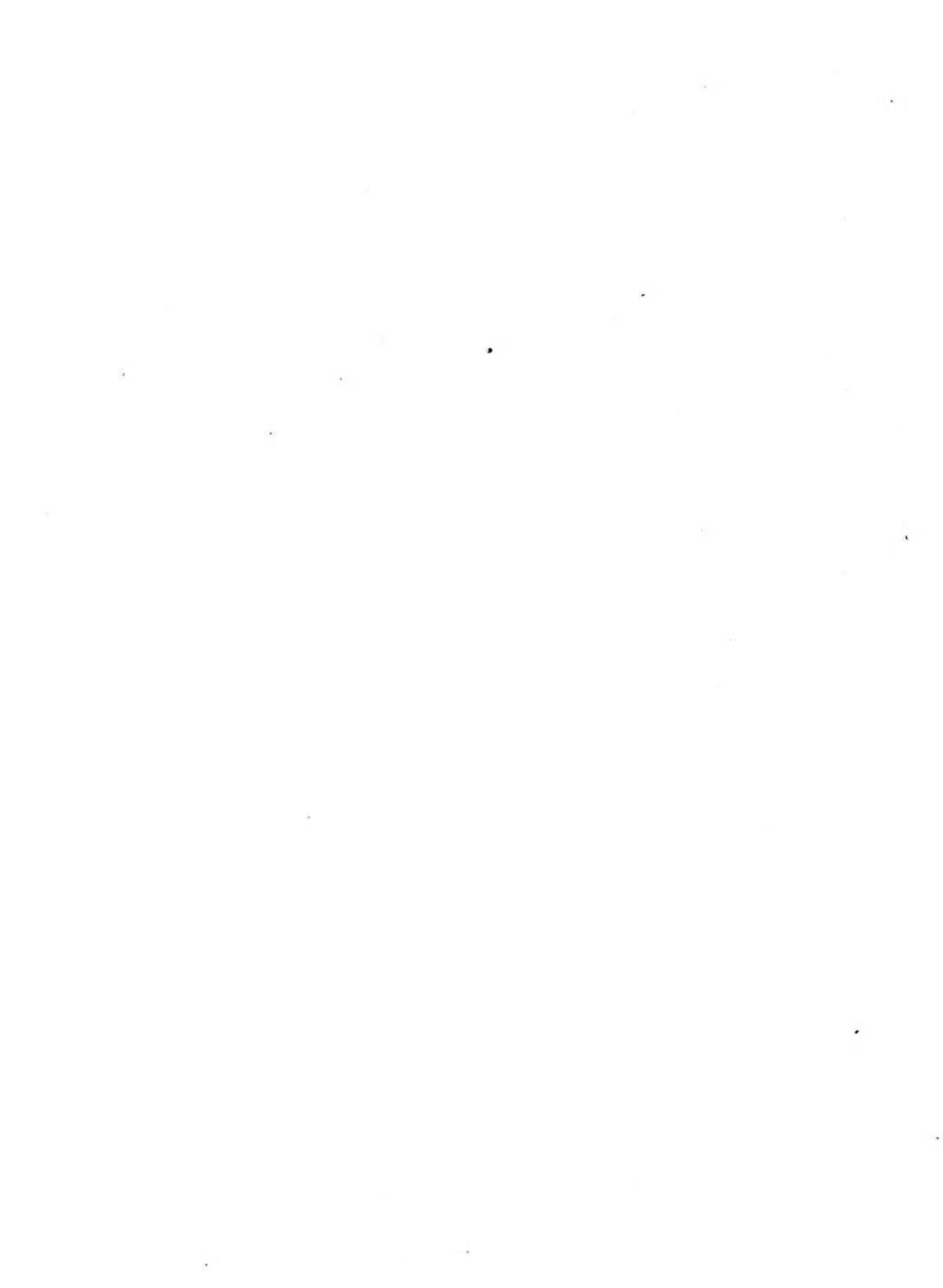
5. In the west part of the temple hall at the ceremony an officer held a socketed Ko called a Ch'ü possibly as representative of Shang dynasty weapons. The ritual Li Chi 22.4.25 says that all four officers, hsiao ch'en, stationed in the hall carried Ko which is a general name for these weapons.

6. In the east part of the temple hall at the ceremony an officer held a triangular Ko or perhaps a four-ringed lance Ko sometimes and frequent weapon found in the early Chou Tombs at Hsiao Hsien. It was called a tsui, possibly a representative of Chou dynasty weapons.

7. On the front platform on the hall, four guards held decorated ordinary ceremonial Ko "point up" at the ready. These men may have been charioteers or outrunners called chien sa who cleared the way both actually and ceremonially for the king.

8. Ko were also used in the tsai-tsai tsai ceremonies performed before the ancestors in the ancestral temple.

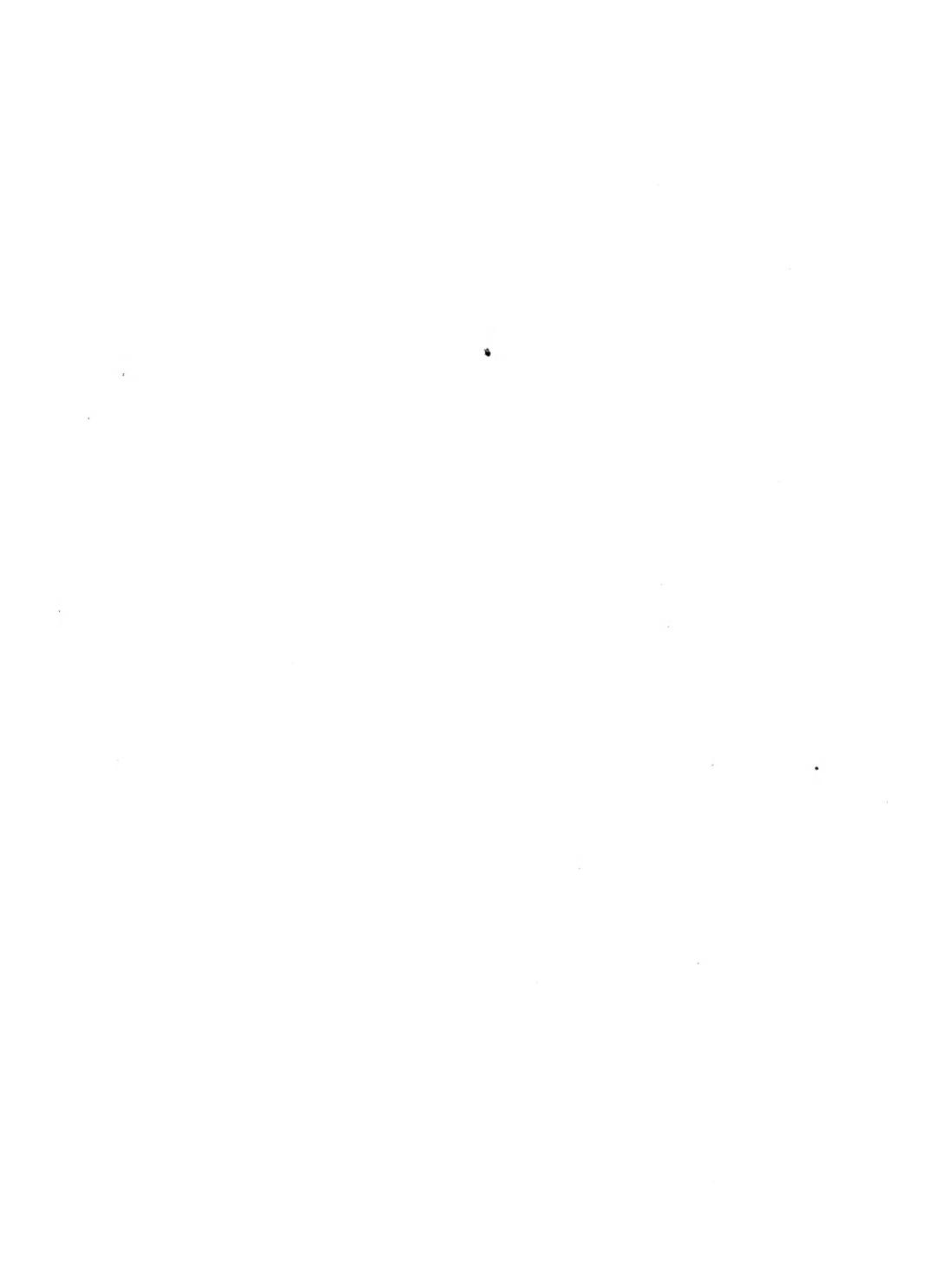
In each case these Ko were appropriately decorated for ceremonial use.



C. Funereal use.

The classification of the Yo is somewhat confused by its use among the ming-ch'i found in Shang dynasty tombs.

The Chinese term ming-ch'i should become a loan word. There is no equivalent in a European language, which exactly expresses the idea. The term designates those "obvious objects" placed in tombs to show the "filial-piety" of the mourners. They have been called "vessels to the eye of fancy", "spirit vessels", "ghost objects". These terms are based on later definitions by Chinese commentators of the Han dynasty (A.D. 20-220) who had the point of view of their own time and not that of the Shang dynasty. This is not the place to enter into an exposition of the religious ideas on which the Shang dynasty burial customs were based, except to state that the term ming-ch'i as applied to Shang dynasty objects is confined to those things which were expressly made for the funeral and burial to complete an adequate furnishing of the tomb. The elaborateness of these furnishings depended on the standing in society of the person buried but also on the degree of filial piety among the members of the family who were conducting the funeral. Ordinarily in a wealthy family the actual ritual vessels and objects used by the deceased were buried in the tomb with him. His own vessels from his



altar inscribed with his own personal name and the names of his deceased fathers, mothers and elder brothers whom he honored in the ancestral ritual were no longer suitable for the use of his sons. These "real" personal vessels along with any other general sacred family vessels which were broken, mended, outdated or which the family were willing to use for this purpose were first gathered together. The balance of a complete set of tomb furnishings suitable to the deceased and to the desire of the mourners to express their affection or respect were made up of ming-ch'i.

In the writer's opinion ming-ch'i were not made for the purpose of deceiving the dead but to express that distinctive virtue of the Chinese people which we call filial piety, hsiao. The raison d'être of ming-ch'i was to put into "visible form" the respect for the person and status of the deceased. The spirits of the deceased, still living and knowing, followed with interest the last expressions of human affection. To fail to express it to the full was to be unfilial, pu-hsiao. However, the greatest desire of the deceased was the maintenance of his family among the living and the preservation of its proper status in society. To bury all the valued ritual vessels from off the family altar without replacing them with equally suitable vessels was to be still more unfilial, pu-hsiao, for this brought disgrace in society, where suitable ancestral ceremonies could not be celebrated without suitable bronze vessels.

To meet this situation, ming-ch'i were used. These objects met all the requirements in appearance, but did not in every detail the family unnecessarily. Lists of objects buried in the tomb were made and "announced" to the spirits of the deceased and those present at the funeral. The object had to conform to the written description. A bronze ko, ming-ch'i, had to be made of bronze if so designated, but the quality of bronze might be poor, the workmanship shoddy and the

size miniature. Where no material was named the vessels might be made of cheap pewter or clay. Stone or bronze ming-ch'i might simulate either elaborate archaic ceremonial Ko or contemporary usable weapons. This explains the great variety of shapes among the ming-ch'i. The quality of the object depended on the remuneration paid to the artisan, but an object properly finished and suitable to be used "above ground" was not called a ming-ch'i. There are many sets of ritual utensils in which all the objects including Ko were made for funereal use only. In such cases, apparently, the deceased had no personal objects other than those that could properly be used by his descendants, or else the "trade in" value of the good bronze in them was worth the exchange ^{in order to secure} to a more complete set as a ^{greater} expression of respect.

In the writer's opinion the contents of Shang dynasty tombs were always consistently ^{homogeneous}. That is, a vessel inscribed to be used in the ritual for a father or other ancestor would bear the name of the actual father or other ancestor of the deceased, but not the names of other persons. The graphs on Ko would be the ^{living} name of the deceased ^{cast} on ^{the ko carried} by his retainers. Such names had been used during his lifetime or were ^{living} court titles granted before burial. One does not find in a Shang tomb vessels that belonged to some other person.

1. [In a Chou dynasty cemetery at Tsun Hsien, however, vessels and Ko inscribed with different names were found in one and the same tomb. Apparently these Chou people were not concerned that all the burial furniture should have been the property of or ^{the ancestral relationships of} appropriate to the deceased. They were either his own before death or ming-ch'i, made for his burial]

Dr. G.D. Wu in Prehistoric Pottery in China, page 166, writes, "So far as I know from modern discoveries ming-ch'i were rarely used during the Shang-Yin period, when real objects of daily use were deposited in the tomb; they were used more often in the Chou, but not till the Han were they common." Dr. Wu is here confusing two types of ming-ch'i which are associated with

two different types of burial custom. According to the custom of Han I times there were buried in the tomb objects, needed by the deceased to maintain his physical life and comfort: houses, granaries, grinding mills, wells, pig stys, sheep folds, fowls, watch dogs, servants, cooking-stoves and a great variety of things modelled from clay. No doubt also things made of wood and straw have disappeared. Such objects are never found in Shang tombs. In them one finds all the implements and regalia which the deceased used in the worship of his ancestors. To the men of the Shang dynasty the important thing in the after-life was to maintain contact with the ancestors who had gone before and this was to be accomplished by burying with him his ritual vessels and personal ritual robes and equipment and that of his escort. In this case not all the objects were ming-ch'i, but only those necessary to make the set of ritual vessels complete.

The common man of limited means was ordinarily buried with a single Ko, presumably his own weapon, by his side. Richer burials have yielded numbers of Ko. There is reason to believe that in such cases groups of a certain number of Ko were included in the tomb furnishings and that this number was commonly 6. Thus five similar Ko were found with Ko 35. These are all ming-ch'i. The set of six Ko, Nos. 102-107, are strongly made and may have been used for court ceremonies such as are described in the Testamentary Charge¹.

1. (Legge III, 544-561; An Index 42.0207 and 42.0401).

This document refers to two officers of the body guard escort and four men with Ko on their shoulders, blade up, who stood guard on each side of the two sets of steps east and west of the great hall. This is a total of six. Further evidence to the same effect is given by two oracle bones which record the "Ordering of six Ko men"².

2. Ch'ien pien 7.34.2 and Hayashi 2.5.11. Date about 1200 B.C. It has been reported that several sets of ten Ko with ten beheaded men have been found by the Academia Sinica in the Great tombs in Lou Chia Chuang, Anyang in 1934-35.

CONTRIBUTIONS TO HISTORY AND GEOGRAPHY

General limitations

This study of the Shang Ko has opened up the way for still further researches into the history and geography of the Shang dynasty. Strictly speaking, these lie outside the boundaries set for this monograph. The studies of the inscriptions on the individual Ko have been made with a view to determining their more precise dates rather than to discovering historical and geographical information about their owners. Most references made in the catalogue to oracle bone inscriptions merely record the diviner's name in order to determine the date of the bone script periods in which the Ko were made. Therefore many of the suggestions advanced in these studies must be considered as tentative and not final. The presentation of the evidence in an English form has compelled the writer to risk many translations and interpretations of inscriptions which are open to dispute. It seemed better, however, to venture an interpretation of the graphs in English rather than to remain silent and call them merely "totem marks". This difficulty of interpretation does not arise in a presentation in the Chinese language where the graphs may be transcribed into modern Chinese script and their interpretation left to the reader.

The nature of the literary records.

All extant Chinese literature displays only a vague knowledge of the history and geography of the Shang dynasty. The orthodox interpretation of the move to Yin was that it represented a shift from north of the Yellow River to the south of it. The reason is, apparently, that the Chou conquerors of 1038 B.C.

wished to blot out all remembrance of the Shang people as the originators of Chinese culture. At first they condemned especially the last King of Shang and extolled the virtue of King Wen and King Wu, emphasizing that Shang had been conquered by the mandate of Heaven, T'ien ling. Confucius, 451-479 B.C. said he admired the ancients, Hao Ku. He travelled to the state of Sung in search of evidence for the ritual and history of Shang dynasty but found little. The documentary records had all perished.¹ He visited the capital of the state of Wei

1. Legge I, p. 22 Analects III. 9.

only two days journey from the waste of Yin but evidently did not learn that the capital of the Shang dynasty was nearby. He praised the culture of the Chou dynasty above that of the preceding two dynasties, Xia and Shang and said, "I follow Cucu, Ku ts'ung Chou".² By Confucius' time the propagande of the

2. Legge I, p. 24, Analects III 14.

Chou conquerors had succeeded. The Classic of History, Shu Ching which he is said to have edited was filled with Chou dynasty model emperor lore and propagandistic records of the conquest of the Shang dynasty.³ The judgement of Mencius (390-

3. See Ku Shih Tien and A. C. Hummel, The Autobiography of a Chinese Historian, Leyden, 1911.

305 B.C.)⁴ may be summarized as follows "After the death of

4. Legge II, p. 156, dates according to Prof. Ch'ien Mu. see Bibliography general.

model Emperors Yao and Shün of oppressive sovereigns arose one after the other. By the time of Chou, the last King of Shang, the world was again in a state of great confusion. Duke Chou assisted King Wu and destroyed Cucu, of Shang. He extinguished fifty states and the world was glad". The Classic of History

says, "Great and splendid were the plans of King Wen".

It is obviously vain, therefore, to search for the historical background of Shang Ko in literary sources only. These can be trusted only when supported by primary evidence such as that afforded by archaeological excavation and exploration, inscriptions on bronze ritual vessels of the Shang dynasty, and oracle bone inscriptions from Anyang.

The evidence of the inscriptions on bronze ritual vessels

The inscriptions cast on Shang ritual vessels were intended to facilitate their use in ancestral ceremonies. Many of them have only one graph; some have two or more graphs combined into a sort of "monogram", often contained in a square cartouche, ya. This is the court name of the owner. From the type of graphs used, the name often appears to be a court office such as "Ko Bearer" (Ko 70), "Keeper of the Ritual Vessels" (Ko 71), "Mounter of Chariots" (Ko 72), "Leader of Ten thousand" (Ko 75, 95), "Quiver bearer" (Ko 76), "Controller of Silk" (Ko 77), etc. In addition to these name graphs of the owner, day names of ancestors were frequently added on Shang bronze vessels. Many scholars seem still to be uncertain that the inscriptions on these sets of ritual vessels are of Shang date. Even so erudite and daring a research worker as Kuo Mo-jo in 1933 began his essay, "The evolution of inscriptions on ritual vessels in the Chou dynasty" ¹

1. Chou Tai Yi Ming Chin Hua Kuan, published as a supplement to volume I of his book, Ku Tai Ming K'io Lu K'ao, Tokyo, 1933.

with the following statement, "While some vessels have survived from the end of the Shang dynasty and from before the Chou dynasty, yet the number of those of which we can be definitely sure does not reach ten". He continues, "It was formerly considered that

all vessels with the ^{cyclical} day names, chia yi, etc. belonged to the Shang dynasty, but this custom existed even in the middle period of the Chou dynasty, so this old opinion cannot be entirely accepted."

The uninitiated reader would infer from the above that there are very few authentic Shang dynasty ritual vessels and that there is no evidence that ^{most} vessels inscribed with day names belong to the Shang dynasty. Such inferences would be quite wrong. There are at least 3000¹ inscribed Shang vessels, most

1. The two books Yin wen and 1st Yin alone list a total of over 2400 vessels. Not less than 600 additional are found scattered in many other books and in unpublished collections.

of them having ^{cyclical} day names as well as "owners" names.

It is true that there are only a few long Shang dynasty inscriptions on bronze vessels which bear upon them the full and unmistakable temple titles of Shang Kings and Shang dates. A bowl, kuai, with one such inscription is known to have been above ground for over a hundred years.² Its long text of 35 graphs is

2. It has the seal of the collector Chin Fu-t'ing engraved on the bottom of it. Shortly before the present war the writer obtained this vessel from Mr. C.F. Loo of New York. The inscription is recorded in Yin wen 1.19.3 and San-tai 6.52.2 and transcribed in the writers Chia Ku-Yon Liu (Oracle Bone Studies) 1933, p. 116.

well known to Chinese scholars and is undoubtedly one of the "less than ten" which Mr. Kuo Mo-jo would recognize as definitely of Shang date. The inscription is composed in the same manner as those on oracle bones beginning with the two cyclical graphs of the day wu ch'ên and ending with the month and year of the king. "In the eleventh moon, on the occasion of the kings, wei wang, twentieth annual sacrifice, ssu, the day of the united, hsieh, ceremony reaching back, kou, to Queen Yi Nu and King Ju

(Tsu) Yi illustrious ones, ho; one wild boar". The vessel was made in 1071 A.C. A general, sin, named "Composite ho" gave to one whose personal name was yi "twenty pails, yi of sacrificial liquor and small tokens which he used to make his precious sacrificial vessel in honour of his father Yi". Father Yi was the second last king of Shang, called in literary records Emperor, ^{Yi} (Yi Yi). The occasion for which the vessel was made was a special ceremony well attested also on the bones, conducted in honour of Queen Hi Ku and her consort King Yi (Yi) Yi whose unmistakable names it bears. The inscription is signed at the end with the "important office or family living name" of the "owner". This graph shows three men gathered around a standard the top of which supports a small graph "prisoner" using which

1. Prisoner sin is mentioned under ho 76.

seems to be the symbol of authority. The owner's important name may be transcribed li, the modern remnant of which is "to march" or "travel". Had this vessel been inscribed in the early Shang II fashion, omitting all record of the date and the historical occasion on which it was first used, it would have borne only the three graphs: "standard bearers, li," and Father Yi. Precisely these three graphs are found both on the lid and body of the pail, yi, belonging to this set². The associated steamer,

2. Red Yin 1.72.6 and 7, same as an-tai 13.49.1 and 2.

asien, (Yin ên 1.19.7) is inscribed "standard bearers", li, "Grandfather, tsu, ling" i.e. King Yen 'n. Ting. The three vessels of this set thus bear the names of three generations of royal ancestors of the owner, "Standard bearers, li". Standard bearer li is the important living name of a member of the royal house belonging to the same generation as Shou sin the last king of

Shang.

The genealogical nature of the inscriptions on these vessels provides additional proof that inscriptions on ritual vessels which bear only the living name of the owner and the day name of an ancestor do belong to the Shang dynasty and most probably to the royal family. On the bowl made in 1071 B.C. i.e. near the end of the Shang dynasty, the use of such otiose words as "made this sacrificial vessel, tso pao yi" had already become permissible. This proves that vessels which use these phrases cannot be excluded from the Shang dynasty on this evidence alone. The occasional use of longer inscriptions on one vessel of a ritual set probably began as early as the reign of King (Lia) Hsin immediately following the death of Tsu Chia in 1157 B.C.¹ In the

1. See No 133.

writer's opinion, the three-graph inscriptions without ^{the addition of} such "unnecessary words" are more often to be dated in the first half of Shang II culture period than near its end. The inscribed No and ritual vessels with a single graph belong to this group.

The fact that day names of ancestors are found on some bronzes as late as the middle period of the Chou dynasty does not preclude the dating in the Shang period of inscriptions which have only the name of the owner and the day name of an ancestor. On Chou bronzes these day names of ancestors are rare and most probably belong to the descendants of Shang who clung to old traditions. There is no evidence that the Chou conquerors adopted the Shang posthumous temple titles which used the day names. Inscriptions on bronze of the very beginning of the Chou dynasty call them King Wen and King Wu. When ^{cyclical} day names of ancestors are found on Chou bronzes they are associated with long verbose inscriptions which praise the merits of the owner's ancestors. The Chou



method of inscribing the date was different from the Shang. The year was called harvest, nien, instead of annual sacrifice ssu. The inscription began with the year of the King, the month and the phase of the moon followed by the cyclical graphs of the day. The compositions were eulogistic, extolling the virtues of King Wen and King Wu and declaring the gift of the mandate from heaven to the Chou dynasty. They recorded charters and gifts of the Son of Heaven and often covenants and records of conquests. It is the writer's opinion that ^{cyclical} name days of ancestors found on Chou bronzes are the names of ^{persons descended from} members of the Shang royal house ^{who inscribed them}. According to ^{Shang?} tradition the Chou conquerors employed many descendants of the Shang dynasty as officials and permitted them to remember their ^{Shang?} ancestors in regular ceremonies. But these later vessels and their inscriptions exhibit the contemporary fashions of the Chou dynasty.

The philosopher Mo Ti 480-390 B.C.¹ sarcastically described

1. Lo Tzu, lu wen section. The date is that given by Professor Ch'ien Mu.

the inscriptions of his time in words which may be applied to all Chou inscriptions. He wrote: "Attack a neighbouring nation. Kill its people. Loot its cattle, horses, grain, millet, goods, treasure. Write it on bamboo and silk. Carve it on bronze and stone. Compose it into an inscription for your ceremonial bells and tripods. Hand it down to your sons and grandsons of future generations and say, 'No one possesses more than I do'". In the time of Mo Ti, bells and tripods, chung ting, were merely sacred objects on which to record military achievements and the honours granted by the Son of Heaven. Since some of the events recorded on Chou bronzes can be identified in the recorded history of the Chou

dynasty, scholars have judged Shang inscriptions by these later standards and considered that the number of graphs on them were too few to be of use as a source for Shang dynasty history.

Many inscriptions on Shang bronzes have been available to scholars for nearly a thousand years. Cu-yang Hsiu published his Chi Ku Lu Pa Wei about A.D. 1050. The drawings and inscriptions of the great Imperial collection of the Sung dynasty Hsuan Ho Fo Ku T'u Lu were published about A.D. 1125. But only since the discovery of the oracle bone inscriptions at Anyang have we had the key to the interpretation of these brief inscriptions on the Shang bronzes. Up to the present, however, these two primary sources for Shang dynasty history have not been used in conjunction. The links between them noted in this study should lead to further use of this method in identifying names found on other ritual vessels with the names recorded on bone inscriptions. It is only by coordinating all the available information from these two primary sources that we can rewrite the historical and geographical background of the Shang Ko. Before we can understand the kind of information to be derived from these two primary sources we must clearly recognize their nature. Inscriptions on Shang Ko and the associated ritual vessels have been described in a previous chapter. The only information we can expect from them is the important living names of the owner and his ancestral relationships. From the beauty and elaborateness of his vessels we can judge his position in Shang society. Formerly, sets of Shang vessels were not left together but were dispersed among collectors. Recently, several sets have been unearthed at Anyang and kept together. The greater part of two such sets, ^(The boy with the halberd's set and the man with the jade circle's set) is in the

Royal Ontario Museum. The method of recording inscriptions has also obscured the recognition of sets. The vessels of the set were grouped according to shape in different sections of books of inscriptions. Many of the sets recorded in the present monograph have been gathered together for the first time. Yet it is only by considering the whole set that one can determine the relationship of the owner to the ancestral line of the Shang royal family.

The evidence of the oracle bones.

The nature of the evidence to be gotten from the oracle bones is quite different. These inscriptions are the contemporary records of divination signs or propositions made to the "fish bone" in the name of the king. The answer was given ^{to the initiated} by the ^{shape of the} divination crack, ku, produced by singeing the tortoise shell or bone. On the bones the "living names" of people and ^{the names of} places as used in the royal court were recorded. While oracle bone inscriptions do not provide a connected historical record, ^{yet since they do give contemporary names} they are by far the most important source for Shang dynasty history and geography.

In the endeavour to fix the dates of the inscribed Shang ko, the oracle bone inscriptions were searched for similar names. It was discovered that most of the graphs cast on the Shang ^{bronze} ko contained the names of persons mentioned also in bone script period I, dating from the move to Yin in 1311 B.C. to the end of King Wu Ting's reign, 1197 B.C.¹ Many of the graphs on the Shang ^{bronze} ko

1. Mr. Tung Tso-pin, Criteria, p. 373, seems to restrict bone script period I to Wu Ting's reign, 1255-1197 B.C., but the writer considers that many oracle bone inscriptions antedate this reign. Some may immediately follow 1311 B.C.

were also found to be the names of "owners" of sets of bronze ritual vessels of which the ko formed a part.² In this way the

2. No 35, 100, 102-107 were all reported by reliable authorities to have been found in the same pits with sets of ritual vessels.

graphs on the Shang Ho became a link between the inscriptions of oracle bone inscriptions with their wide variety of historical and geographical information and the records of the ancestral relationships of the owners inscribed upon the vessels. Thus we learn that the owners of Shang Ho whose names were cast on the butt of the weapon were important persons living ^{was in use} when the bone-script period I, 1211-1197 B.C.) and that they possessed elaborate sets of bronze ritual vessels. See The bronze vessels of the late Shang period (See Journal of the American Oriental Society, 1937, pp. 1-17).

It also becomes evident that these sets of vessels are to be dated in the early part of the Shang II period, and that a considerable amount of information about their owners is to be gotten from the oracle bone inscriptions. This has given in turn, a real colour to the names of these persons in the oracle bone inscriptions and has supplied us with their ancestral relationships which could not be learned from the oracle bones alone. The ancestral relationships indicated on the oracle bone inscriptions are those of the reigning king only. The skeleton of Shang dynasty history is the genealogy of the Shang royal house. About one half of the oracle bone divination wishes made on behalf of the reigning king were concerned with proposed royal ancestral ceremonies. From these records it has been possible to reconstruct the genealogy of the kings and queens of the Shang dynasty based on contemporary sources⁶ and to prove that

6. See the writer's Shang in Hai Chin, (radio one studies) 1933, pp. 61-125. The names of the queens are not found in the histories.

the records of Shang genealogy preserved in the Han dynasty histories are substantially correct. The kings and queens of

the Shang dynasty are known both in the contemporary bone records and in the subsequent literary history by their posthumous ancestral titles coupled with their name days and not by the "living" names and titles by which they were known during their lifetime. The realization that the "living" names cast upon ^{the} to and ritual vessels are the names of important persons frequently mentioned on the bones and that many of these had the same ancestors as the reigning king leads the writer to believe that the genealogical skeleton of Shang dynasty can now be clothed with flesh and blood history.

It is true that the inscriptions on the bones are not historical records in the strictest sense. They are the divination wishes made in the name of the king, "proposals" for action rather than the record of deeds accomplished. When on Ch'ien pieh 7.31.4 we read that a divination wish was made "asking about commanding 'standard bearer Chu' (the owner of ko 137) to follow Marquis of Yung (possibly the military title of the owner of ko 70) and make a looting raid, k'ou, upon the state or capital of Chou", we are supplied with considerable historical information even though we do not know whether this proposal was put into effect or not.

We are just at the beginning of oracle bone studies. Ink rubbings of the inscriptions have been published making this historical material available for direct study. The graphs have been listed under the categories of the Siuo Wen dictionary compiled about A.D. 100. Unfortunately most Chinese scholars base their interpretations on the Siuo Wen definitions which are filled with Han dynasty theories current 1400 years after the flourish of the graphs they are used to define. Even granting the marvellous continuity of Chinese script, this is a wrong method to pursue.

More use must be made of the bone inscriptions themselves and of contemporary archaeological material to determine the original meanings of the graphs. It will then be understood why the translation of cryptic divination sentences is so difficult especially when many of them are fragmentary. Many things, however, have been accomplished. The names of over a thousand persons and places have been separated out although at times the same graph appears to do duty for both place and person. The bone script has been classified chronologically and the names of some 50 diviners have been listed. The genealogy of the royal house has been reconstructed, including the names of the queens who had descendant kings to remember them in cere onies, and other members of the royal house ^{though they} who did not reign themselves but had descendants who did. A chronology may yet be derived from the cycle of 60 days and the months recorded on almost every bone inscription, but in the meantime we are forced to use a tradition current about 300 A.C. based on the ancient text of the Annals found with the Bamboo books excavated in A. D. 281 from the tomb of King Aniang of the Wei state in north Honan about 50 miles south of Anyang. When the oracle bones are grouped according to their bone script periods the strikingly contrasted groups stand out. They are (1) the wars written in large bold graphs of bone-script period I to which the names cast on the Ko belong and (2) the hunting travel and wars written in the delicate minute graphs of bone-script period V for which ~~no~~ parallels on the Ko have been found, ^{except the inscription on Mr. G.L. Winthrop's Jade Ko No. 16}. On each of these groups there are hundreds of names of places and persons which should yield much historical and geographical data. The writer has traced a punitive expedition from Anyang to Linchia in Santung by means

of the inscriptions in the second group and it would be possible from the hunting and journeying directions to determine the area covered by these place names in the latter part of Period II period. The number of days given in the directions to various places on a journey should indicate approximately the distance by which they are separated. In the writer's opinion the travels covered most of the cultivated land area of North China and many of the places names are roughly so far as the site of administrative centres in the 20th c. See Chicago University Journal No 2, Tsiman, 1935, pp. 127-129.

A few of the place names in the third script period I are found among the names of places recorded in Period V, but many of them are different. This leads the writer to conclude that the later ones were carried on in a different area. Mr. Sun Tso-rin (Criteria, p. 336) has set down in a general manner the comparative locations of a number of the important places and regions, fang, in Script period I. They lie west and north of Anyang and appear to be the names of tribes or nations and places located somewhere along the 800 mm. rainfall line which was later fossilized into the great wall separating the nomadic people and the agricultural, city-dwelling people who cultivated the land and developed the arts and crafts of ancient China so well illustrated by the elaborate bronze ho and the bronze ritual vessels recorded in this monograph.

The geography of this area represented by the names of places and peoples found on the inscribed ho and the associated bone inscriptions extends from the Shan, Shan, (see ho 99, 102-107) people in the far west to the most important enemy nation in the north-west transcribed by Mr. Sun as ku 104. The "earth round region" T'u fang seems to be located in the north. These are

(Giles 628) The alternate pronunciation ku instead of ku is used for the reputed burin place of ku 720

apparently all foreign enemies. Relationship with the Tibetans seems to have been more intimate than with the other two whose names disappear from the oracle bone inscriptions after the bone-script period I. These foreign invaders were in China from 1311-1197 B.C.¹

1. According to Mr. Tung's "long" dates, the period would be 1395-1281 B.C.; according to the orthodox chronology 1587-1266 B.C. The reader will find modern scholars referring to this important period by any one of the three chronologies.

The Wars of Bone-script Period I

The wars of bone-script period I have been called "the Wars of Wu Ting" from a reference to them in the Classic of Change. Hexagram 63.3 records, "High Ancestor Kao Tsang (Wu Ting) punished the terrible (demon) region, tsuei fang, and in three years subdued it".² The history of the period preceding Wu

2. Legge, Yi King or Book of Changes, p. 206.

Ting's reign is told in the three sections of the P'an Kêng document in the Classic of History³. In their present form and

3. Legge, III, pp. 220-247. See p. 221 for Legge's presentation of the orthodox interpretation of the move to Yin. According to this view Yin lay south of the Yellow River at Yen-shin Hsien and the move thither took place from north of the river at Kêng or Tsing. This confusion was based on the misinterpretation of a graph in the introduction to the Classic of History which seemed to identify Yin with Fo; western Fo was supposed to be at Yen-shin Hsien. The graph was not Fo Yin but chai Yin "to make a dwelling place at Yin".

according to the orthodox interpretation they portray the move to Yin as a peaceful shift of capital from a land exhausted by cultivation and flood to a new and unoccupied Utopia. The

assumption that all the wars of Bone-script period I occurred in Yu Ting's reign seems to rest solely on these two literary suggestions.¹

1. Scholars frequently begin their researches with such historical traditions, place names or definitions of graphs as found in the later classics, histories or dictionaries and the commentaries on them. They anchor the information found in the Shang inscriptions on the oracle bones or bronze ritual vessels to these traditions like a drifting kite tied to a broken stick.

Shang inscriptions antedate by a thousand years the present literary records which were all collected in the Han Dynasty after the burning of the books in 213 B.C. Inscriptions should be allowed to tell their own story, checked only by archaeological evidence. The names of places and persons should not be connected with literary tradition until all the relationships in the bone and bronze inscriptions of that period have been taken into consideration. This is especially true of bone-script period I with which our epigraphic records begin. The graphs on many ko in this monograph are the same as those of persons and places mentioned in references to the wars of this period. The presumption that the graphs are late in date simply because they are cast in bronze can not be allowed to prejudge the case. The date of the ko is fixed by the lifetime of the owner and this is indicated by the bone inscriptions. The name of the owner may have originated in the name (1) of his office at court or in the nation, (2) of the nation, state, region, territory, people, tribe or family which he governed, (3) of the place or city which was his administrative centre. In oracle bone inscriptions the context alone indicates which was meant.

There are about 6000 oracle bones from bone-script period I.

At least 300 of these record the name K'ü fang who appear as a people making inroads into the Shang settlements. The name is not found after this script period and it is a moot question at what date within the period these marauders were driven from China.

The only method of deciding whether the bone fragments belong to the reigns of Wan Yang, Hsiao Hsün and Hsiao Yi or to that of Wu Ting is by means of the names of ancestors found on the fragments themselves. In all the inscriptions examined, only the names of early ancestors are found. Ch'ien pien 1.23.6 records the name K'ü fang and Mother Chi the wife of Pao Ting. This fragment belongs to the earlier reigns from 1211 to 1256 B.C.¹

1. Hou pien has the relationship "father" but records no day name. This is a strange omission.

We may, therefore, say that at least part of these wars with the K'ü fang occurred before the reign of Wu Ting. That they continued into Wu Ting's reign seems to be indicated by the appearance of grandfather Hsu Ting on Hou pien 1.29.4 and Hayashi 2.5. 14. It is strange however that the name of Father Yi for Hsiao Yi or any other member of his generation which occur so often on oracle bone sentences elsewhere should not be found on this group containing the etnic name K'ü fang. Mr. Tang Tso-pin lists 12 diviners' names in bone script period I and others are known to have lived in this period.² Only seven of these names

2. See appendix.

are found in association with K'ü fang and of the seven only three, Han 1.1, Pin 1.4 and Cheng 1.5, occur with any frequency. These diviners' names are associated with the earliest bone inscriptions.

The result of this study of the date of the K'ü fang's in-

roads into China and their withdrawal from its borders is to suggest that they came in the period preceding Mu King's reign and departed in the early part of that reign.

Oracle bone Yavashi 35.1 has two sentences. The lower and first of them reads, "Inquire about the matter in a ceremony in honour of Ancestor Tsu King." Cheng chih yu tsu King. The second records, "Inquire about not calling out troops to war with K'u fang". Cheng wu hu chan K'u fang. "To war" is here pictured by the blade of one Yo striking at the hilt of another, their handles being held in opposite directions. Although too much should not be read into such a symbolic representation, the form of the graph seems to suggest that K'u fang also used the Yo as a weapon of war.^P It is an interesting fact that among the many weapons found in China the Yo, axe and spear or some variety of them are the only types known. The sword and dagger so common in the ancient Near East are absent. This again suggests that these foreign people who made inroads into China and possibly caused King Tan Kien to move from south-eastern China to Anyang to meet their aggression, did not come from the Near East via the Kansu corridor, but that they were rather a northern people from Central Asia who possibly occupied the basins of the Ob and Yenisei rivers. The archaeology of this region is being studied by Russian scientists and we may expect light on this problem from them in the future. This area appears to have ^{produced} archaeological material with similarities ^{to that obtained from} sites in the Perm region of the Urals and so further west to the Baltic.

The halberd in Bronze Age Europe is said to have spread in succession from Spain to Ireland, England, Scotland, Saxo-Thuringia,

Sweden, Lithuania and Slovakia but never to have been adopted in

Silesia, Czechoslovakia, Hungary, southern Germany or France.¹

1. V.G. Childe, The Bronze Age, Cambridge, 1930, pp. 87-89; Sean P.O. Riordain, The Halberd in Bronze Age Europe, Archaeologia, Vol. 36, Oxford, 1936, pp. 193-221, distribution map, p. 277, fig. 58.

Both Childe and Riordain (p. 223) mention the supposed halberd with gold-capped rivet from Neft Grave VI at Gyenes. They apparently depended on Evans' Excavation of Minos, II, p. 177, fig. 57, which gives no impression that the weapon is as much as 850 mm. long. Cf. Karo, Die Scheitgräber von Lykensis, No. 928, p. 163, pl. XCV. The writer attempted to haft this weapon as a Ko from careful drawings but was convinced that it was in reality a symmetrical but worn sword.

The slanting row of rivets may not be in their original position. From Karo's photograph one side appears to have been restored and to have thrown the rivets back. Karo notes that the tang was restored. The blade should be re-measured to determine the correct position of the rivets. It bears no resemblance to the beaked halberds of North Europe. The two small bronze sickles from Becklo and Hama, lengths 13.2 cm. and 11 cm.² do not seem to be related except insofar as they

2. V.G. Childe, The Dawn of European Civilization, p. 87.
Gerald Inghall, Early Iron Age, Archaeology, 1943, p. 27, note 5, plate VII.3.

are grain sickles. The pictures on cylinder seal figures from early Mesopotamian sites appear to this writer to represent axes such as those found at Z and not beak-shaped halberds or ko.

The European distribution of the halberd noted above leaves out of account the very early appearance of the halberd in north central Russia, in northern central Asia and, in all China.

While the European halberd is hafted with copper rivets, in shape it is very similar to the Chinese Ko. The upward sloping tendency of the European halberd approximates more to the shape of the Chou dynasty blade except that the European blade never developed a hu. The Chou blade is to be dated 1039 B.C. after the Shang ko but it may represent a development

of a type that had begun in northwest China at an earlier date. If the halberd or Ko was a common weapon of offense in northern Eurasia and China in the earliest bronze age, the possibility of this weapon having spread into Europe from the east should be explored as an alternative to the theory that the halberd originated in Spain. The contiguity of the areas using the halberd or Ko from Spain through northern Europe, north Russia Southern Siberia to China demands an explanation as much as does the absence of that weapon from south central Europe and the ancient Near Eastern world. The Shang Ko was a highly developed weapon at the beginning of Shang II (1511 B.C.). It is not impossible that the European bronze-age halberd, like the Ko, had its origin in the Neolithic sickle of northern Eurasia. The two weapons might be regarded as different expressions of the same development from a utilitarian sickle to a weapon for war and a symbol of rank and power. The presence of the sword in bronze-age Europe along with the halberd may indicate two streams of influence, one from the Near East and one from the Far East by way of the northern steppes and rivers.

1. Lortz's plate of Chinese Ko, op. cit., p. 243, Pl. 69 is a very mixed group and somewhat misleading. They are by no means to be "regarded as belonging in the main to the Han quarter (206 B.C. - A.D. 220)". Only the non-C Chinese ones are so late. The writer dates these Ko as follows:
- No. 3 is Shang II, type V, 1511-1059 B.C.
 - No. 5 is Shang II, type VII.
 - No. 6 is Chou I, 1059-771 B.C.
 - No. 1 is possibly Chou I.
 - No. 2 is possibly end of Chou II, 770-481 B.C.
 - No. 4 is end of Chou III, 481-207 B.C.
 - Nos. 7-10 are probably Chou III to Han I, 481 B.C.-A.D. 220.

The rivet holes of No. 3 are not ordinarily found in Chinese Ko. Nos. 7, 9, and 10 are more Siberian than Chinese in type.

There is a marked difference between the Shang Ko and the later Siberian form found in the Minussinsk area. The

division line between the North Eurasian bronze and
the latter area and the Caucasus line, but not the
west wall of China and not west of the Ural mountains.
The interrelation between the bronze-iron transition
of ca. 1300 B.C. and that of the bronze-iron transition
to be defined; the latter is not to be confused with the
date, valid for southern Iberia.

From the point of view of the bronze-iron transition, there
is a clear difference between the bronze-iron transition
in the Caucasus, size and art. It is obvious, op. cit.
fig. 2, p. 10; see also p. 10, fig. 2, p. 10 and
p. 11. The bronze-iron transition in the Caucasus,
is very similar to the bronze-iron transition in the
Caucasus, but the bronze-iron transition in the Caucasus
is not to be confused with the bronze-iron transition
in the Caucasus.

According to Hallgröm, swords are found in the
areas from which the Ural and Siberian swords came.
Hallgröm, op. cit., 1911, 90, see also, op. cit.,
p. 292.

Many copper sickles are found in the fields of the
Venisel and the Ob river basins. The people of the
oldest bronze age in the region were settled agricultur-
ists and the sickles were used for agriculture.
Cambridge, England, p. 246, fig. 162, hafted bronze
sickle, length, 100 mm. (4 ins.).

A P P E N D I C E S

... 11 ...

Proposed ...

(1) ...

for the occasion of the ... and ... the date of the construction of the ...

(2) ... historical ... order to facilitate ... already ...

is now ...

(1) ...

Quantity.

... correct to ... of the ...

(2) 'The present ... the bamboo books', Yu Pei Chi Sin Chi N..., ... ^{AD} ... after the ... 'The last item ... written in 299BC ... before ...'

Data ...

1. The ... until the founding of the ... of various ...

2. The ... until the founding of the state of ...

3. The ... of ...

The second and third parts of data ... covered by ...

Bamboo Annals. This represents an unknown editor's attempt to complete the "Ancient text" available to him in order to make it correspond to the summation period of 273 years. It may be based on more old data than we recognize. By comparison with Column 2 which gives the orthodox lengths ascribed to the various kings in the Han dynasty it is possible to see some of the sources of Mr. Tsang's adjustments. Only in the cases of Hsiao Yi and (Ti) Yi does he differ from both. In Chinese reckoning the full year of time in which a king died was included in his reign. The new King counted his own reign from the beginning of the new year following. The remainder of the old year was part of the period of mourning when the ministers of the old King continued his rule and installed the new King in office. The dates given in Column 1 are the first years of each new King, the former King having died during the previous year.

I A Table of the Chronologies of the Shang II Period.

Shang Dynasty Kings	Tentative Chronology	reign lengths,			Orthodox Chronology.
		Tsang's and adapted.	Present Bamboo	orthodox	
F'an Keng	1325	28	28	28	1401 <small>Present Bamboo See Johannes MH appendice III Vol. I p. cc XLII. 1315</small>
Move to Yin	1311	14	14	14	1387 1301
Hsiao Hsin	1297	21	0	21	1376 1287
Hsiao Yi	1276	21	10	28	1355 1284
Wu Ting	1255	29	29	29	1326 1274
Tsu Kung	1236	7	11	7	1219 1215
Tsu Chia	1129	20	20	20	1200 1204
(Len) Ksin	1156	5	4	6	1225 1171
K'ang Tse T'ing	1150	3	3	21	1219 1167
Wu Tse Yi	1142	1	10	1	1198 1157
Wen Yu Ting	1138	13	13	3	1194 1124
(Ti) Yi	1125	35	9	37	1191 1111

(Chou or S'hou or Ti[nsin	1090	52	52	32	1154	1102
Destruction of Shang	1038				1122	1050

The chronology of the Chou I period, 1038-770 B.C. does not readily yield a satisfactory division of the 267 years into the reigns of the kings. The writer prefers the Present Text of the Bamboo Annals although they have been mutilated by a later editor because the chronology given is based on an ancient text and no doubt preserves much of it. In a note the editor says he altered the 267 years by adding 24 years at the beginning, before the supposed transfer of the tripod to Lo Yi, making 291 years to which he added 11 years of King Lu, making a grand total of 302 years, see Legge III, p. 153. (The 24 years added are all one year short as a result of his misunderstanding of the year 1 B.C.) The Chinese editor however did not follow his own computation, for the years he gives to the individual reigns total 290 to 770 B.C. or 269 to 791 B.C. The latter is 12 years in excess of the supposed 257 years. The writer has taken the length of King Lu's reign to be 14 years, which is given as the supposed Kung Ho Interregnum instead of the 26 which the editor assumed. This difference of 12 years offers a solution of the problem without altering the other reign lengths. It seems to the writer that this is where the editor became confused and departed from the Ancient Text of the Annals.

There are two quotations given in Shao-t'ao's edition of the Ancient text of the Annals of the Bamboo books, Ku pen chu chu chi nien which refer to Kung Ho.

1. "Ho, baron of Kung protected the King's throne, Kung ho ho kan wang wei". From this we learn that Kung ho was the name of a person and not of an interregnum.

Hsual	827	46	46	46	827	847
Yu	781	11	11	11	781	781
P'ing	770				770	770

After the move to Lo Yi at the beginning of King Hsin's reign the correct dates of the Kings of Chou follow the orthodox chronology. This is not true however of the dates of the rulers of the various states which were very much confused in the orthodox computations and correspondence tables.

This study is limited to the second part of the Shang dynasty for the greater part of the objects have come from the site of Yin, Anyang, in North China. This period has a cultural unity which may be designated Shang II for purposes of general description. The span of time is 270 years from 1311-1040 B.C. These exact dates are taken from the ancient text of chronological records current about 300 B.C. They are considered more correct than the orthodox chronology calculated in the first century A.D. which gives 1337-1113 B.C. The latter 1193-1113 B.C. are a modern combination which adds the 270 years of the Ancient Text to 1113 B.C. of the orthodox chronology.

The Ho was already in use before the beginning of Shang II, i.e. in Shang I. The Ancient Text ascribes to Shang I 345 years, from 1534-1189 B.C. The historic period preceding Shang I is given as 471 years and dates back to 2005 B.C. The Ancient Text calls this the Ho dynasty. It is a moot point whether this is a suitable term. The bone inscriptions refer to a long series of historical personages antedating Shang I; There is as yet, however, no sure proof of the existence of another historical

dynasty separate from and antedating the Shang. The writer believes that historical time as recorded on bone inscriptions dates back to 2000 B.C. This length of time at least is required for the development of the high state of bronze culture existant at the beginning of Shang II and illustrated by Ko in this monograph and by the sets of bronze ritual vessels to which they belong. The writer would be quite willing to accept the terms Hsia I and Hsia II to cover the 471 years attributed to that dynasty, for he believes that some such term is desirable for designating an historical period. It is evident that Dr. G.D. Wu in his Prehistoric Pottery in China, London, 1938, had the same difficulty about the inclusion or omission of the Hsia Dynasty and the implications of the term Prehistoric artifacts from culture strata of individual sites such as those presented by Dr. Wu in Table 5 on page 170 are best designated by the names of the master type site and its stratification of cultures. The correspondences between these sites and their absolute dates when determined can readily be fitted into the general framework of the Historical Culture periods. Both these series of names are necessary to designate artifacts not exactly dated. Thus Ko 55, 59 and 60, found in the culture strata at Hsiao T'un would be designated by reference to the pottery and its stratification as Hsiao T'un II, according to the terminology adopted by Dr. Wu. These Ko have been called in this monograph, Shang II. Dr. Wu, page 42 says, "Hsiao T'un was not inhabited in the Red Pottery period, but only later in the Black Pottery period, after which there was an interval of perhaps not more than a few centuries

before the Saang-Yin people came". This implies that the Black Pottery period is to be dated before Saang I. Dr. Wu's thesis was limited to a discussion of "Prehistoric Pottery in China" as this thesis is restricted to the "Shang Ko". The period of time which the two studies have in common is designated by Dr. Wu as Hsiao T'un II. His table of Correspondences on page 170 is separated into two parts with the sentence "at the sites below this line certain prehistoric wares persisted into historic times". Below this he enters on the first line as contemporary with Hsiao T'un II not only the nearby site of Hou Kang III, but also Sha-Kuo T'un II in South Manchuria, see map facing page 1, site 18; Hsi Yin IV, map, site 9, and Ching-ts'un I, map site 10, in Southern Shansi; and Fan-Shan, map, site 12 on the T'ao River, a southern tributary of the Yellow River in Western Kan Su. The writer has no wish to press these correspondences but merely to point out the possibility that they are correct and to suggest that these culture sites though widely distributed in area are the places to look for Ko, bronze Types III-X and the proto_type I stone sickles and jade Ko, prototype II of the Shang II period. The pottery at Tou Chi T'ai in Western Shensi, site 11, where jade Ko 17 is stated to have been found is placed in the period following Hsiao T'un II.

These 13 pottery periods of Dr. Wu's table (page 170, 7 before and 6 after the move to Yin) do not conflict with the historical culture periods used in this study. Excavated artifacts are best designated by the names of the type site and its stratification of culture layers until they can be given absolute

dates or their correspondences in historical culture periods.

The Ko discussed in this monograph cannot be given any designation based on archaeological culture strata. We are compelled therefore to use historical culture periods which are given below in the suggested chronology and the accepted orthodox dates. The term Hsia is placed at the beginning for lack of

any better historical name, Culture Periods	Relative Chronology	Orthodox Chronology
Hsia(?) (I and II)	2005-1535 B.C.	2205-1767 B.C.
Shang I	1534-1312 B.C.	1766-1388 B.C.
Shang II	1311-1039 B.C.	1387-1123 B.C.
Chou I	1038- 771 B.C.	1122- 771 B.C.
Chou II	770- 482 B.C.	770- 482 B.C.
Chou III	481- 207 B.C.	481- 207 B.C.
Han I	206B.C.-A.D.22	206B.C.-A.D.22
Han II	A.D.23-220	A.D.23-220

A TABLE OF THE SEXAGENARY CYCLE OF DAYS

The sixty days of the sexagenary cycle are designated as follows: Chia (1), Yi (2), Hsin (3), Hsing (4), Wu (neutral) or Mou (an earlier pronunciation--Jou Hsien) (5), Jen (6), Chia (7), Jen (8), Jen (9), Kwei (10), and

The twelve months are: Tau (A), Sh'ou (B), Yin (C), Mao (D), Ch'en (E), Ssu (F), u (G), wei (H), Jen (I), Ku (J), Sh' (K), Hsi (L).

The method of designation is indicated in the following table by applying the same numeral and Roman letters in proper sequence.

	10	20	30	40	50
1A	11A	12A	13A	14A	15A
2	12B	23B	34B	45B	56B
3C	13C	24C	35C	46C	57C
4D	14D	25D	36D	47D	58D
5E	15E	26E	37E	48E	59E
6F	16F	27F	38F	49F	60F
7G	17G	28G	39G	50G	
8H	18H	29H	40H		
9I	19I	30I			
10J	20J				

The following table shows the sexagenary cycle of days in the form of a calendar for the first ten days of the first month of the first year of the sexagenary cycle. The days are usually written in two parts of thirty days each.

First Part.

1 Chia Jen	11 Chia Jen	21 Chia Jen
2 Yi Mao	12 Yi Mao	22 Chia Jen
3 Hsin Shên	13 Hsin Shên	23 Yi Mao
4 Hsing Hsin	14 Hsing Hsin	24 Hsin Shên
5 Wu Jen	15 Wu Jen	25 Hsing Hsin
6 Jen Kwei	16 Jen Kwei	26 Wu Jen
7 Kwei Yin	17 Kwei Yin	27 Jen Kwei
8 Yin Hsin	18 Yin Hsin	28 Kwei Yin
9 Hsin Shên	19 Hsin Shên	29 Yin Hsin
10 Shên Hsin	20 Shên Hsin	30 Hsin Shên

Second Part

31 Chia Jen	41 Chia Jen	51 Chia Jen
32 Yi Mao	42 Yi Mao	52 Yi Mao
33 Hsin Shên	43 Hsin Shên	53 Hsin Shên
34 Hsing Hsin	44 Hsing Hsin	54 Hsing Hsin
35 Wu Jen	45 Wu Jen	55 Wu Jen
36 Jen Kwei	46 Jen Kwei	56 Jen Kwei
37 Kwei Yin	47 Kwei Yin	57 Kwei Yin
38 Yin Hsin	48 Yin Hsin	58 Yin Hsin
39 Jen Shên	49 Jen Shên	59 Jen Shên
40 Kwei Hsin	50 Kwei Hsin	60 Kwei Hsin

School-boys' copy tables were often written on uninscribed spaces of used oracle bones. The graphs were written one below the other in six perpendicular columns. There was very little other writing on oracle bones not strictly classified "divination sentences", pu t'zu. These tables were sometimes written upside down when compared with the original "divination sentences", pu t'zu, written on the same bone by the diviner scribe. Compared with the well formed graphs these tables were crassly written, naturally enough in view of the youth of the writers. The Ritual, Li Chi, says "At nine years teach the (boys) to count days, chia hien chia chin chu jia. The last commentator, Cheng 'sh'an, says "days" are the six chia tables chi, chia, chu, chu, chu, chu. Chia was the simplest bone graph. It was written as an upright cross. Each of the six columns of the table of nine days began with a chia graph. At ten years (boys) are to learn to write records, chia hien chia chu chu chia"¹.

1. Logan, Li Chi, vol. 1, p. 175.

present list has 31 names down to Shou (Shou or Ti) Hsin (31), the last king of Shang. The bone inscriptions record Ming Ta King (2) in the same manner as other kings. They give no indication that he did not reign as Mencius and the Shih Chi History state. The number given to each king in this list after Ta King is one greater than that given in other lists, e.g. P'an Keng is here listed as the 30th King of Shang then the 19th King Ta Yi. Wu Keng (32) successor of Shou (31) is placed at the end of the list. The list of Kings of Shang is somewhat different from the Shih Chi ancestral genealogy of the Shang. After the fall of the dynasty, no doubt there were a number of kings who ruled in his generation (31IV).

Beginning with the first king, the grandfather of Ta Yi, the names of the queens of each king in the direct line of succession were recorded on the bones. The names of other kings who reigned themselves but did not have sons who reigned were not recorded. This information is not found in the later literary records. When a paternal son presided at the sacrifices he always mentioned the queens from whom he was descended along with the kings. When more than one queen was recorded at least one son of each ascended the throne in the next generation. Thus in generation III Ta Yi (14) had two queens, Yi Chia and Yi Keng, and in generation IV there were two brother kings, Tsu Hsia (15) and Hsiao Chia (16). Tsu Hsia (15) had two queens, Yi Chia and Yi Keng, and there were two brother kings in generation IV, Tsu King (17) and Tsu Keng (18). Tsu King (17) had two queens Yi Chi and Yi Kuei and there were four kings and two other brothers in generation (VI), Hsiang (Hsiang) Chia (19), P'an Keng (20), Heiao Hsin (21), Father Chi (21A), Father Kuei (21B), and Hsiao Yi (22). Tsu King had three queens,

Pi Hsia, Pi Kuei, Pi Wu, and there were three brothers in the next generation: I-shu Chi (24A) I-shu Keng (24) and I-shu Chia (25). This confirms the record of the generations in the brother or son relationship of the successive kings.

An ancestral title of (Pi) Elder Brother Chia (26) is not recorded on the bones. He was simply called Elder Brother in the same manner as the persons recorded on 231, 237, 24, 251, 257, who did not have titles but were in the royal succession. If the number of young kings was 26 and not 11 then the evidence of the bones points to the order of (Pi) Elder Brother Chia (26) and I-shu Chia (25).

The present table has some new additions to the writer's table of 1937 suggested by this study of the ho. Elder Chia (24A) (Chia Chia I.1.231-11.3.2.4, Chia Chia I) and Elder Kuei were manifestly brothers. They were inscriptions mention them together as father and son of Ho 21, 22, 23-26, 28-29, 30, 31, et al. They belong to the generation of Pi Chia (20) also Chia (21) and Chia Chia (22) and Chia Chia (23).

Elder Brother Chia (26) was elder brother of Chia (25) (Chia Chia I.1.231-11.3.2.4, Chia Chia I and Chia Chia I.1.231-11.3.2.4, Chia Chia I) and not elder brother of Chia (23) who was called Chia Chia I.1.231-11.3.2.4 (number) Chia Chia I.1.231-11.3.2.4, Chia Chia I and was elder brother of Chia (24) (Chia Chia I.1.231-11.3.2.4, Chia Chia I) and not elder brother of Chia (25) (Chia Chia I.1.231-11.3.2.4, Chia Chia I) Chia Chia I.1.231-11.3.2.4, Chia Chia I.

Elder Brother Chia (26) was elder brother of (Pi) Elder Brother Chia (25) and 'I-shu Chia Chia (27), lot of I-shu Chia as Kuo 'uo-jo suggested in his note on Chia Chia I.1.231-11.3.2.4, 279. The script is somewhat earlier than Mr. Zuo judged. This is proved by the set of bronze vessels belonging to "Little Minister Man With

elaborate hair dressing kneeling before a liquor jar on an alcohol stove," whose name is found on some inscriptions (Sh'ien pien 5.30.1; Shang-shi 1.25.16). Even 37 vessels recorded by Jung Heng, Shen Wen Wen, 1939, Supplement, Vol. 1, p. 13 are either ling, shai-tai 13. 6.3 and 4; shou-shi, shai-tai 5.17.1; 7.3.8; and shou-shi, shai-tai 5.11.3. ling was, like shou, older brother of (11A) shai (11) and of shou-shi (17) and not of shai-tai (12).

This present table has been used to obtain the dates of sets of bronze ritual vessels from inscriptions and other inscriptions on them. To the right of them is recorded the absolute date which can be determined by the archaeological chronology may be as late as 1000 B.C. or as early as 700 B.C. The generations given in this table are a considerable number. It is based on a multitude of sources and errors may be detected. The date of inscription to this is given in the list of generations III, which place in the list was determined from the ancestral temple with Father 21 (11A) in inscriptions. A set of bronze ritual vessels of the name of Father Kuei (21) from the same inscriptions may be accounted for on the supposition that he was a son of King Wen (10): it is stated in the Shi (11) History that he (11) was son of Chiang (10) Shi (11), the son of T'ang (10). Father Kuei would then be related to the direct line of succession only through his great grandfather, T'ang Yi (14). If this were so, Kuei might well have been omitted by the reigning sovereign for the ancestral ceremonies recorded on the oracle bones. But because his father was King (10), his name would have been inscribed by

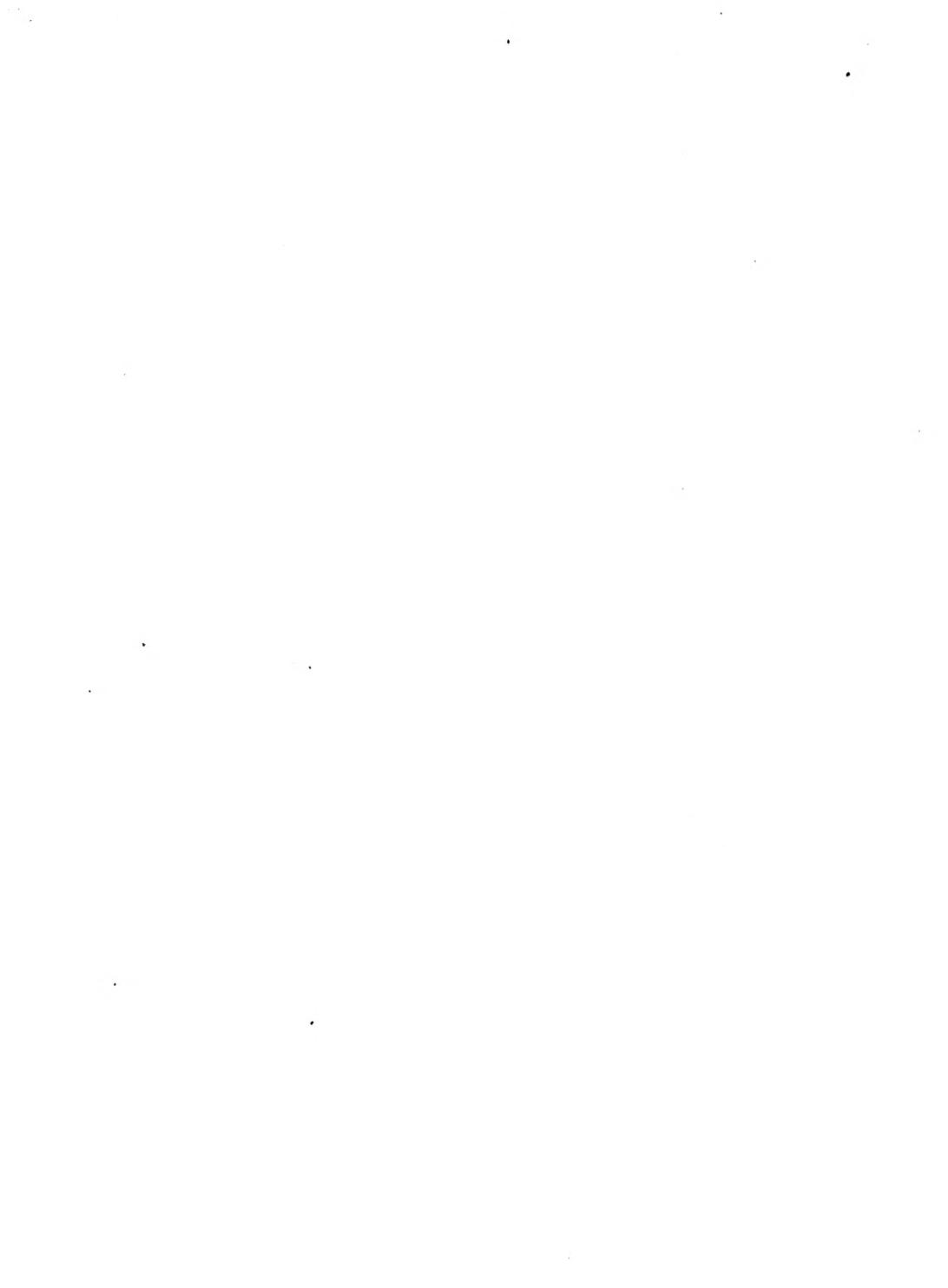
his sons on their bronze ritual vessels. Their vessels would also have been inscribed with the names of deceased kings of the direct line of succession. In this manner lists of bronze ritual vessels would include the names of the sons of King Lu (18) while kings of the direct line might omit their names from the ceremonies as persons who could no longer hope to pass on the throne to their descendants.

A Table of the Generations of the Rulers of the Shang dynasty beginning with Shang Chia.

<u>Generation</u>	<u>Elder brothers</u>	<u>Direct Line</u>	<u>Queen</u>	<u>Younger brothers</u>
I		Shang Chia		
II		Pao Yi		
III		Pao Ling		
IV		Pao Ling		
V		Shih (Chu) Jen	Ti Feng	
VI		Shih (Chu) Kuei	Ti Chia	
VII		T'ang on Ta (T'ien) Yi (1)	Ti Ping	
VIII		Ta Chia (2)	Ti Jen	
VIII				Tu (Wai) Ping (3)
VIII				Tan (Chung Jen) (4)
IX		Ta Chia (3)	Ti Jen	
X	Hsiao (10) Ping (8)			
X		Ta K'ang (7)	Ti Jen	
XI	Hsiao Chia (3)			
XI	Chung (Yang) Chi (9)			
XI		Ta Wu (10)	Ti Jen	
XII		Chung Ping (11)	Ti Kuei	
XII				Tu (Wai) Jen (12)
XII				Shan (Ho T'an) Chia (13)
XIII		Tsu Yi (12)	Ti Chi Ti K'ang	
XIV		Tsu Hsin (15)	Ti Chia Ti K'ang	
XIV				Chiang (16) Chia (16)

Generation Elder brothers Direct Line Queen Younger brothers

XV		Tsu Ting (17)	Pi Chi Pi Kuei	
XV				Nan Kêng (18)
XVI	Hsiang (Yang) Chi (19)			
XVI	Pi Hsiang (20)			
XVI	Hsiao Hsia (21)			
XVI	Father Chi (21A)			
XVI	Father Kuei (21E)			
XVI		Hsiao Yi (22)	Pi Kêng	
XVII	Elder brother Ting (23A)			
XVII	Tsu or Elder brother Su (23B)			
XVII		Wu Ting (23)	Pi Hsin Pi Kuei Pi Su	
XVIII	Tsu or Elder brother Chi (24A)			
XVIII	Tsu Kêng (24)			
XVIII		Tsu Chia (25)	Pi Wu	
XIX	Elder brother Ting (26A)			
XIX	(Lin) Elder brother Hsin (26)			
XIX		K'ang Tsu Ting (27)	Pi Hsin	
XX	Elder brother Kuei (28A)			
XX		Wu Tsu Yi (28)	Pi Wu	
XXI		Wen Wu Ting (29)	Pi Chia (?)	
XXII		Wen(Ti) Yi (30)	Pi Kuei (?)	
XXIII		Shou (Ti) Hsin (31)	Pi Chi (?)	
XXIV		Wu Kêng (32)		



THE DATES OF THE DIVINERS ON THE
BONE INSCRIPTIONS FROM THE WASTE OF YIN

The bone inscriptions, as noted in the preface, provide evidence for dating the inscribed bronze Yao. These bone inscriptions have been divided by scholars into five script periods on the twofold basis of their developing graph forms and of their relation to the genealogy of the Shang Kings. In bone inscriptions concerning ancestral ceremonies and in subsequent history each Shang King was distinguished by a temple title and name day, possibly his birthday, one of the cycles of ten days. The Temple titles used were: "great" ta, "middle" chung, "little" hsiao, "Ancestor" tsu, "warrior" chi, "peaceful" k'ang, and others such as "lover" pan, for King P'an Keng¹ who moved the capital to the Waste of Yin. When a

1. The word "love" pan, is now pronounced unaspirated, the later orthodox pan of the King's name is now pronounced aspirated.

diviner inscribed for a King a divination bone about ancestral ceremonies to be conducted in honour of the King's "Father" fu, "Mother" mu or "Elder brother" hsiang, he wrote these titles of blood relationship combined with the name day rather than the permanent temple titles used in succeeding generations. In this manner the names of the diviners themselves, which are an integral part of most bone inscriptions, are closely linked with the distinctive bone script of a dated period. The names of persons which occur both on Shang Yao and on bone inscriptions are thus more precisely dated by the names and script of the diviners who inscribed the bones.

The script periods are listed in English in the Illustrated Catalogue of Chinese Government Exhibits for the International

Exhibition of Chinese Art in London, 1936, Vol. 4, p. 128. This list gives only the names of the reigns and uses the orthodox literary names of the kings. In conformity with the usage in this monograph, the names of kings are given in the table below as they were originally inscribed on the oracle bones and dates have been added from the chronological scheme proposed by the writer. A detailed discussion of the names of diviners Cheng jen and the evidence for their dates is given by Mr. Tung Tso-pin in his article entitled "Criteria that may be used for a more exact dating of the Oracle Bone Records" in Studies presented to Ts'ai Yuan-p'ei, Peiping, 1933, pages 323-424 (called hereafter Tung Criteria). On page 373 Mr. Tung lists the diviners cheng jen, who were also the historians shih kuan, under their respective script periods. The names in the table below are given in Mr. Tung's order; his article may be consulted for the Chinese characters. In this monograph reference will be made by giving the Chinese name of the diviner followed by the Roman numeral of the period and the Arabic numeral of the sequence. This Nan I.1 means that Nan is the diviner listed first in the first script period. Where question marks are placed in the list the present writer does not hazard a sound equivalent; the graphs are definite and are not in question.

Table of the bone-script periods and of the Diviners.

Script period I	Before the reign of Wu Ting, 1311-1256 B.C.
	Reign of Wu Ting, 1255-1197 B.C.
	Diviners: 1, Nan; 2, Huan; 3, Yung; 4, Pin;
	5, Cheng; 6, Wei; 7, Chung; 8 (?); 9 (?);
	10 (?); 11, Fu; 12, Shih.

- Script period II Reign of Tsu Keng 1196-1190 B.C. and of Tsu Chia 1189-1187 B.C.
Diviners: 1, Ta; 2, Lü; 3, Chi; 4, Hsing; 5, K'ou; 6, Hsuing; 7, Ch'u.
- Script period III Reign of (Lin) Hsin, 1156-1151 B.C. and of Tsu Ting, 1150-1145 B.C.
Diviners: 1, Yi; 2 (?); 3 (?); 4, Chu; 5, Ti; 6, P'eng; 7, Shen; 8, K'ou (the same as II.3); 9, Lu (the same as II.2)
- Script period IV Reign of Wu Tsu Yi, 1142-1139 B.C. and of Wen Tsu Ting, 1138-1124 B.C.
Diviners: According to Mr. Tung the fourth script period did not record the names of diviners on the inscriptions.
- Script period V Reign of Yi¹, 1125-1091 B.C. and of Hsin², 1090-1039 B.C.

1. This king was not given a temple title on some inscriptions because the Shang dynasty perished in the reign of his son who honoured him with the filial title father, fu. In literary historical sources he is called Emperor Yi, Ti Yi, a title probably given after the first emperor Chia Hung Ti assumed this Shang dynasty name for god in 221 B.C. Certain inscriptions on bronze ritual vessels make it possible that Wen Yi was the temple name of this king. See Min Yi-shih (James L. Menzies) Chia Ku Wen Chiu (Oracle Bone studies) Cheeloo University, Tsinan, 1935, pages 123 and 125.
2. He is simply called "King" on oracle bone inscriptions written during his reign. Chou dynasty literary sources call him Chou Hsin. This is a derogatory name. Other literary sources call him Shou Hsin. This is possibly his temple name. The graph Shou means "to receive", as it were the kingdom. Later when Shang dynasty genealogies were compiled for the History, Shih Chi he was also called Emperor *Hsin* Ti Hsin.

Diviners: 1, Huang; 2, Yung (graph different from Yung I.3).

In the detailed study of the dates of certain ko in the catalogue above, some few variant opinions have been stated. The present writer would place some diviners and their script in the period 1311-1256 B.C. and would identify the Father Line sometimes mentioned in these inscriptions with King Tsu Chia, father or uncle of Chiang (Yang) Chia; P'ia Hsi; Chia Chia; and Chia Si. The large, vigorous script which has no diviners' names but writes the graph for king, wang, in its archaic form without a stroke on top, is taken to be the reign of King Tsu Chia, 1192-1190 B.C. Father Line of these inscriptions would then be King Tsu Chia and not P'ian Tsu Chia as proposed by Mr. Tung. In the writer's opinion, it was in the reign of Tsu Chia that the script of the graph king, wang, was altered to its later form with a stroke on top. This is one of the most characteristic features of the script style of Period III and thereafter it occurs for the graph "king" in most bone inscriptions. Some of the script included by Mr. Tung in Period V in the writer's opinion belongs to Period IV, for the intrusion of an archaistic reversion to earlier script forms between Period III and Period V is unnatural and lacks evidence. Oracle bone study Chia Yu Hsueh is yet in its infancy. Mr. Tung's article Criteria is foundation work well documented. More will be built upon it in the future. It has already contributed much to the more precise dating of some ko in this monograph, the names of whose owners have been found inscribed in the Oracle bone records of the Shang dynasty.

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<u>Chih-Yü:</u>	Ho Guan-shü, <u>Chih Yü Is'ang Yuei</u> <u>Chih Yü</u> , 1915.	40
<u>Sai-Yü:</u>	Ho Guan-shü, <u>Sai Yü Is'ang Yuei</u> <u>Sai Yü</u> , Shanghai, 1915.	315
<u>Chieh-shan:</u>	Ho Guan-shü, <u>Chieh-shan Is'ang Yuei</u> <u>Chieh-shan</u> , Shanghai, 1917.	633
<u>Chai-shan:</u>	Edman by Frank C. Jaubert, edited by Roswell S. Witter, <u>Chai-shan</u> <u>Saint Louis Collections</u> , Chicago, 1933; numbers consecutively.	1687
<u>Ban-shan:</u>	James L. Hensley (1913-1914), <u>Ban-shan Chih Yü Is'ang Yuei</u> <u>Ban-shan</u> , Boston, 1914; numbers consecutively.	71
<u>Seven:</u>	Edman by Frank C. Jaubert, edited by Roswell S. Witter, <u>Seven</u> <u>Collections of Inscribed Oracle</u> <u>Bones</u> , New York, 1933 (less seven collection). Each collection is numbered separately, preceded by key letters:	446

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 3. Shanghai Museum, etc. 193
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Records from the casts of Yin, plates
printed in Beijing, 1916, introduction
Shanghai 1917; numbered consecutively. 3369
- Menzies: James F. Menzies, (in Yi-shih), Ch'ing
Reliquiae or Oracle Records from the
casts of Yin, Beijing 1927, plates of
ink rubbings. The numbers are consecutive
with the preceding. 2700
- Hayashi: T. Hayashi, (in Yi-shih), Wei Chia Hou
in Yen Tan, Japan, 1917. 1023
- Fe-shih: Fei-shih, Ch'ing Yin Shü Shü pien,
Peking, 1933. Many large ink rubbings
were put into several pieces. Of the 1125
pieces the uncut rubbings number about 300
- Material unacquired after 1936.
- Hsieh-pen: Tung Tso-pin, Yin Shü Shü Ch'i Shü pien, Beijing
1919; drawings numbered consecutively. 361

Ta-kuei: Tung Tso-pin, Ta Kuei Ssu Pan Hsiao Shih,
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numbered consecutively. 4

Yi-ts'un: Shang Sh'eng-tso, Yin Ch'i Yi Ts'un,
Nanking, 1933. Rubbings from eight
collections numbered consecutively. 1000

T'ung-tieh: Luo Mo-jia, Lu Tz'u T'ung Tsuan T'ieh Lu,
Tokyo 1933. Unpublished rubbings
appended to the T'ung Tsuan. 128

Yeh-chung One: Huang Ch'ih, Yeh Chung Hsien Hsi Hsi
Chi, Peiping 1935. 341

Yeh-chung Two: Huang Ch'ih, Yeh Chung Hsien Hsi Hsi
Chi, Peiping 1937. 101

Hou-chuang: Tung Tso-pin, An Yang Hou Chia Hsuan
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1937; numbered consecutively. 930

Ts'ui-yien: Luo Mo-jia, Lu Tz'u T'ung Tsuan T'ieh Lu, Tokyo
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II: Inscribed Chinese bronzes

The works are listed in order of publication.

In the indication of the type of record,

"transcripts" signifies "transcripts of the inscription in modern characters";

"hand copies" means "hand-drawn facsimiles of the inscription";

"drawings" and "photographs" refer only to objects.

The word "only" does not exclude a transcript in modern characters, but indicates, that, with the object so named, there is no drawing or photograph of it.

<u>Abbreviation</u>	<u>Title and date of record</u>
Hsin Lu:	Yu Li, <u>Hsin Lu</u> , c. A. D. 550. Transcripts only.
Gu Ya:	Gu-yen 'tsiu, <u>Cai Ku Lu Ya wei</u> , c. A. D. 1030. Transcripts only.
Gu Ya:	Gu-yang wei, <u>Cai Ku Lu Ya</u> , A. D. 1033. Transcripts only.
H'ao 't'u:	Lu Fa-min, <u>'hao ku 't'u</u> , 10 vols., A. D. 1095. Hand copies, drawings.
To 'u:	Tang Fu et al., <u>Huan to to ku 't'u lu</u> , 10 vols. c. A. D. 1125. Hand copies, drawings.
Chao Ya:	Chao Ming-sh'eng, <u>Ch'iu ch'iu lu Ya wei</u> , A. D. 1132. Transcripts only.

- Kuang Ia: Tung Yu, Huang Shou Shu Fa, 11 vols. 1800.
Transcripts only.
- Hiao Wang: Hsiao 'iu, Hsiao T'ien Chi Lu Lu, 2 vols.
A.D. 1176. Hand copies only.
- Teieh K'uan: Hsieh Cheng-tun, Li T'ai Chung Ling Yi Ch'i
'uan Shih Ya T'ieh, 2 vols. c. A.D. 1800.
Hand copies only.
- Tsu H'ao: Author Unknown, Hsu H'ao Lu 'iu, 5 vols.
c. A.D. 1200. Hand copies, drawings.
- Wang H'uan: Wang Hou-chih, Chung Ting H'uan Shih, 1 vol.
c. A.D. 1200. Hand copies only.
- Hsi Ch'ing: An Imperial Commission, Hsi Ch'ing Yu Chien,
40 vols. A.D. 1751. Hand copies, drawings.
- Ch'ing Lu: An Imperial Commission, Hsi Ch'ing Yu Chien
Fu Lu, 16 vols. A.D. 1751. Hand copies, drawings.
- Ch'ing Chia: An Imperial Commission, Hsi Ch'ing Hsu Chien
Chia Lien, 20 vols. A.D. 1795. Hand copies,
drawings.
- Ch'ing Yi: An Imperial Commission, Hsi Ch'ing Hsu Chien
Yi Lien, 20 vols. c. A.D. 1795. Hand copies,
drawings.
- Hing Shou: An Imperial Commission, Hing Shou Chien Ku,
16 vols. c. A.D. 1795. Hand copies, drawings.
- Ch'ien H'uan: Ch'ien Tien, Shih Liu Ch'ang Lo T'ang Yu Ch'i
H'uan Shih, 4 vols. A.D. 1796. Hand copies,
drawings.
- Juan Chi: Juan Yuan, Chi Ku Chai Chung Ting Yi Ch'i H'uan
Shih, 10 vols. A.D. 1804. Hand copies only.

- Ch'iu Yu: Ch'en Ching, Ch'iu Yu Ching The Chin Shih T'u, A.D. 1813. Hand copies, drawings.
- Ts'ao Hwai: Ts'ao H'uei, Hwai Mi Han Fang Chi Chin T'u, 1 vol. A.D. 1814. Hand copies, drawings.
- Feng So: Feng Yün-p'eng, Chin Sain So, 12 vols. A.D. 1822. Hand copies, drawings.
- Yün Ch'ing: Wu Jung-kuang, Yün Ch'ing Yuan Chin Sain Lu, 5 vols. A.D. 1840. Hand copies only.
- Lan T'ing: Fu Hün, Erh Po Lan T'ing Chai Shou Ts'an: Chin Shih Chi, 4 vols. A.D. 1856. Hand copies, drawings.
- Huo Ku: Liu Hsi-hai, Ch'ang An Huc Ku Fien, 2 vols. A.D. 1872. Hand copies, drawings.
- P'an Ku: P'an Tsu-yin, P'an Ku Lou Yi Ch'i K'uan Chih, 2 vols. A.D. 1872. Hand copies, drawings.
- Liang Lei: Wu Yun, Liang Lei Hsien Yi Ch'i T'u Shih, 12 vols. A.D. 1875. Hand copies, drawings.
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- Ts'ung Ku: Hsü T'ung-po, Ts'ung Ku T'ang K'uan Shih Hsueh, 16 vols. A.D. 1886. Rubbing only.
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- K'o Chai: Wu Ta-sh'eng, K'o Chai Chi Chin Lu, 30 vols. A.D. 1896. Rubbings only.
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10. Sung Dynasty, Hsing Ping; Lun Yu Chü Shu, 40 ch'üan.
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INDEX OF COLLECTIONS

Private collections in China are preceded by their "Studio" names when these are known. The owner's place of origin is considered an essential part of his name.

Ann Arbor, Michigan, U.S.A.

James M. Plumer collection.
81.

Boston, Massachusetts, U.S.A.

The Museum of Fine Arts.
49, 58.

China

The Academia Sinica.
55, 56, 89, 90, 91, 156.

Location unknown.
45, 79, 85, 86, 96, 97, 101, 110, 118, 119,
120, 131, 137, 139.

Dairen

The Hsüeh T'ang collection:
Lo Chên-yü of Shang-Yü.
111, 112, 171, 172, 173.

Collection of Mr. Pao Hsi of Ch'ang Pai.
155.

Hanoi, Indo China.

The Musée de l'Ecole Française de l'Extrême-Orient.
169.

Japan

A private collection.
159.

Kaifeng, Honan, China

The Honan Provincial Museum.
3, 54, 176.



Kashing, Chekiang, China

The Ch'ing Yi Ko collection:
Chang Ting-chi of Chia Hsing.
151.

New York City, N.Y., U.S.A.

The Mrs. Dagny Carter Collection.
44.

The C. T. Loo collection.
68, 115, 116, 124.

The Grenville L. Winthrop collection.
16, 36, 37, 50, 62, 63, 66, 80.

Paris, France

The D. David-Weill collection.
65.

The Edgar Gutman collection.
127.

The Alphonse Khan collection.
52.

Peiping, China

The Tsun Ku Chai collection:
P. C. Huang, i.e. Huang Chün of Chiang Hsia.
4, 35, 46, 75, 76, 78, 83, 87, 99, 128, 129, 134,
135, 136, 140, 152, 154, 158.

The Sung Chai collection:
Jung Kêng of Tung Kuan.
73, 74.

The Ch'ih An collection:
Li T'ai-fen of Yang Yuan.
59, 82.

The Chu An collection:
Wang Chên of Peiping.
102, 103, 104, 105, 106, 107.

The Shuang Chien Yi collection:
Yü Hsing-wu of Hai Chêng.

71, 77, 100, 108, 109, 153, 157.

Shanghai, China

The Shan Chai collection:
Liu Ti-chih of Lu Chiang.
72, 174.

Soochow, Kiangsu, China

The Chêng An collection:
Fan Tsu-yin of Wu Hsien.
117.

Stockholm, Sweden

The Ostasiatiska Samlingarna (Museum of Far Eastern Antiquities).
51, 130, 170.

Toronto, Ontario Canada

The James M. Menzies (Ming yi-shih) collection.
125, 177.

The Royal Ontario Museum of Archaeology.

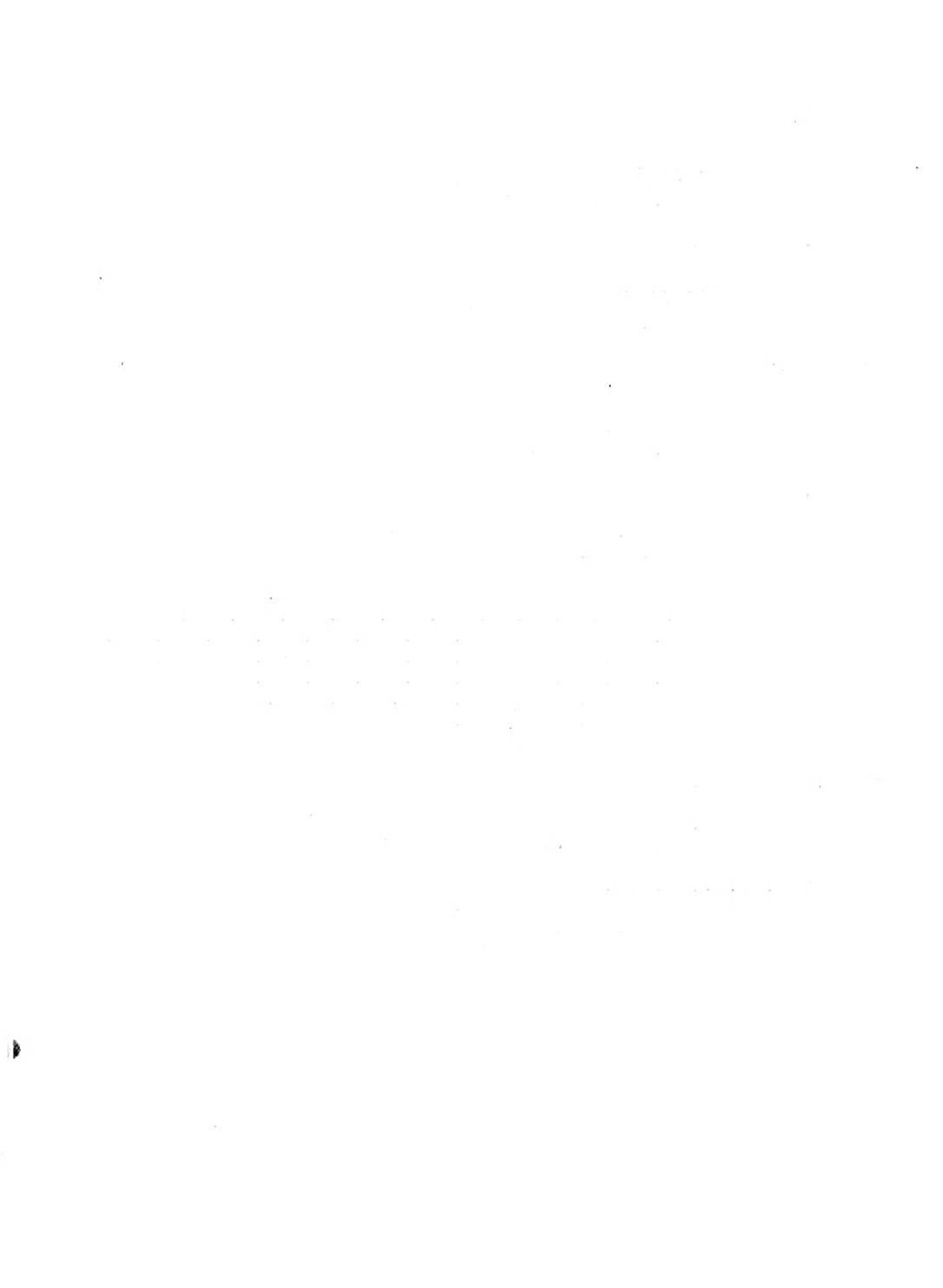
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21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33,
34, 38, 39, 40, 41, 42, 43, 47, 48, 53, 57, 61, 64,
67, 69, 70, 84, 88, 92, 93, 95, 98, 113, 114, 121,
122, 123, 126, 133, 138, 141, 142, 143, 144, 145,
146, 147, 149, 150, 160, 162, 163, 164, 165, 166,
167, 168, 175.

Tsinan, Shantung, China

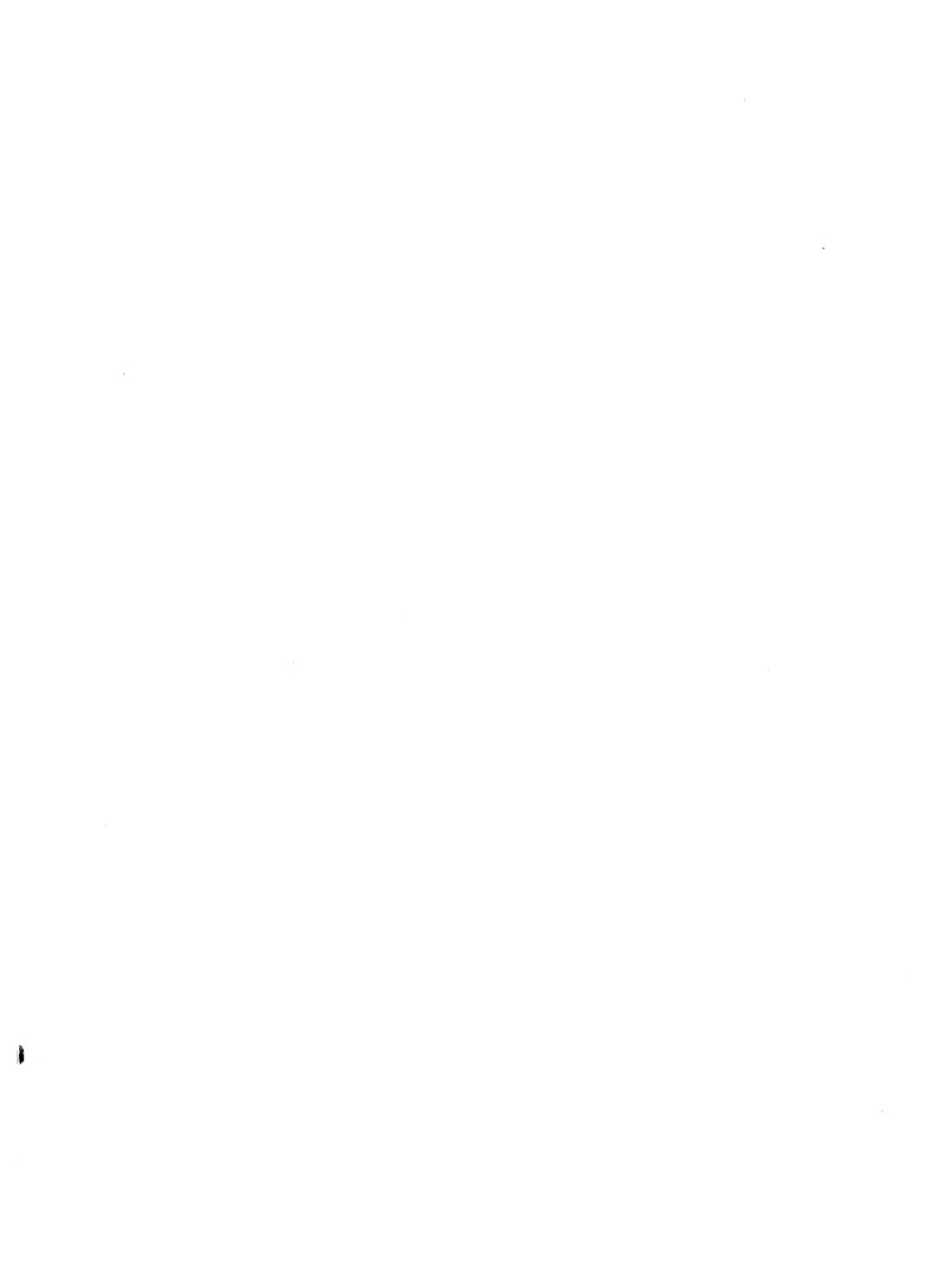
The F. S. Drake collection, Cheeloo University.
60, 94, 161.

Washington, D.C., U.S.A.

The Freer Gallery of Art.
5, 17, 132.



<u>R.O.M.A. No.</u>	<u>Ko No.</u>	<u>R.O.M.A. No.</u>	<u>Ko No.</u>
NB. 61.....	142	NB. 2969.....	42
NB. 110.....	48	NB. 3056.....	11
NB. 1023.....	93	NB. 3156.....	162
NB. 1029.....	114	NB. 3221.....	69
NB. 1231.....	150	NB. 3247.....	88
NB. 1396.....	149	NB. 3250.....	164
NB. 1449.....	145	NB. 3251.....	160
NB. 1599.....	141	NB. 3252.....	59
NB. 1731.....	167	NB. 3253.....	123
NB. 1732.....	41	NB. 3258.....	162
NB. 1733.....	148	NB. 3260.....	57
NB. 1734.....	146	NB. 3361.....	24
NB. 1735.....	147	NB. 3362.....	7
NB. 1791.....	2	NB. 3364.....	8
NB. 1805.....	1	NB. 3367.....	9
NB. 1890.....	10	NB. 3392.....	6
NB. 1915.....	13	NB. 3400.....	163
NB. 1992.....	31	NB. 3879.....	32
NB. 2100.....	144	NB. 3880.....	23
NB. 2129.....	165	NB. 3881.....	22
NB. 2139.....	143	NB. 3890.....	19
NB. 2149.....	12	NB. 3891.....	20
NB. 2153.....	33	NB. 3974.....	95
NB. 2156.....	18	NB. 3975.....	70
NB. 2197.....	21	NB. 3976.....	153
NB. 2358.....	30	NB. 3977.....	133
NB. 2774.....	47	NB. 3979.....	61
NB. 2775.....	57	NB. 3980.....	64
NB. 2776.....	21	NB. 3981.....	160
NB. 2777.....	25	NB. 4038.....	15
NB. 2895.....	175	NB. 4040.....	14
NB. 2960.....	43	NB. 4051.....	132
NB. 2961.....	38	NB. 4052.....	90
NB. 2962.....	40	NB. 4056.....	84
NB. 2963.....	92	NB. 4057.....	121
NB. 2964.....	113	NB. 4058.....	126
NB. 2966.....	34	NB. 4083.....	23
NB. 2967.....	53	NB. 5282.....	27
		NB. 5283.....	20



SHANG KO

A study of the characteristic weapon
of the Bronze Age in China in the
period 1311-1039 B.C.

by

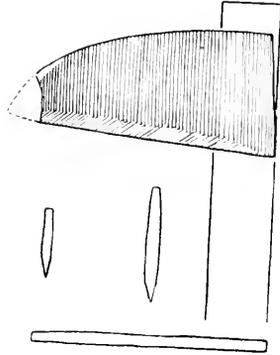
James Mellon Menzies, B.A. Sc.

PLATES

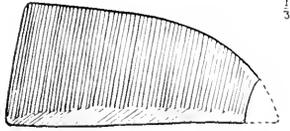
A thesis submitted in conformity with the
requirements for the degree of Doctor of
Philosophy in the University of Toronto.

1942

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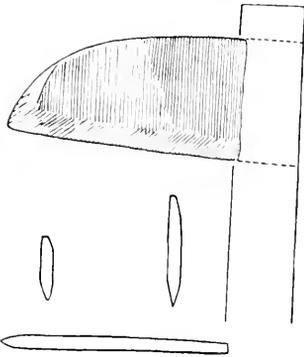


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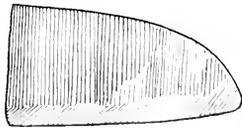


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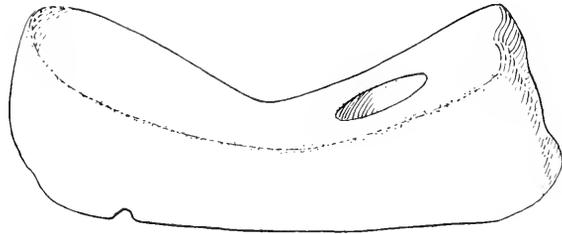
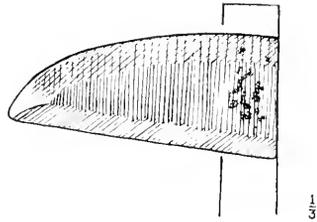


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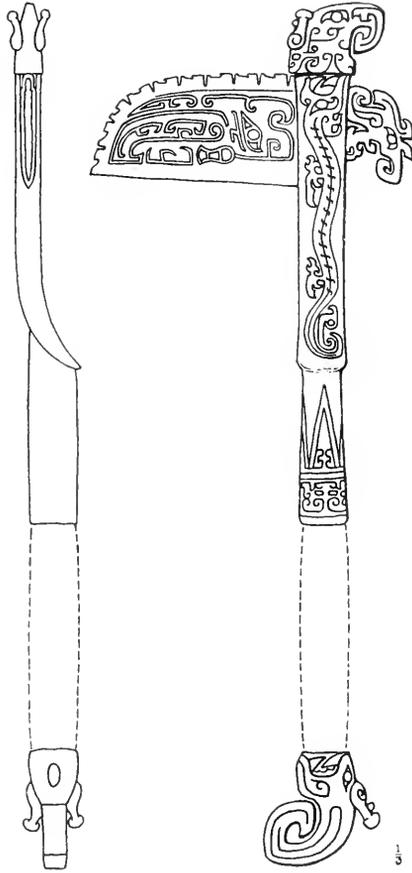
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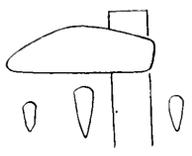


5

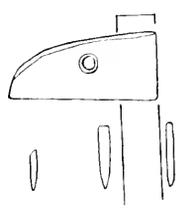
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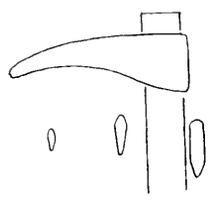
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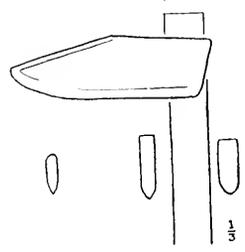
7



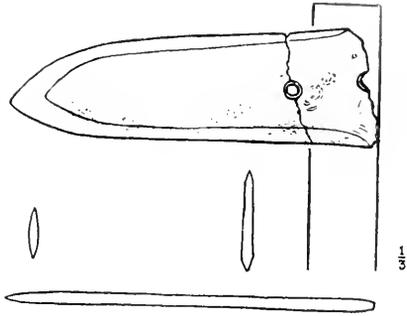
8



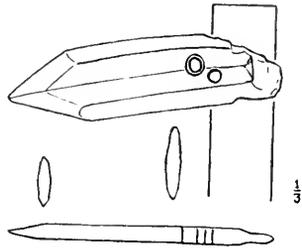
9



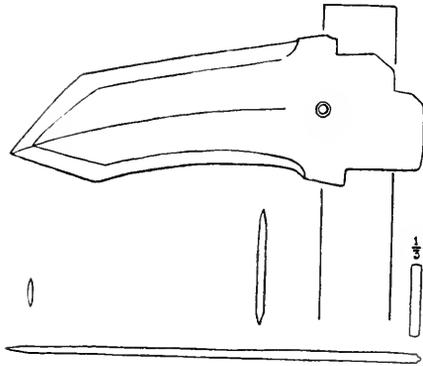
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10

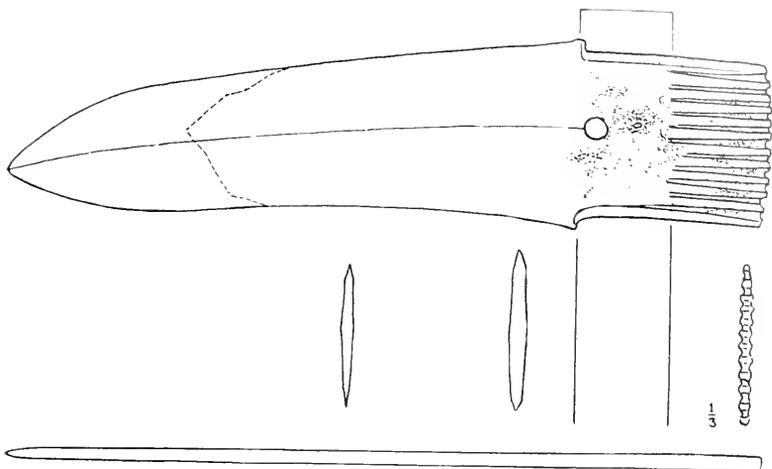


11

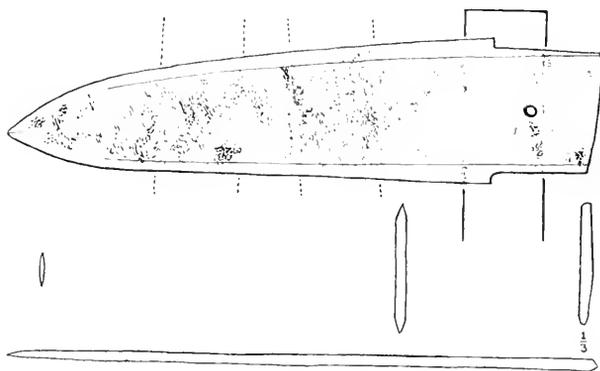


12

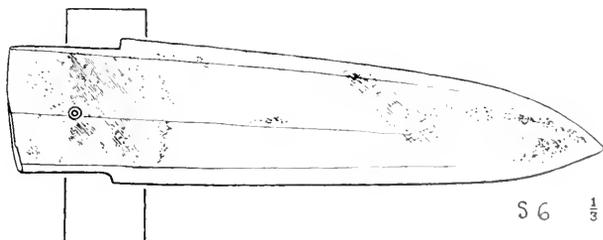
S5



13



14

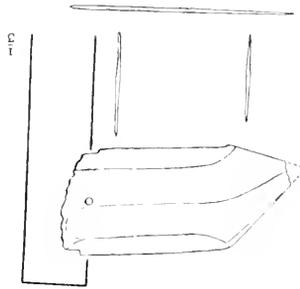


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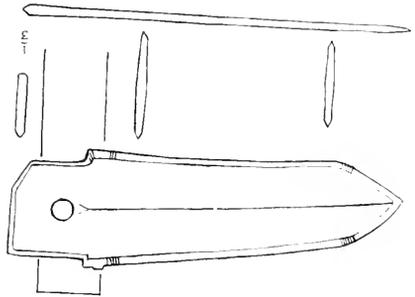
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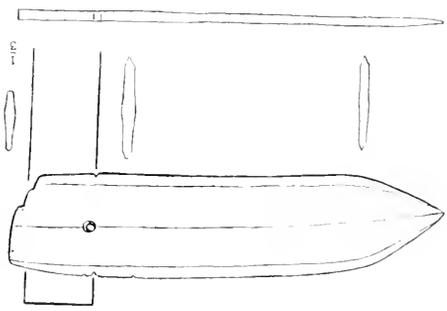
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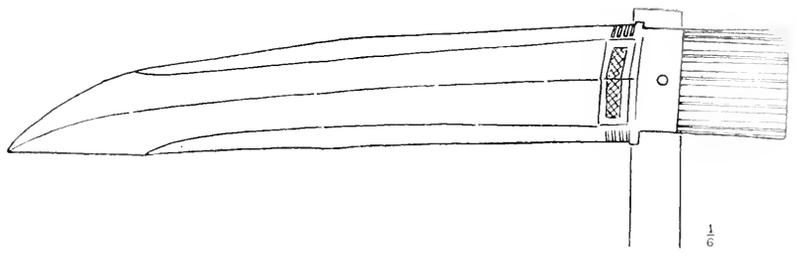


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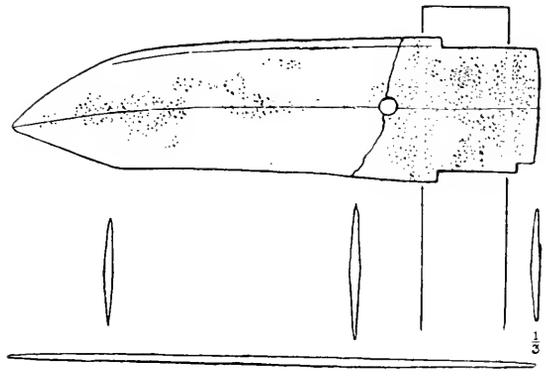


16

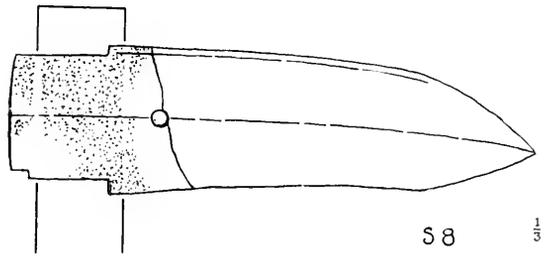
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17

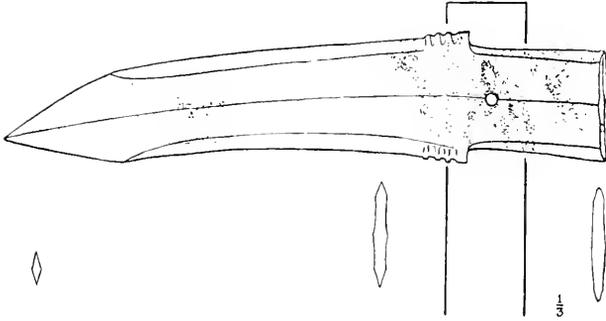


18

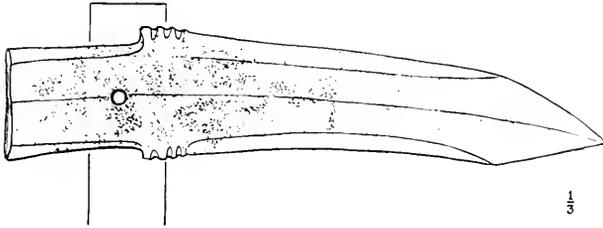


18

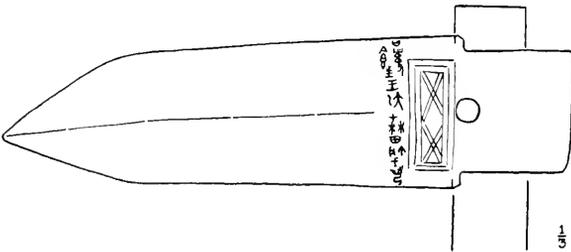
19



20



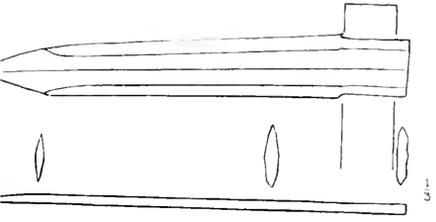
21



S7

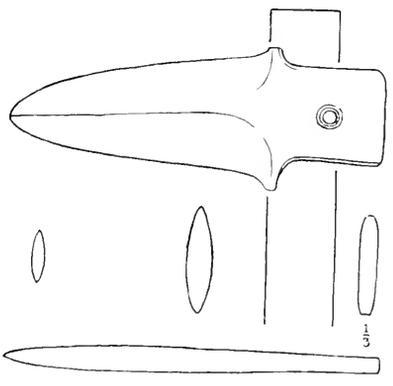
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22

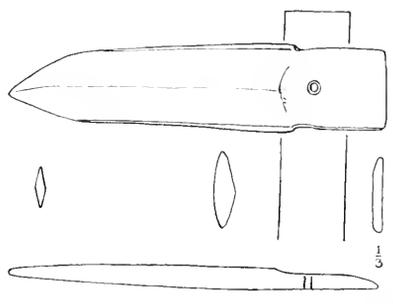


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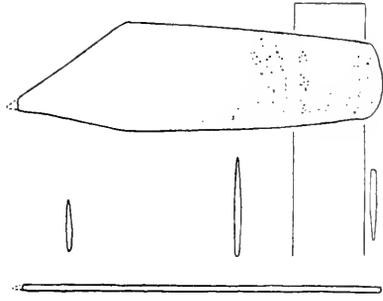
23



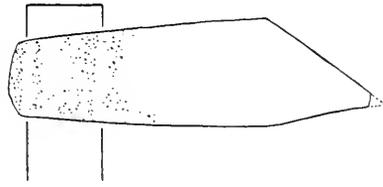
24



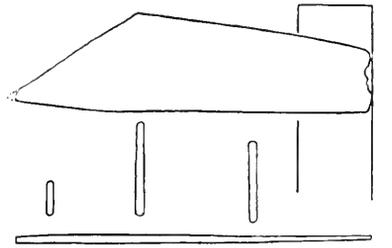
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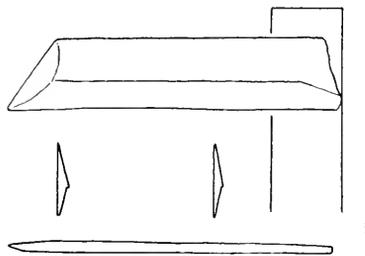
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25



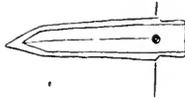
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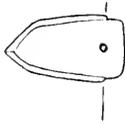
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S 11

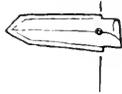
Type II E



28



29



30

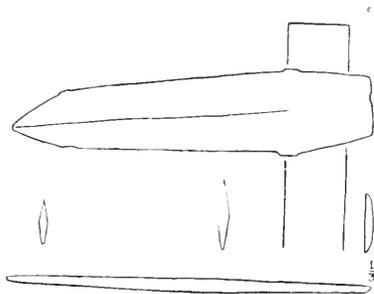


31

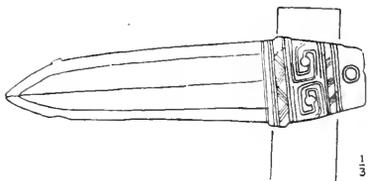
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S 12

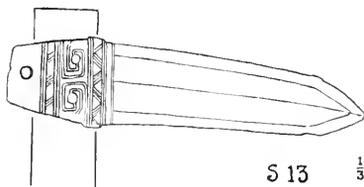
Type II F



32



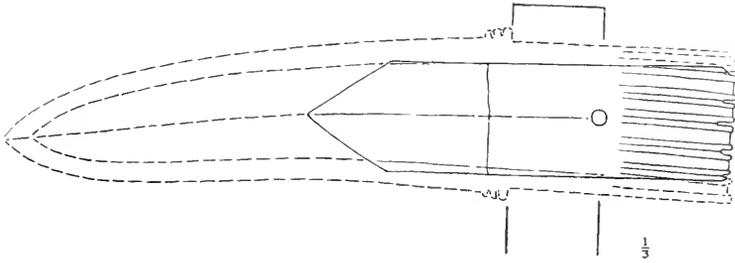
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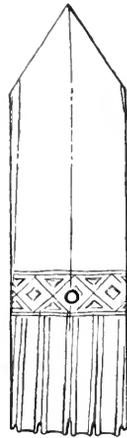
32

S 13 $\frac{1}{3}$

Type II F



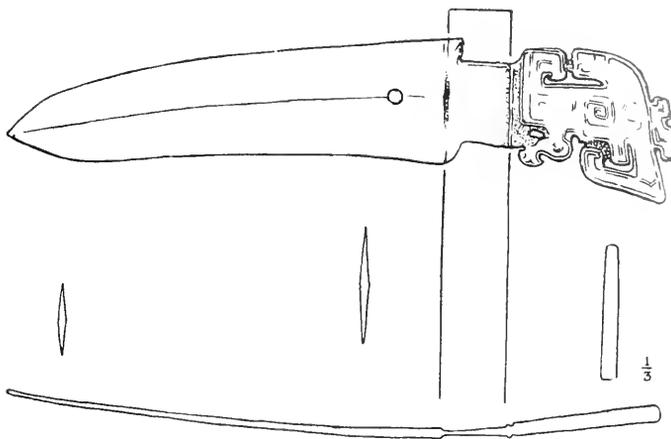
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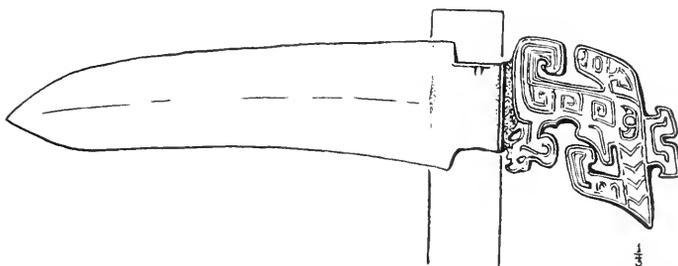
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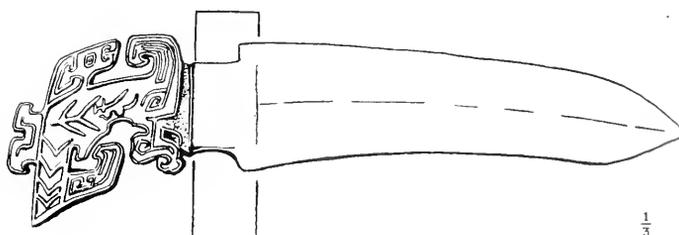
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34

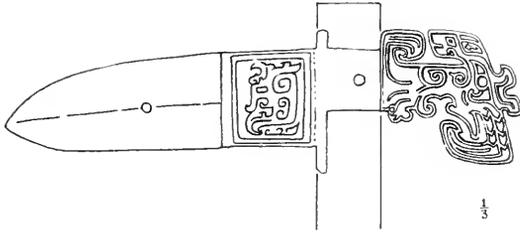


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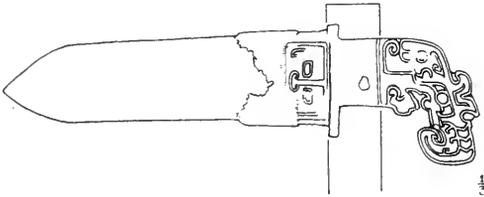


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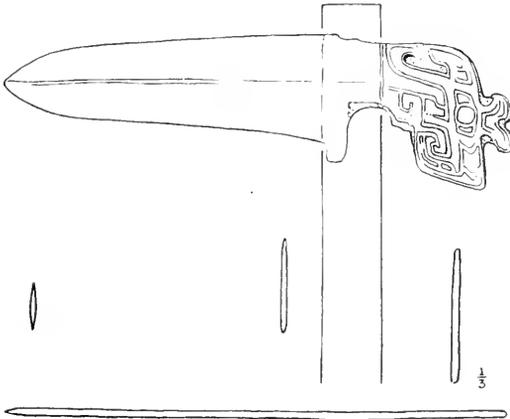
Type IIIA



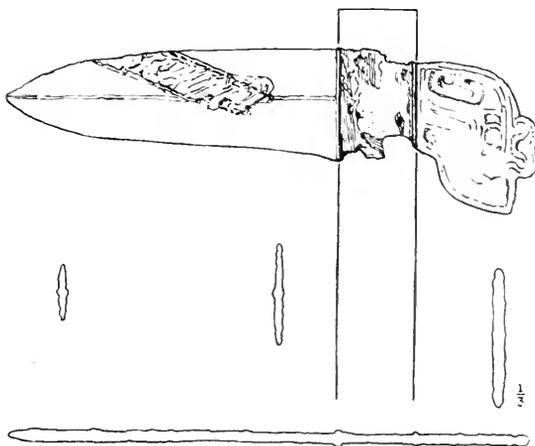
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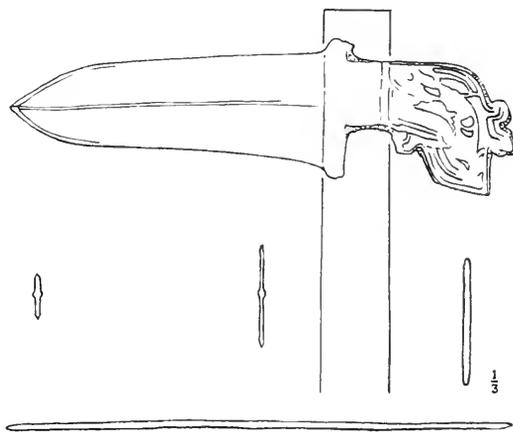
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38



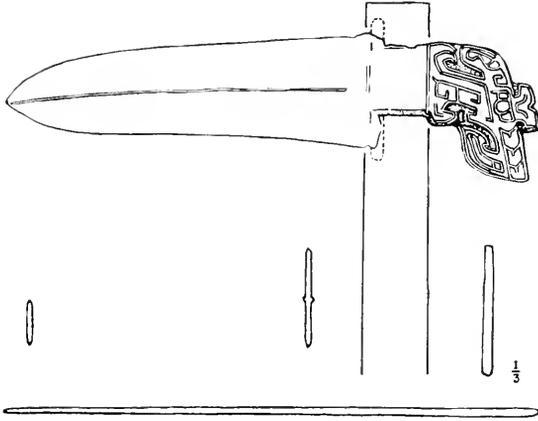
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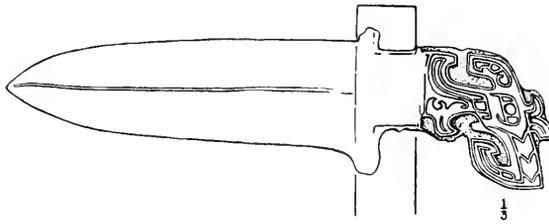
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XXVII

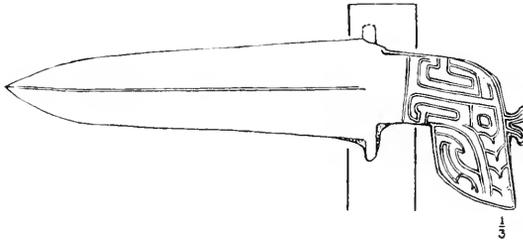
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41

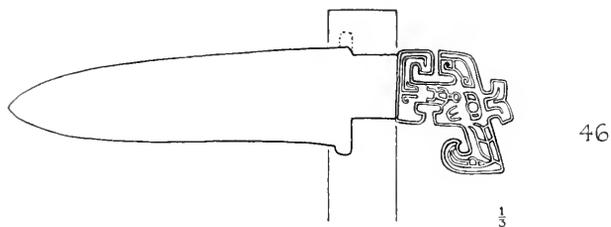
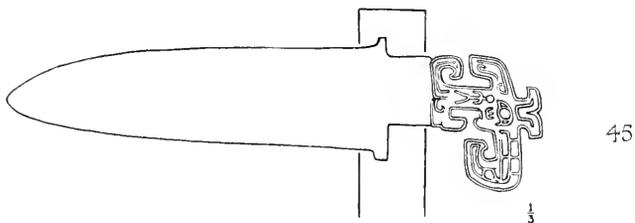
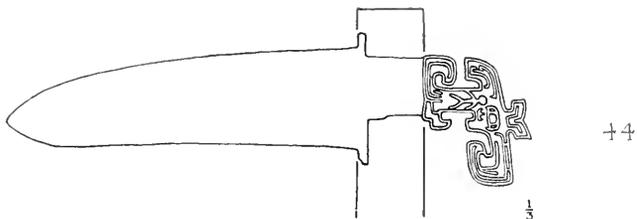


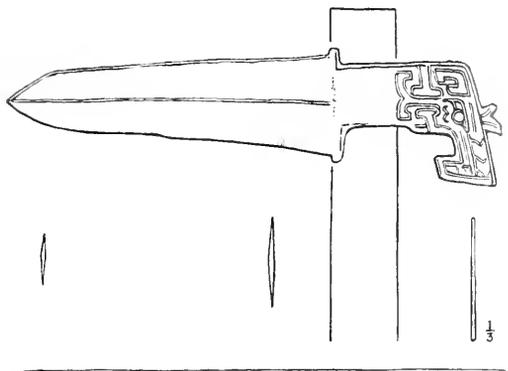
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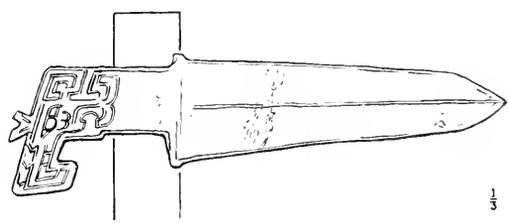
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Type IIIA

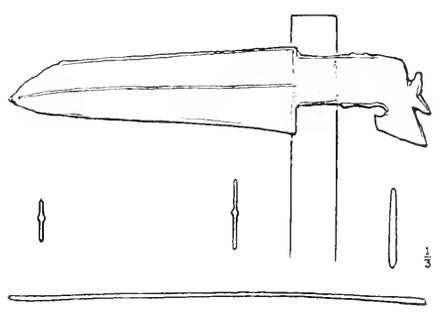




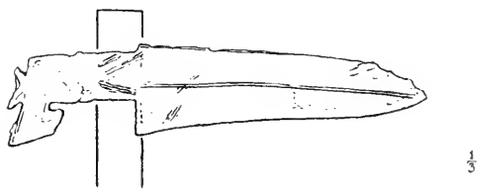
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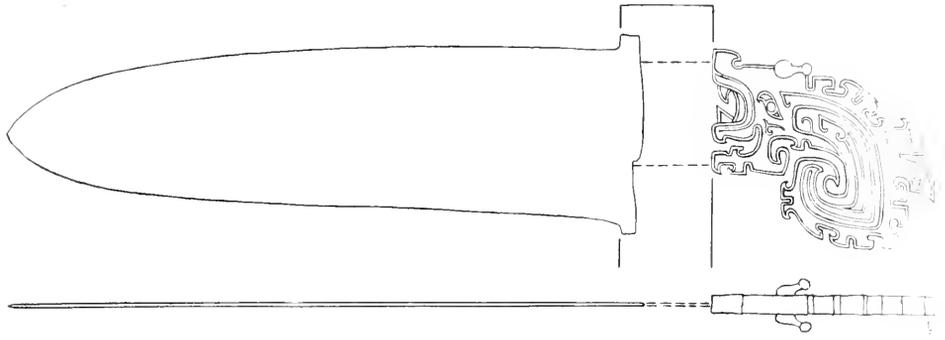
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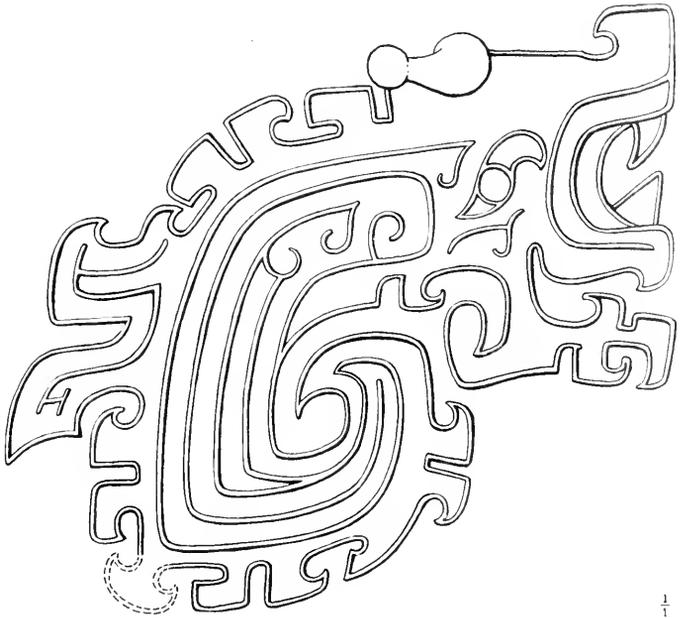
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48

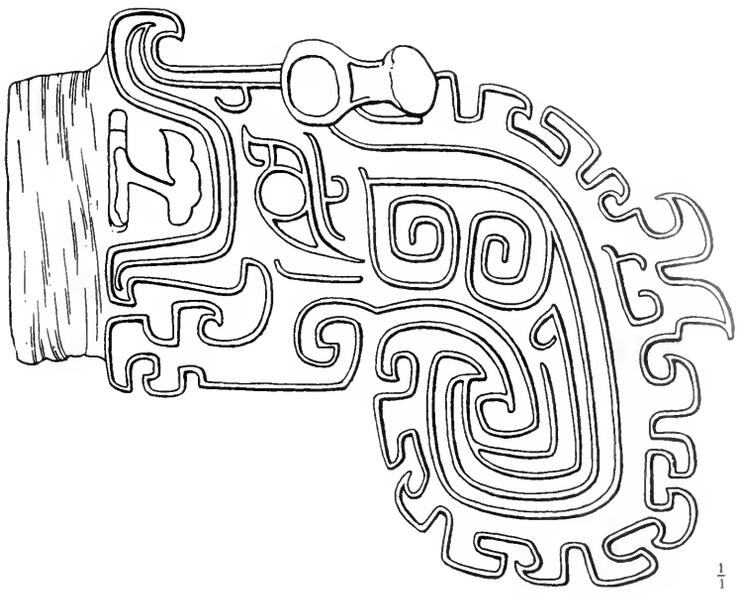


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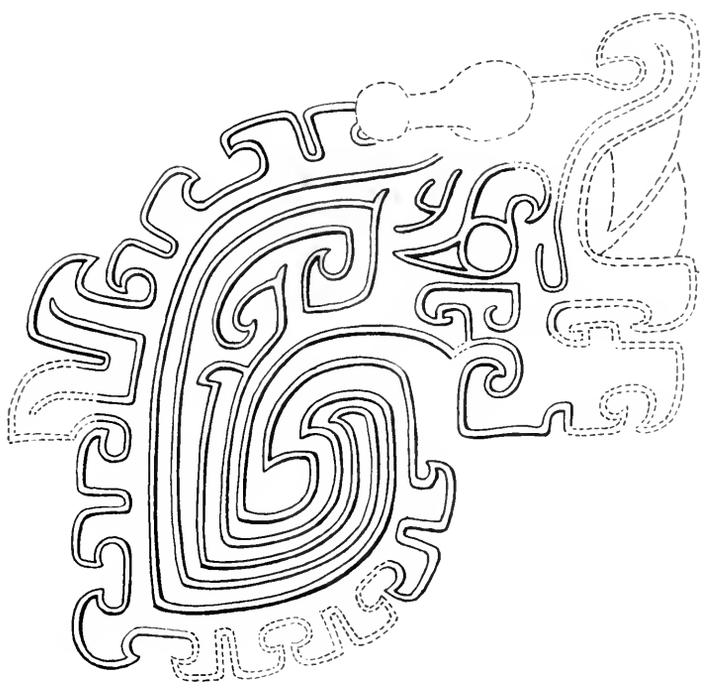
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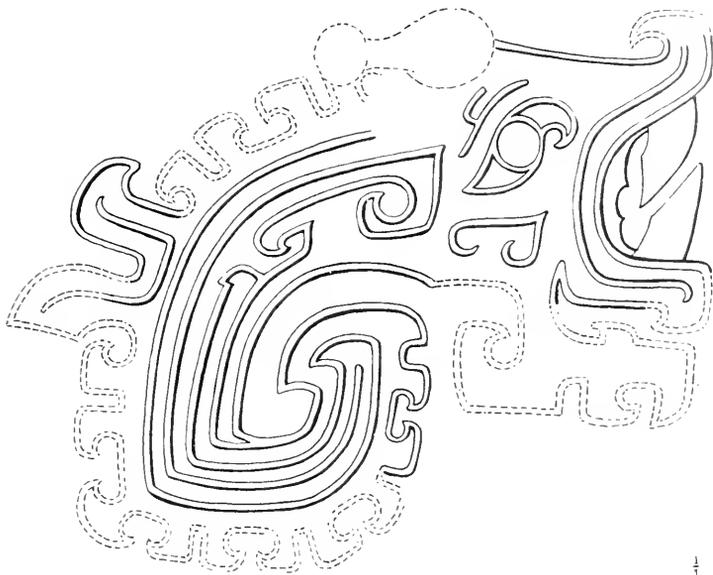


50

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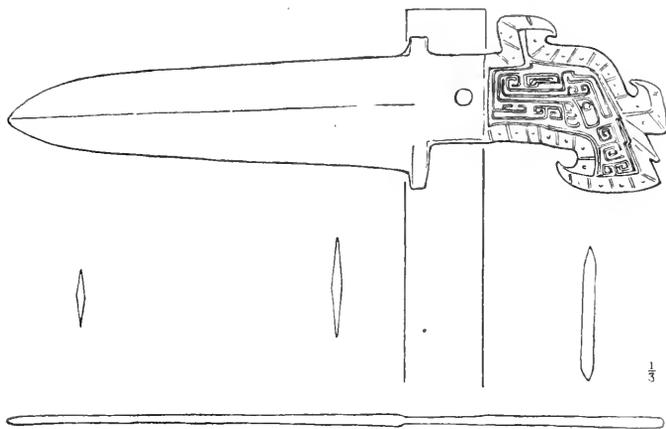


51



52

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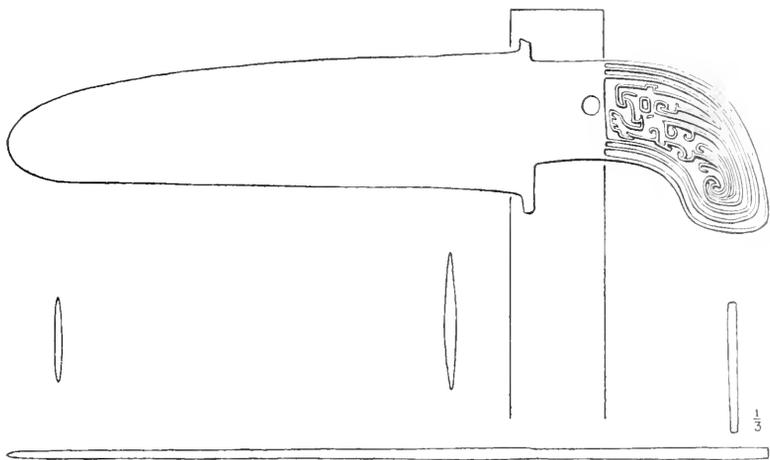


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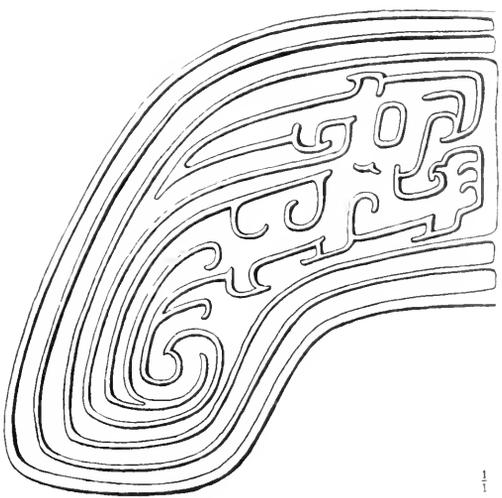
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9

Type IV A



54

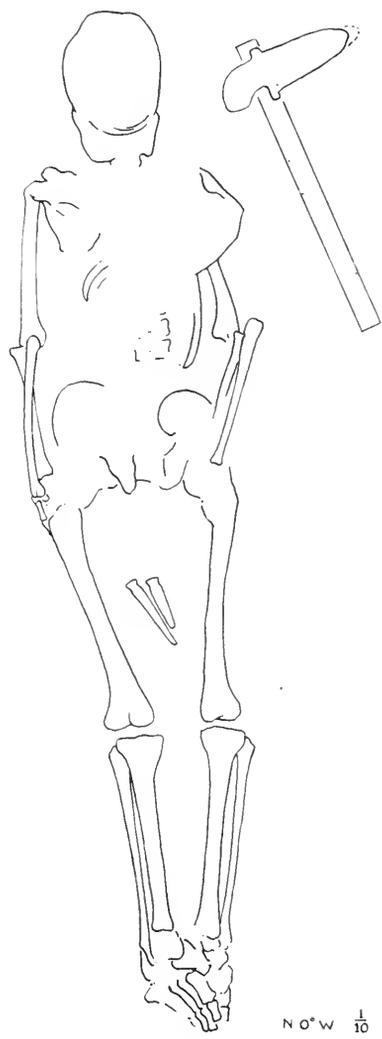


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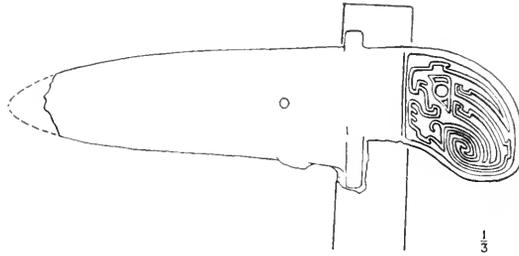
1/1

Type IV A

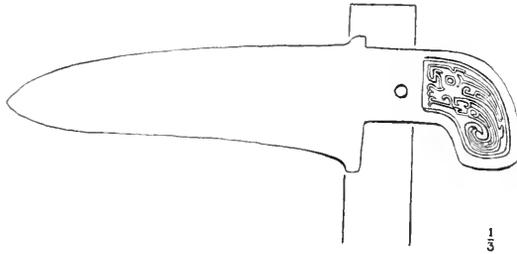
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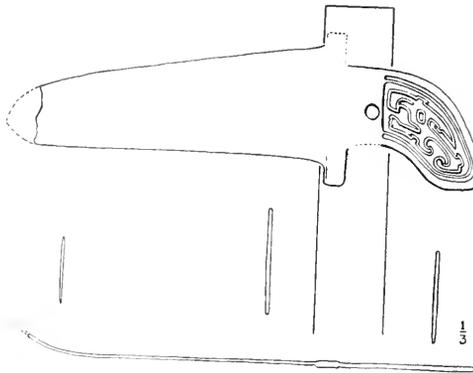
Type $\bar{\text{V}}$ A



55



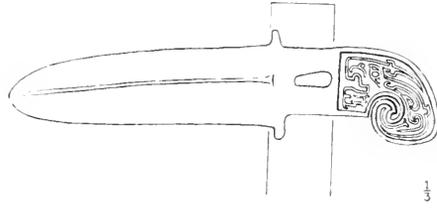
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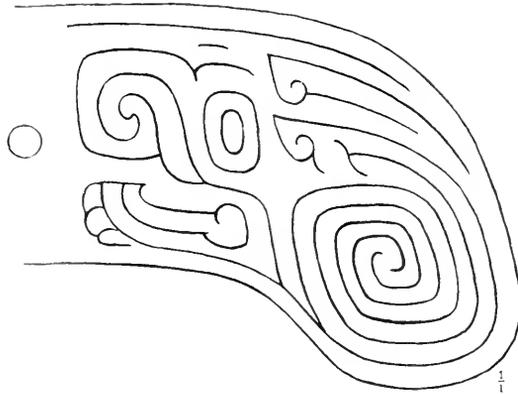
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12

Type IVa



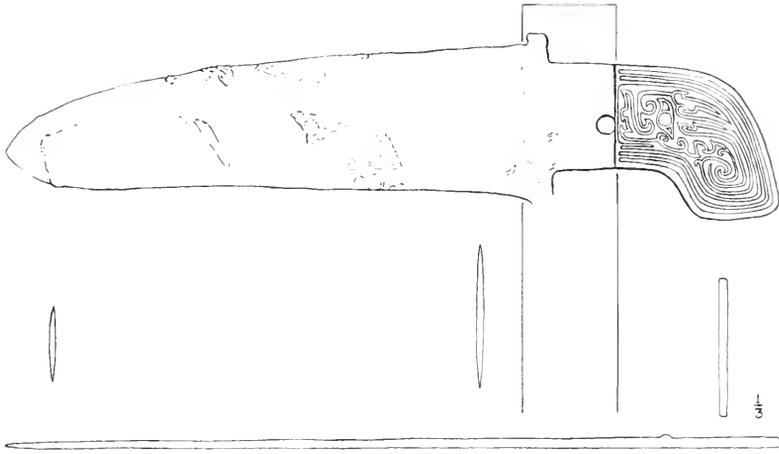
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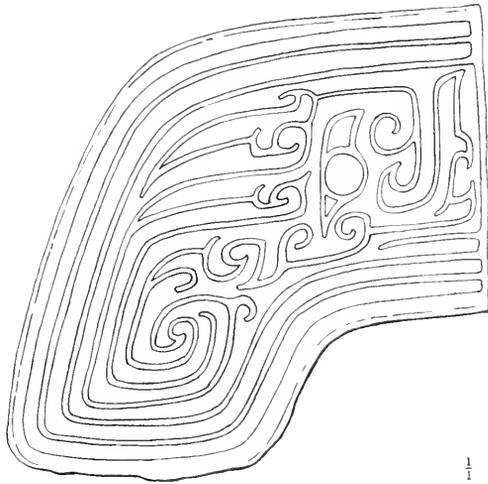
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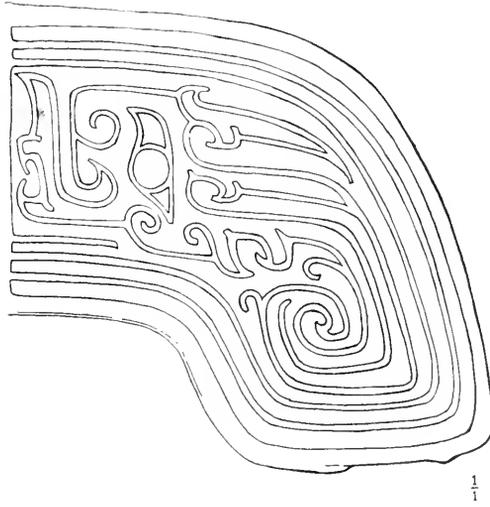
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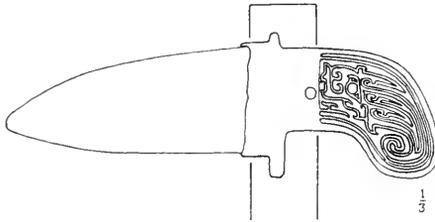
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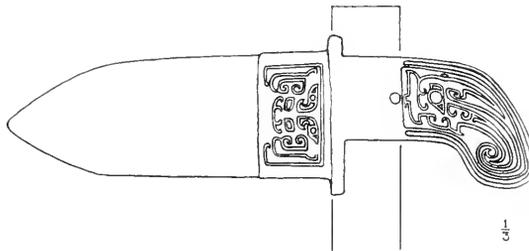
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61

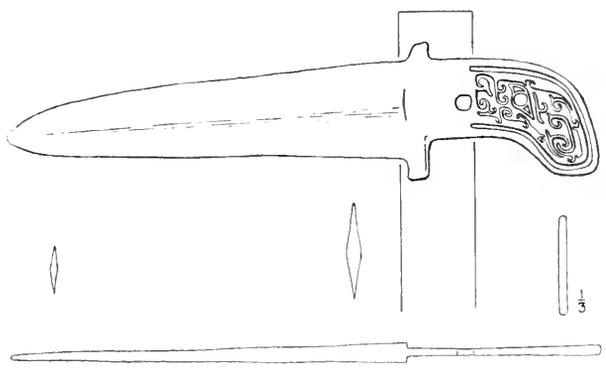


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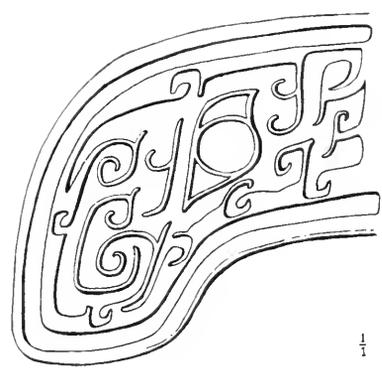


63

Type IV B

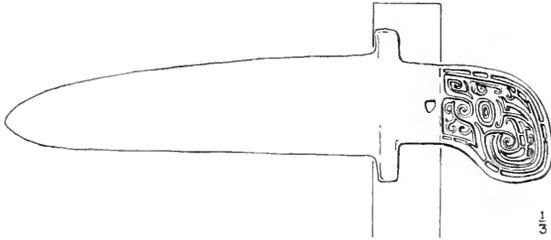


64



64

Type IVc

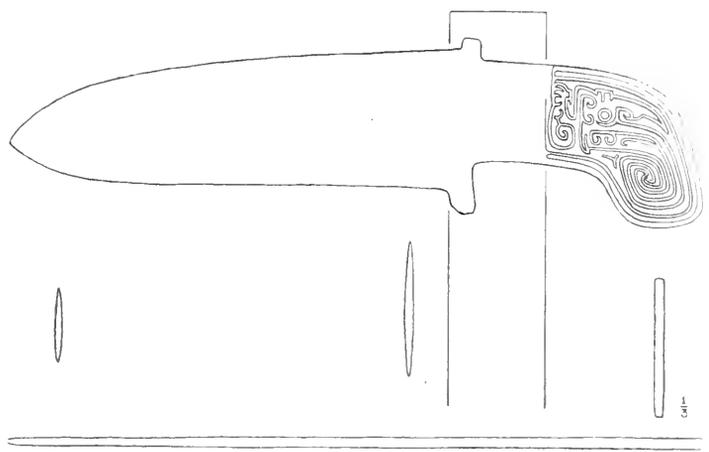


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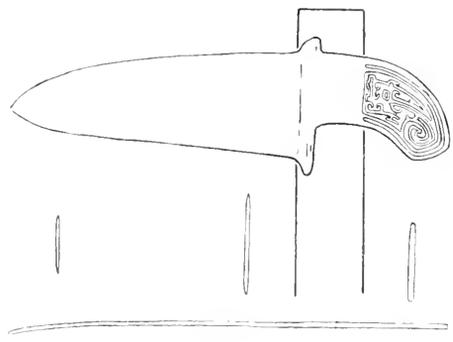


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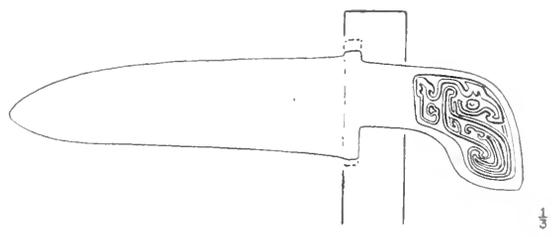
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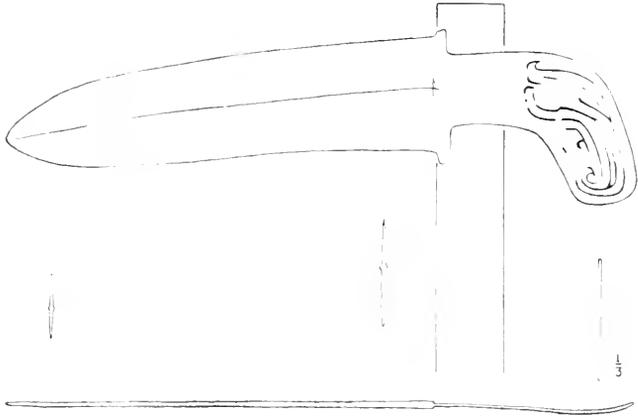
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67



68



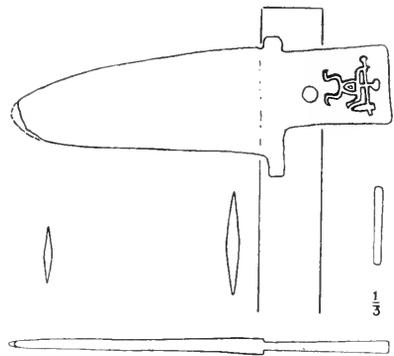
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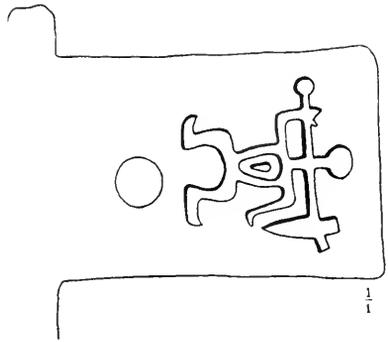
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19

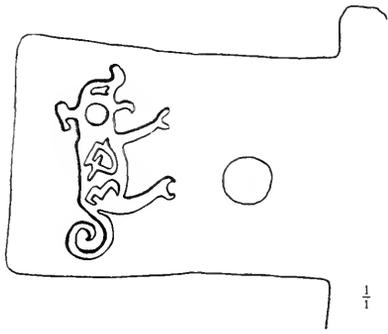
Type V A



70

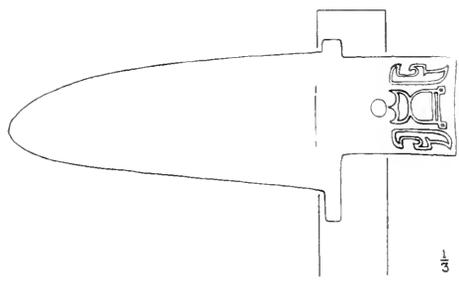


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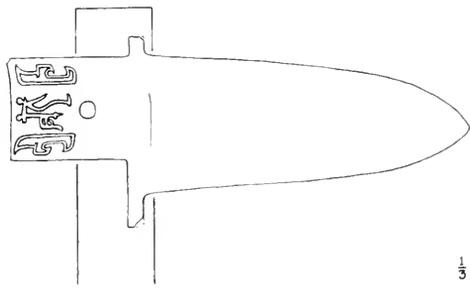
70

Type V A



71

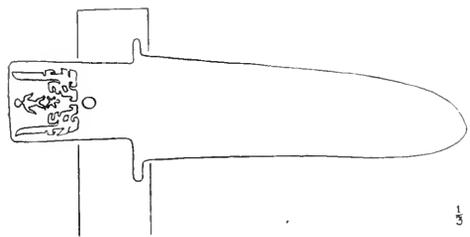
$\frac{1}{3}$



71

$\frac{1}{3}$

Type V B

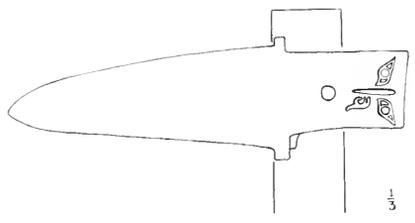


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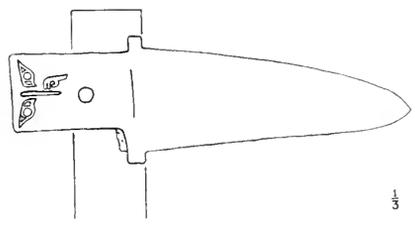
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21

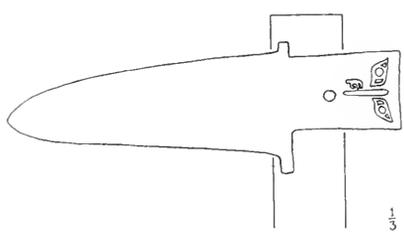
C



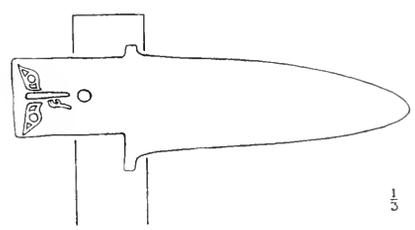
73



73



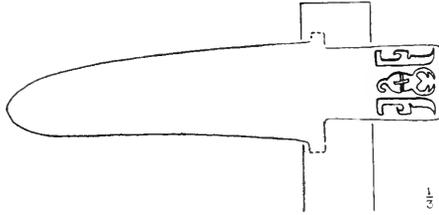
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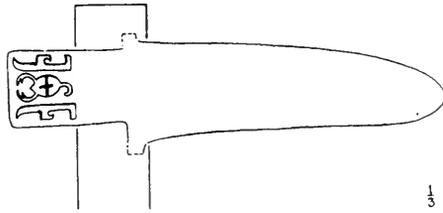
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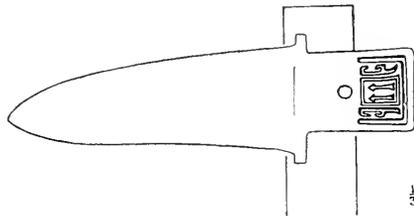
Type Ic



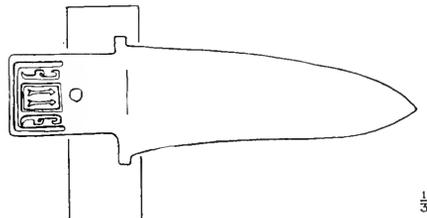
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75

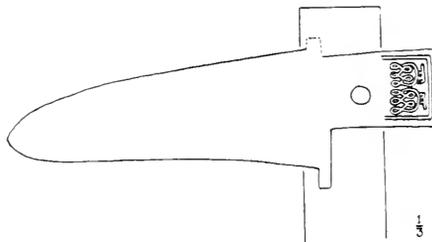


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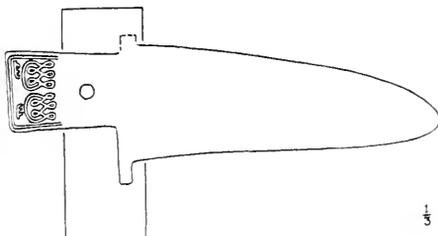


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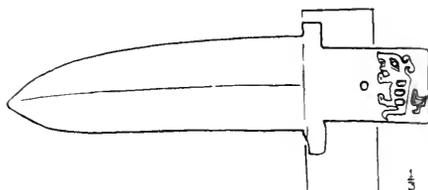
Type 5c



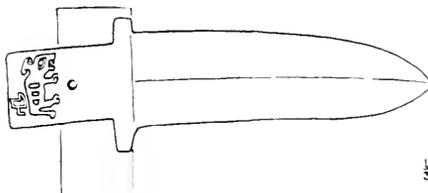
77



77



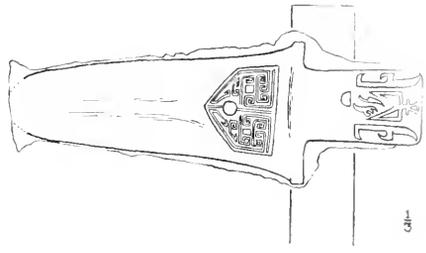
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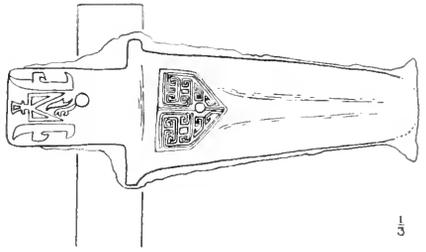
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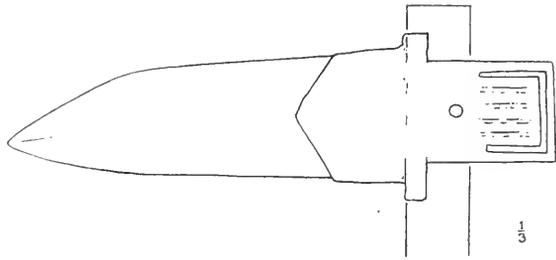
Type V c



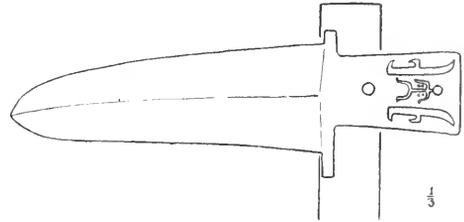
79



79



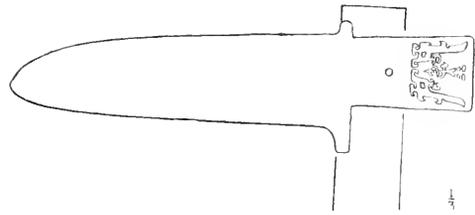
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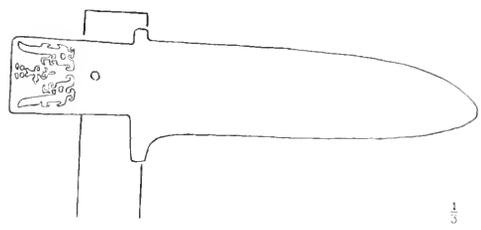
81



Type Vc

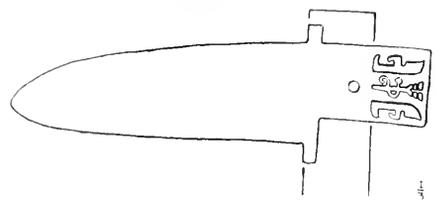


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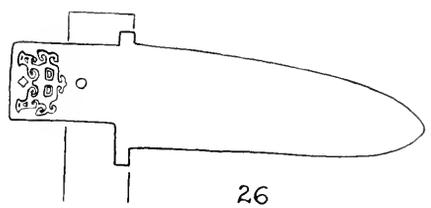


82

Type Vd



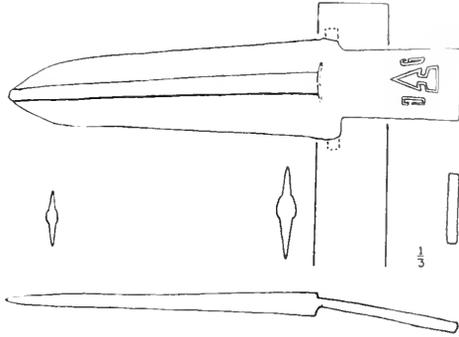
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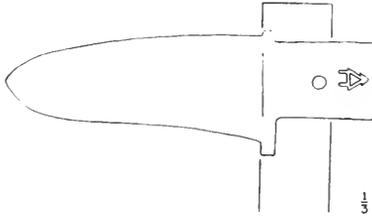
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26

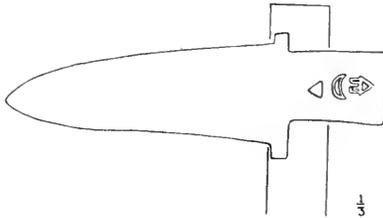
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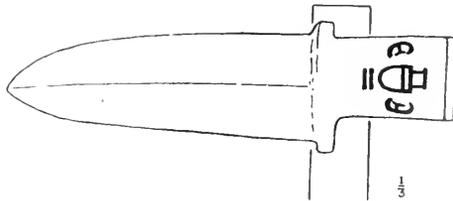
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85

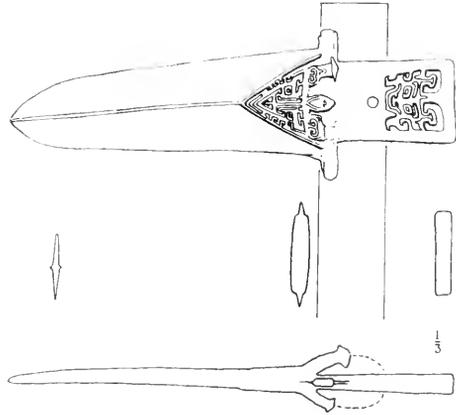


86

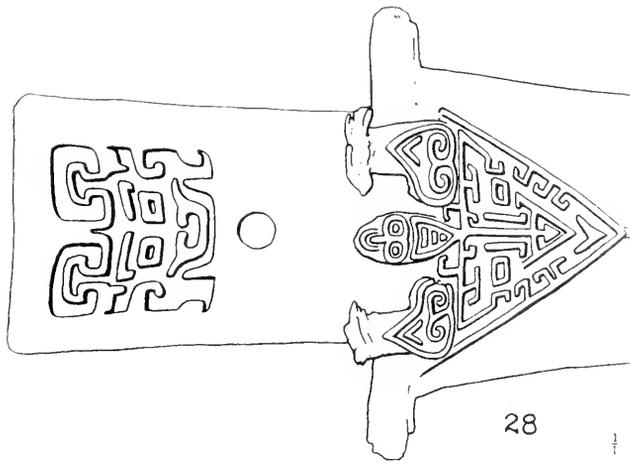


87

Type VE

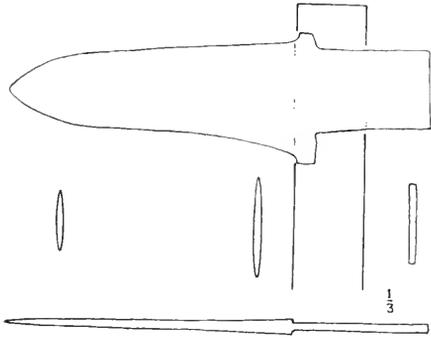


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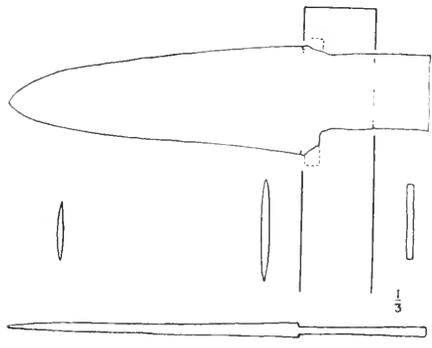


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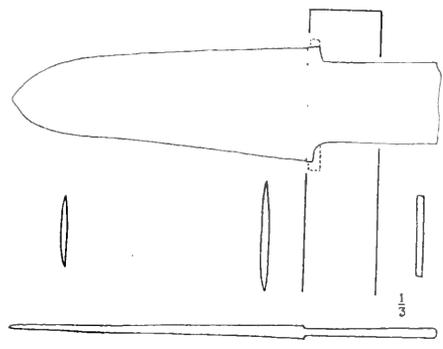
28



89

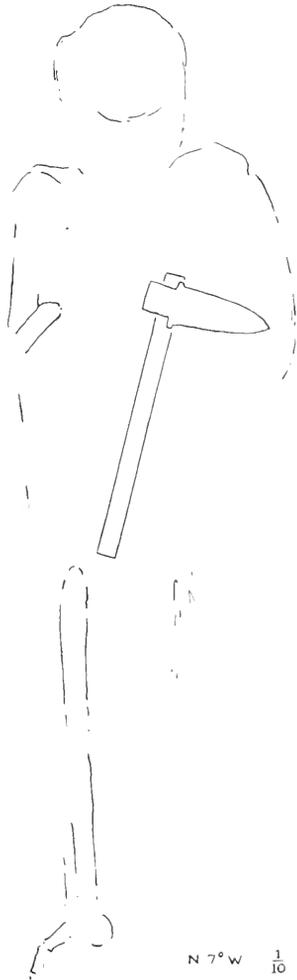


90



91

Τυρεῖς



89

N 7° W $\frac{1}{10}$

30

Type I F



12
 2 11, 22 1

90





11

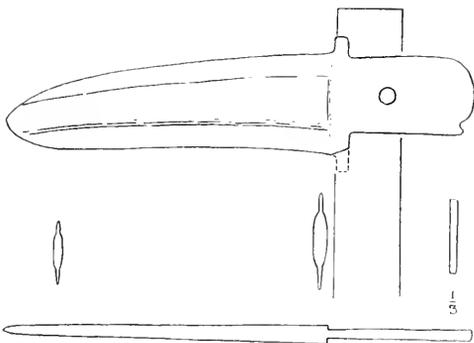


12

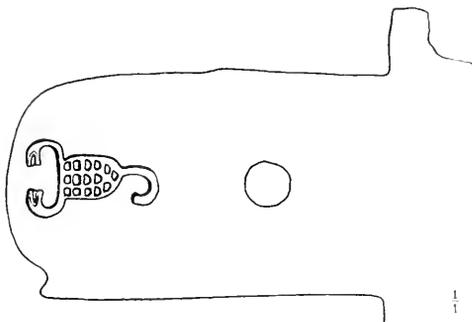


13

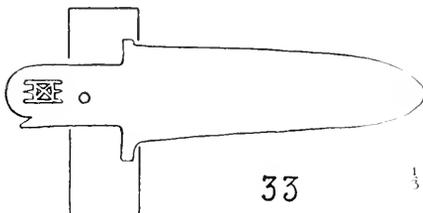
Type VI A



95



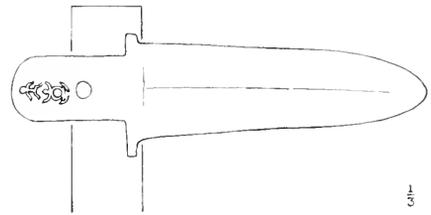
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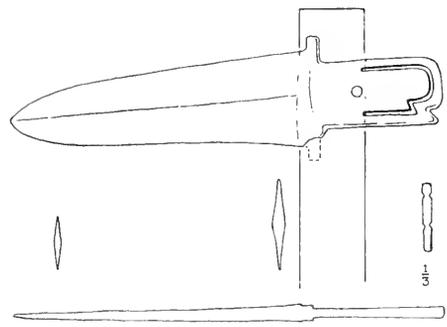
96

33

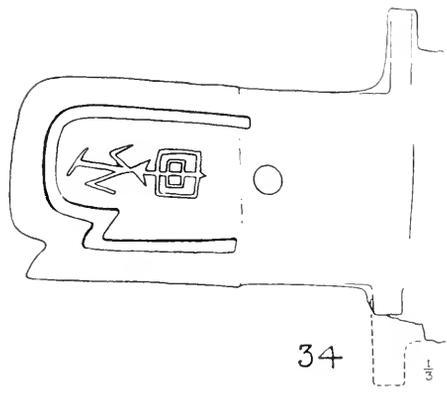
Type VI A



97



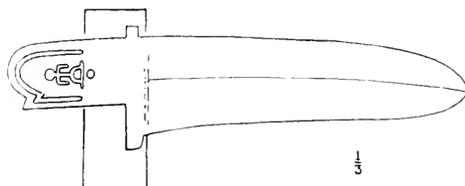
98



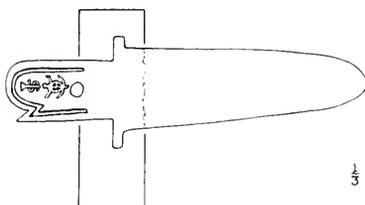
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34

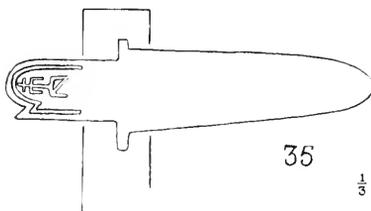
Type VI A



99

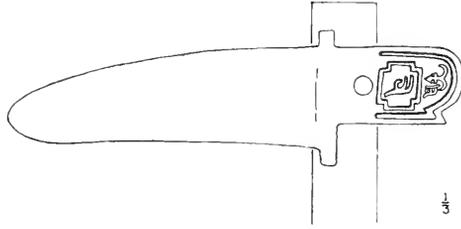


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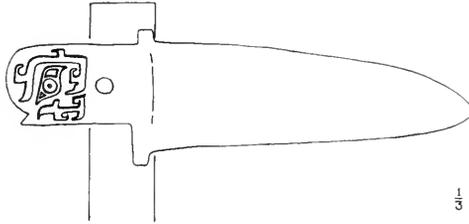
101

Type VI B



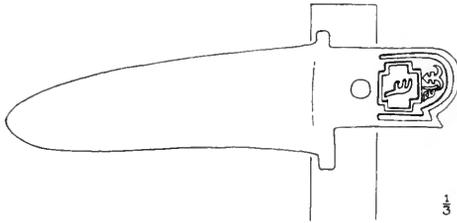
102

$\frac{1}{2}$ cm



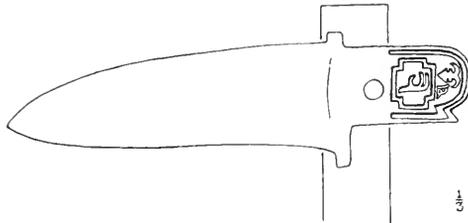
102

$\frac{1}{2}$ cm



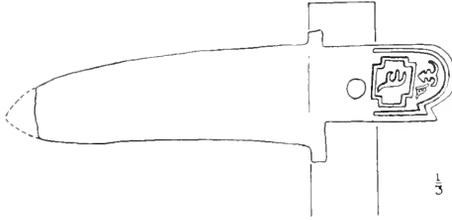
103

$\frac{1}{3}$

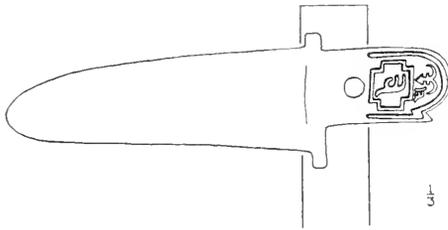


104

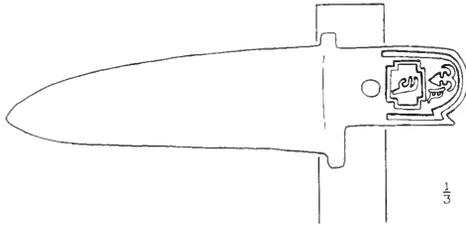
$\frac{1}{2}$ cm



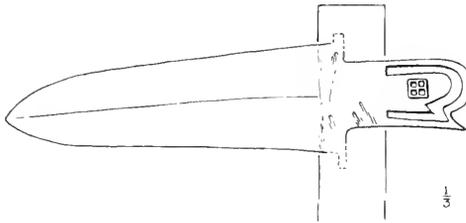
105



106

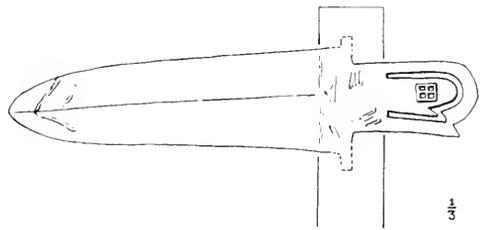


107

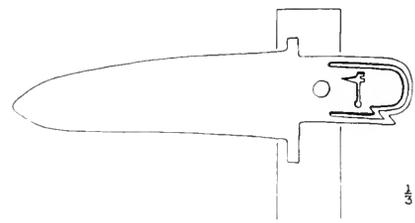


108

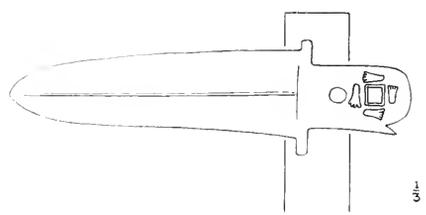
Type VIIb



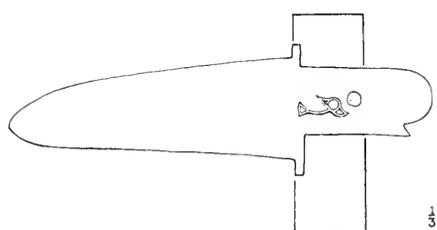
109



110



111

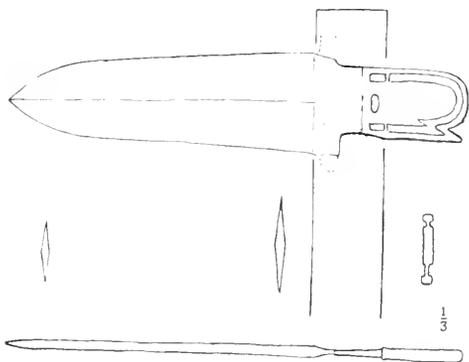


112

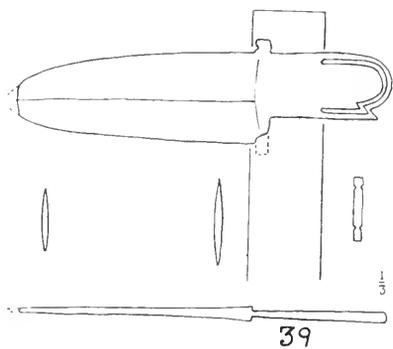
38

1/3

Type VIc



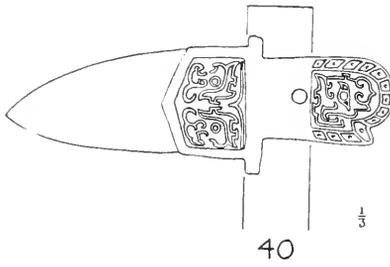
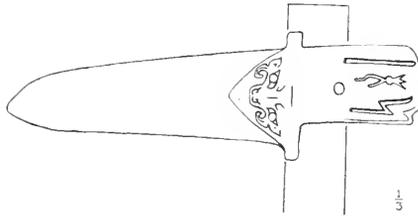
113

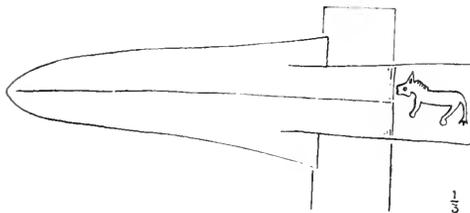


114

39

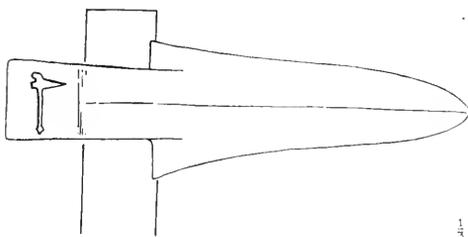
Type VI.D





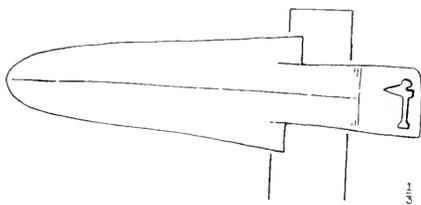
117

$\frac{1}{3}$



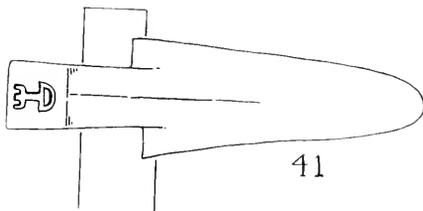
117

$\frac{1}{3}$



118

$\frac{1}{3}$

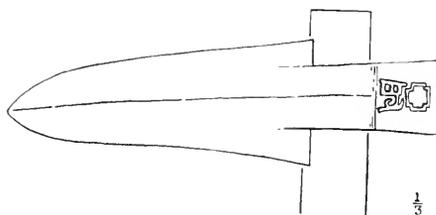


118

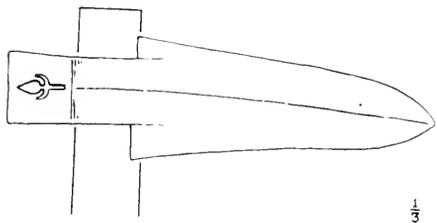
41

$\frac{1}{3}$

Type VII A

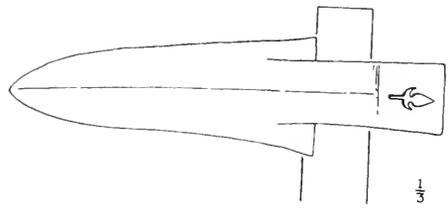


119

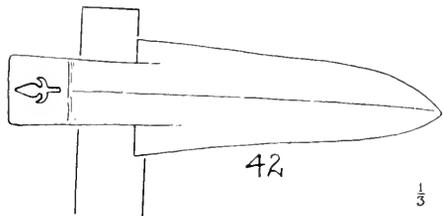


119

Type VII B



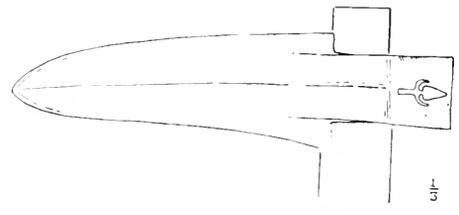
120



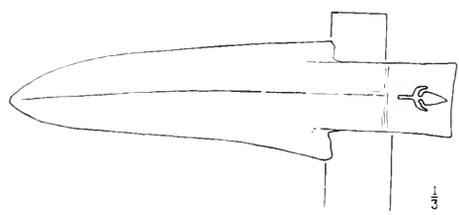
120

42

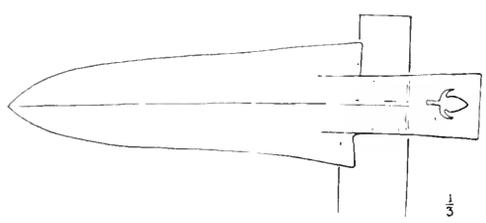
Type VII B



121



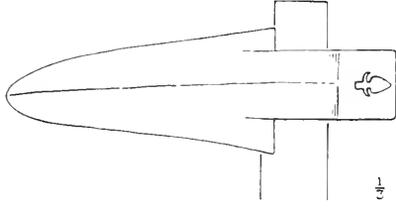
122



123

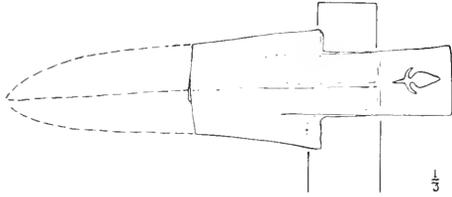


43



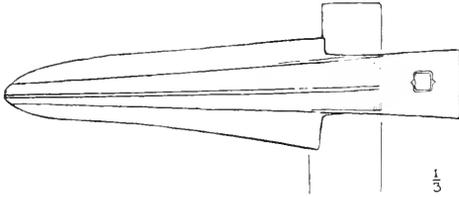
124

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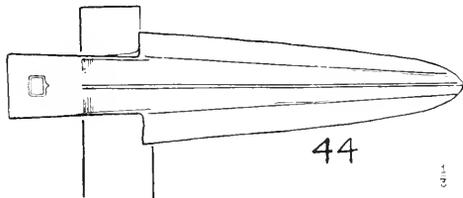
125

$\frac{1}{3}$



126

$\frac{1}{3}$

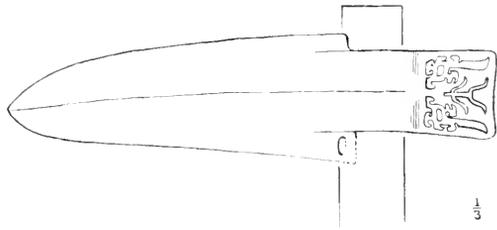


126

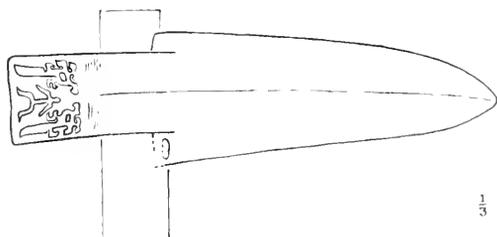
44

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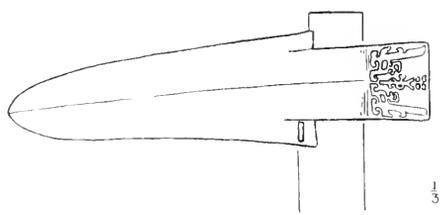
Type VII B



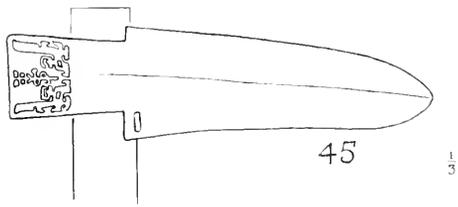
127



127



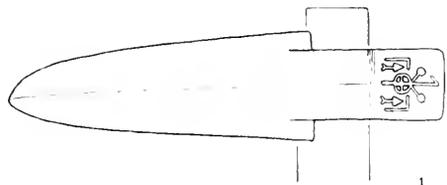
128



128

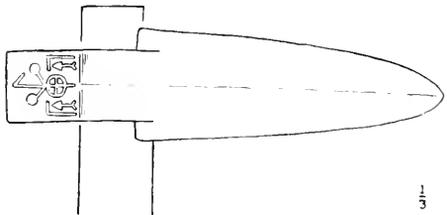
45

Type VII B



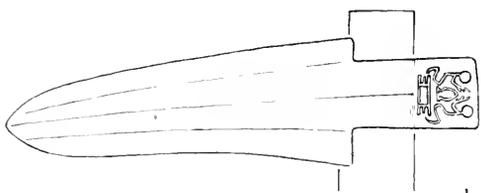
129

$\frac{1}{3}$



129

$\frac{1}{3}$



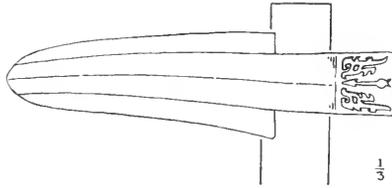
130

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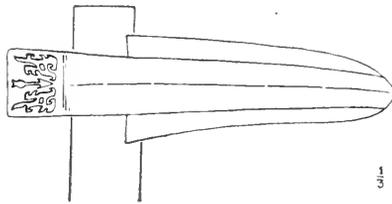


46

Type VII B

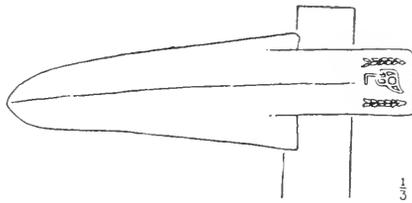


131

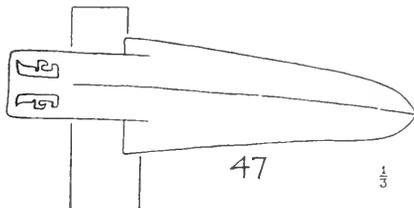


131

Type VII C



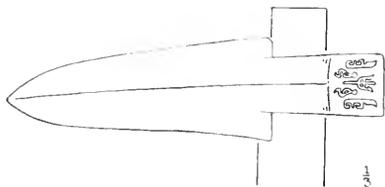
132



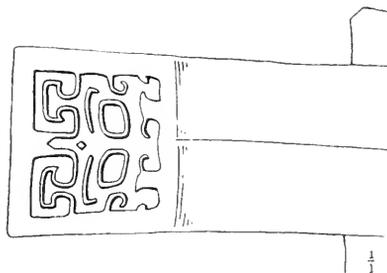
132

47

Type VII C

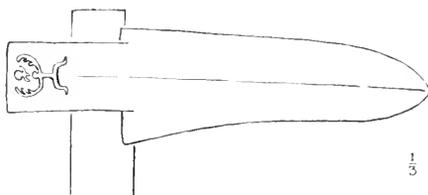


133

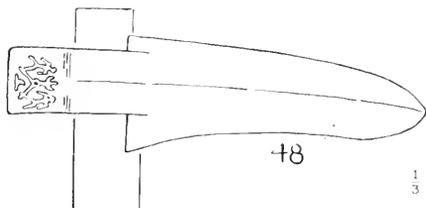


133

Type VII D



134

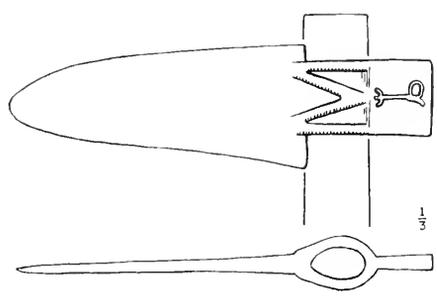


135

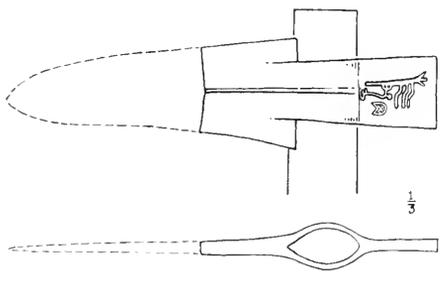
48

1/3

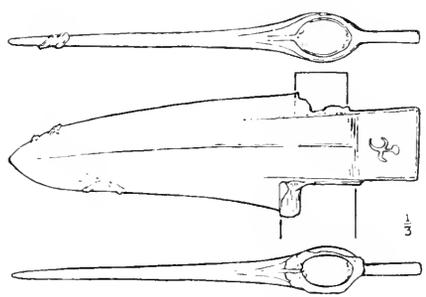
Type VII E



136



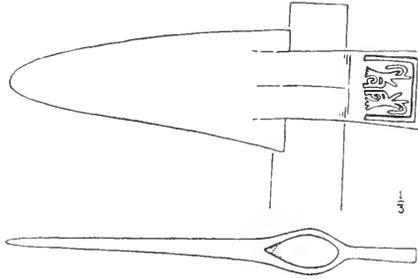
137



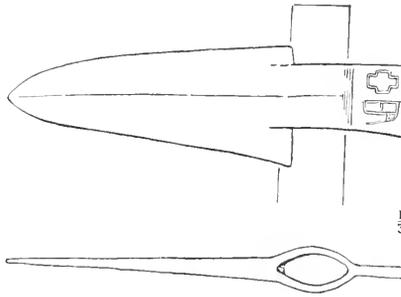
138

51

Type VII E

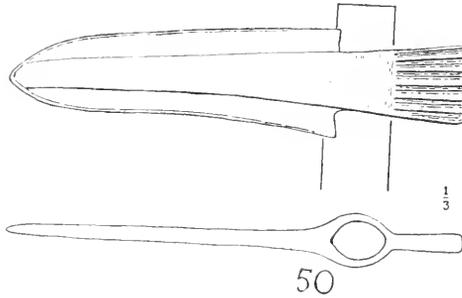


139



140

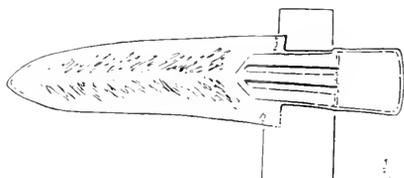
Type VII F



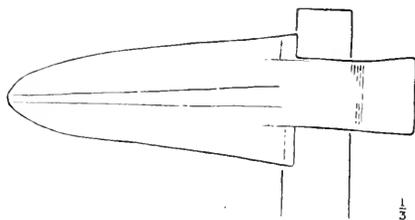
141

50

Type VII F



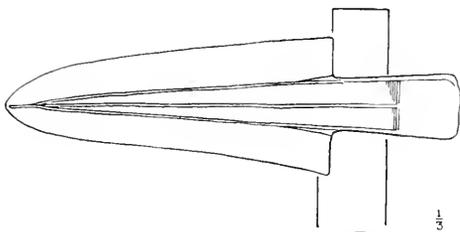
142



143

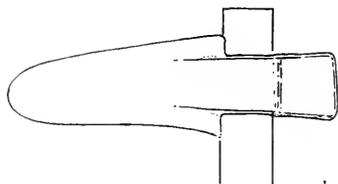


52



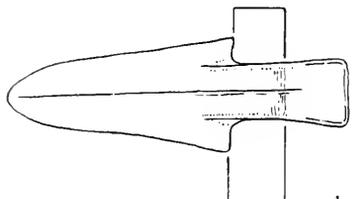
144





145

$\frac{1}{3}$

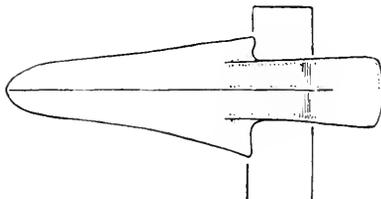


146

$\frac{1}{3}$



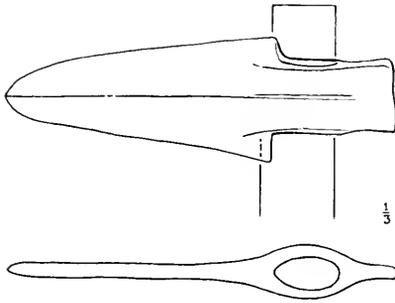
53



147

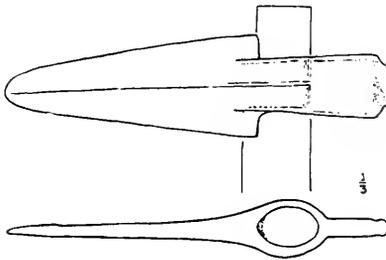
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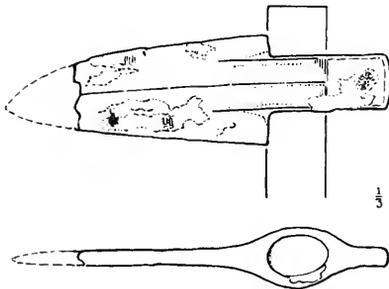


148

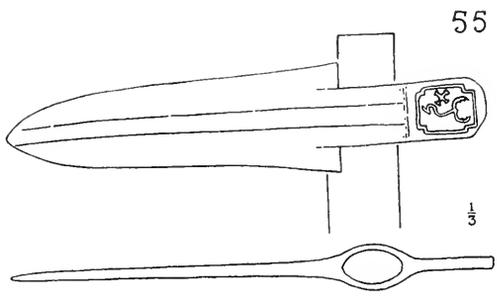
54



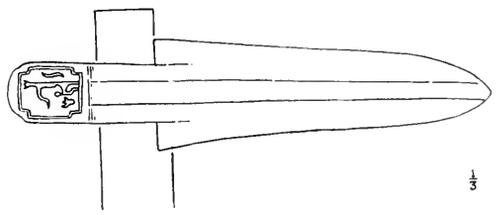
149



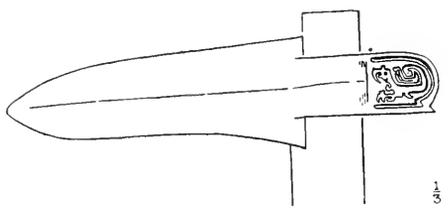
150



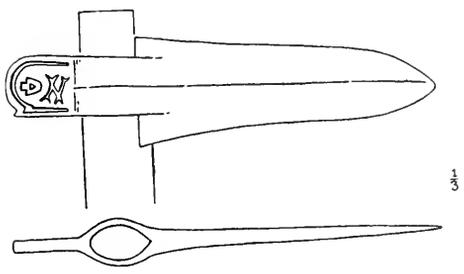
151



151

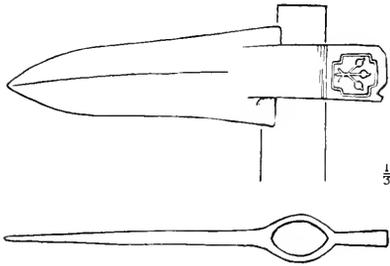
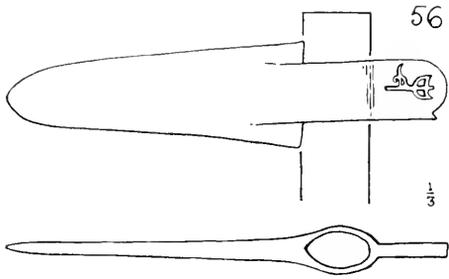


152

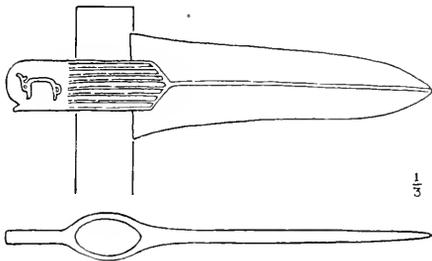


152

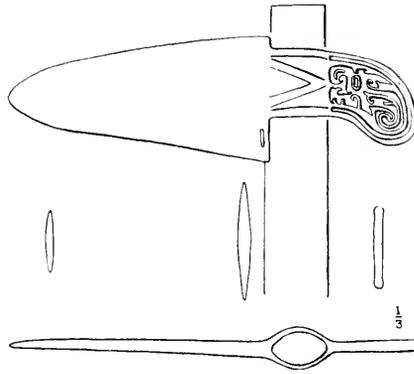
Type VIII B



Type VIII C

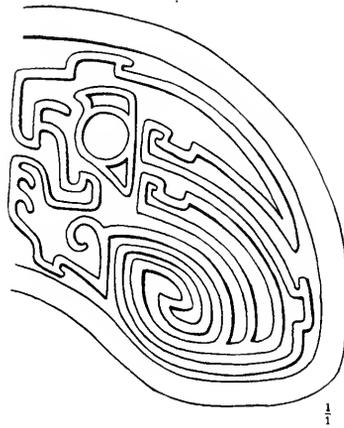


Type VIII D



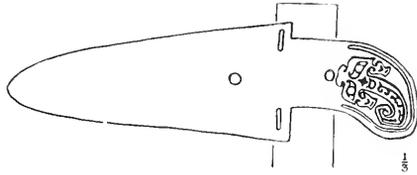
156

57

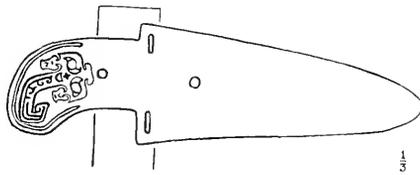


156

Type IX A



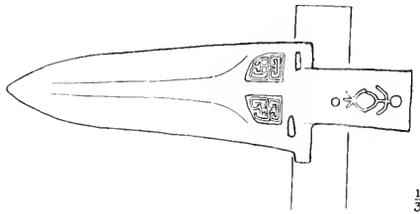
157



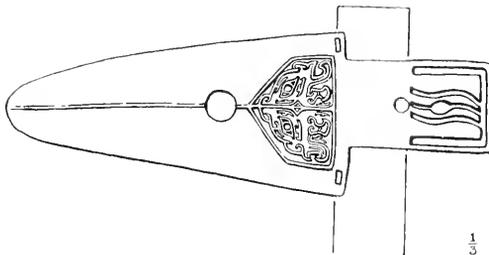
157

Type IX B

58

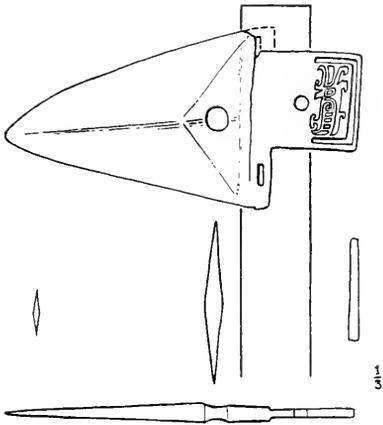


158

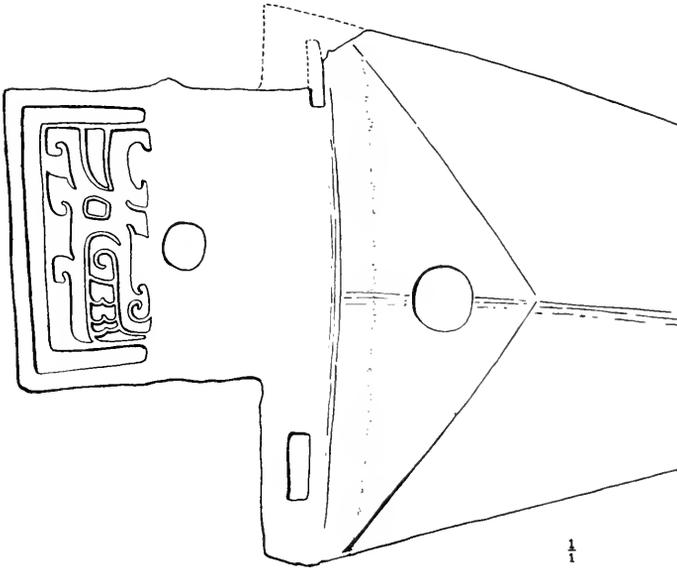


159

59

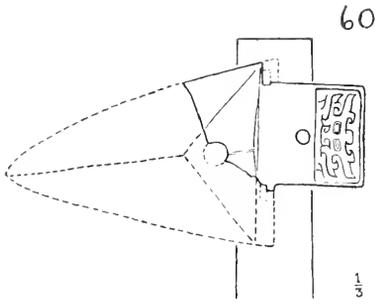


160



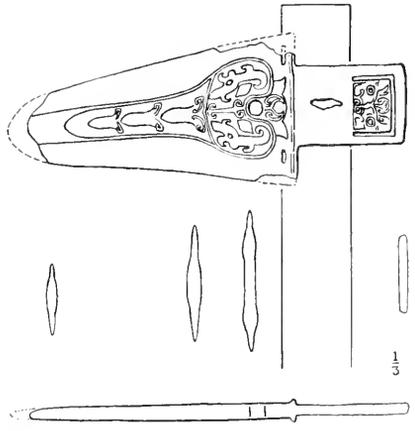
160

Type IXc



161

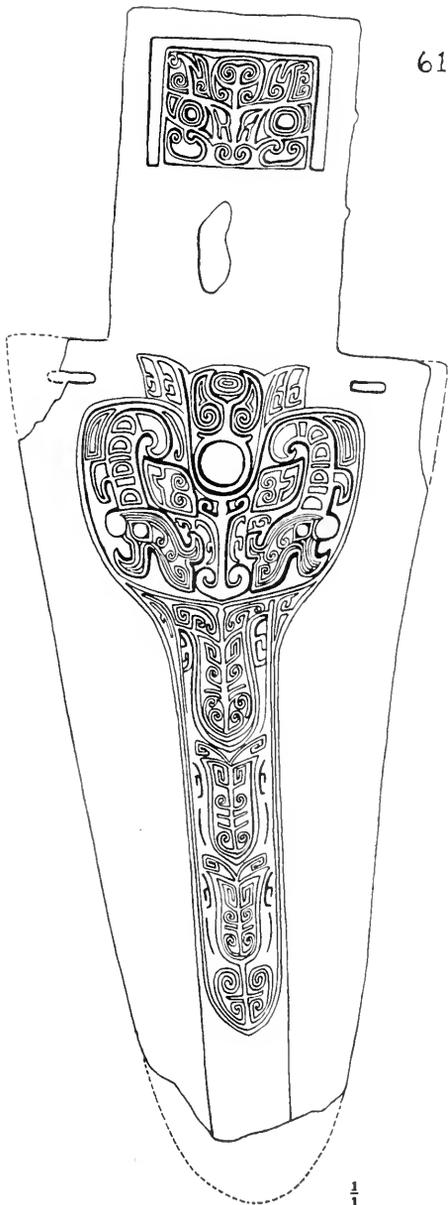
Type IXp



162

61

162



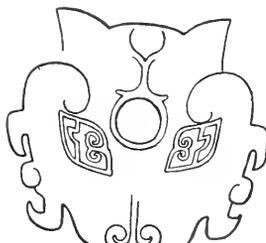
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DRAGON



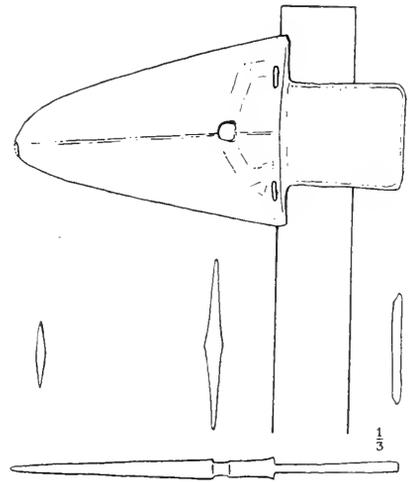
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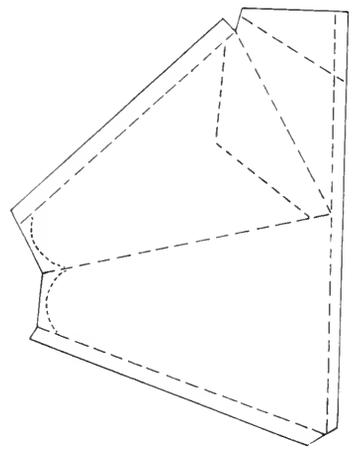
TIGER

Type IX E

62

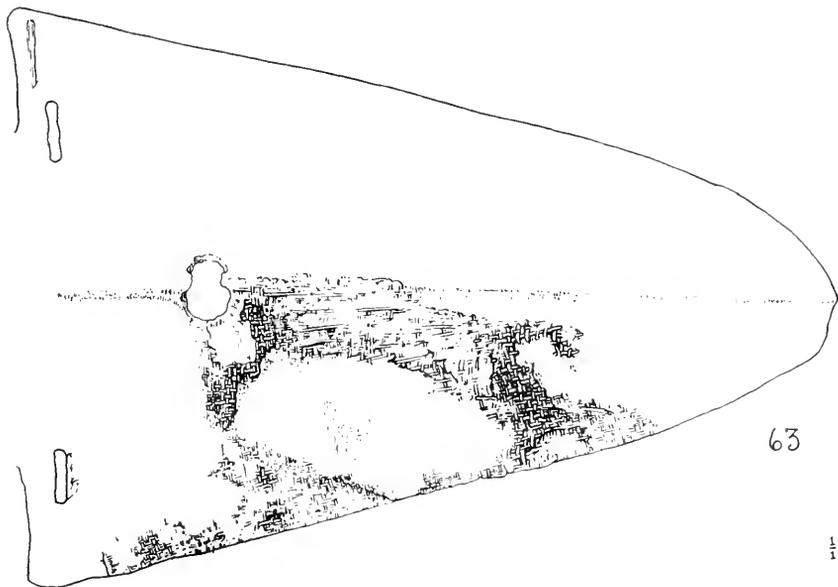


163



163

Type IX E

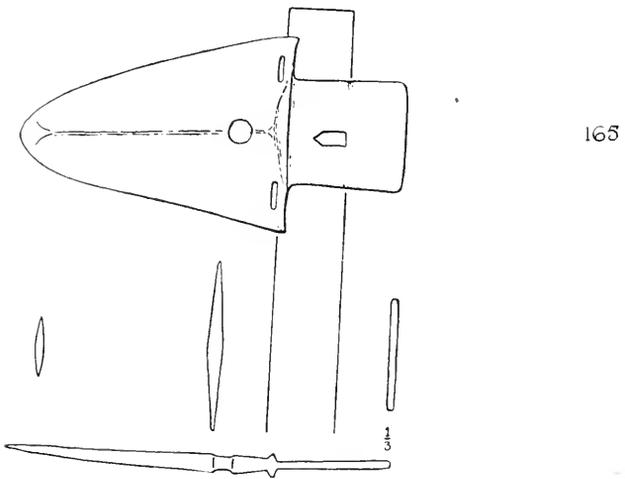
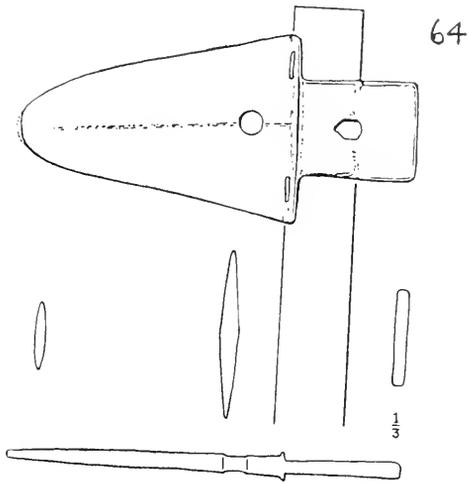


163

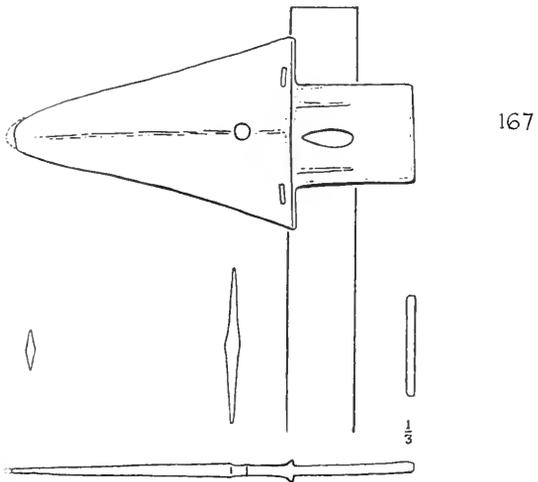
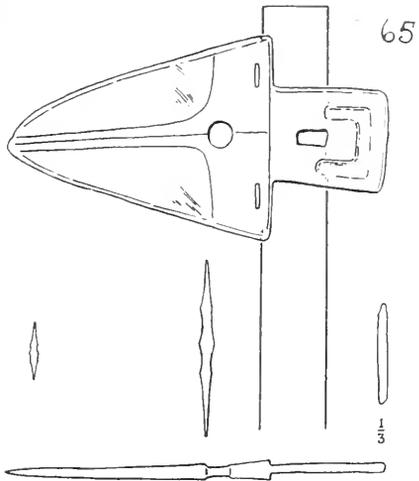
63

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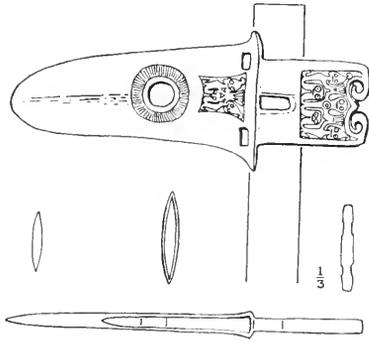
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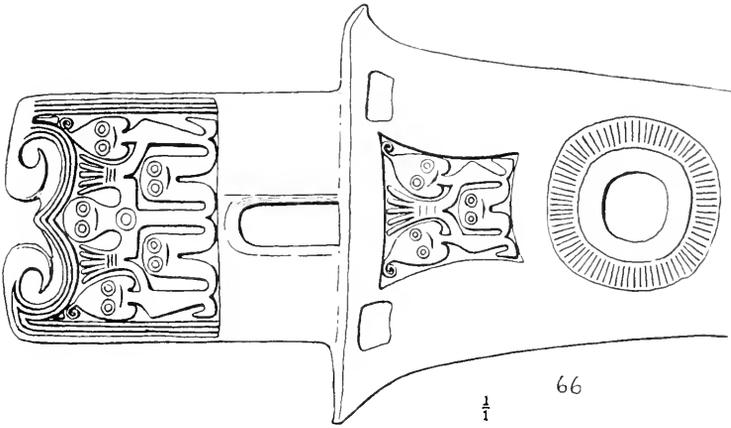
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T. 168



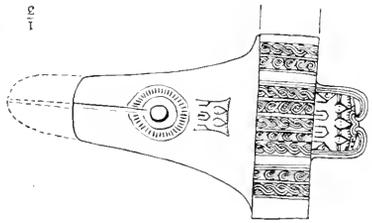
168⁴⁶⁰



168

Toe IX.F

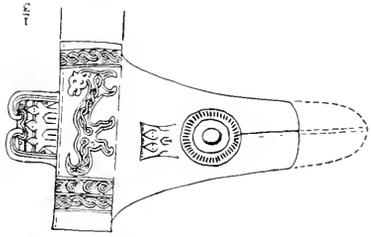
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169



169

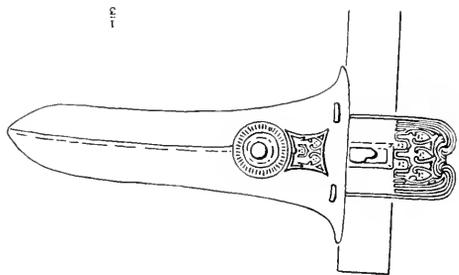


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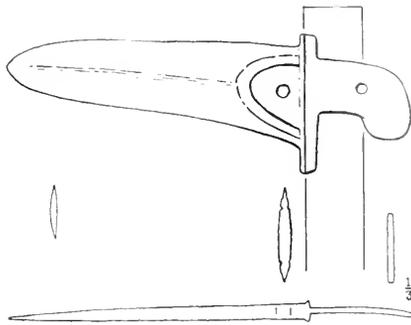
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170



170

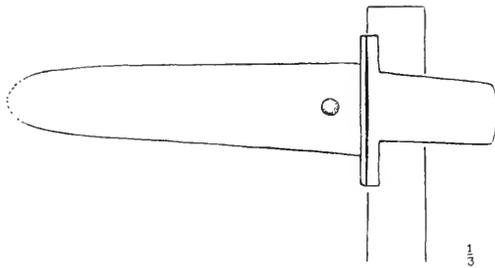
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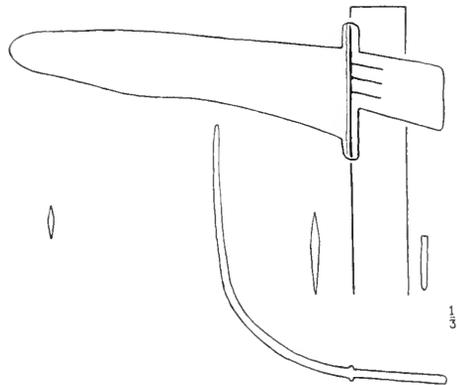
175

69

Type X C



176



177

CIRCULATE AS MONOGRAPH

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Univ Toronto, University of. PhD thesis.
T (Menzies, James Mellon - Shang Ko, a study of
the characteristic weapon of the Bronze Age in
China in the period 1311-1039 B.C.) v. 2.

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