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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" craftsmen: 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 Ko 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, yü, 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", yü shih, and "jade", yü, were used to desig-

nate not only nephrite and the rarer ancient jadeite, but also other jade-like stones. In Chinese literature, therefore, the word jade, yü, 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 Sinicum, Peking 1921, 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, yü, 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 these place names have failed to yield any traces of nephrite or jadeite in situ. Some of the kinds of stone called jadestone, yü shih, used in the Shang Dynasty, are illustrated in sickle blade no. 5, Ko nos. 10-22, 28-33, 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 Hsien in Hopei province, used in Ko Nos. 25, 26 and 27, was called jade, yü, in the inscriptions on sculptured figures made of this same marble about A.D.500. Marble figures of Buddha were inscribed "Jade Buddha, yü fo".

The craftsmen of the Shang Dynasty used many different minerals to manufacture the "jadestone" Ko and other "jade" objects found at the Waste of Yin, Anyang. A geological map showing the quarries where these minerals were found would 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 No. 5 and jade Ko Nos. 10, 12, 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 Ko 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 Ko could be examined by competent mineralogists to determine

how many of them are made of nephrite, which is a silicate of calcium and magnesium, $Ca\,Mg_3(SiO_3)_4$. Jadeite, fei ts'ui, is a silicate of sodium and aluminum, $Na\,Al(SiO_3)_2$, 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. 124, 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, yü, 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 Pi Chi, ch. 15, says that jadeite, fei ts'ui, from Yunnan, was not true jade, yü. 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. CDXXV, 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 (Kan-Sou)" Toung Pao, Serie II, Vol. 14, pp. 258-260. Laufer, Jade, p. 25, quotes the Han 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. 13, p. 436, in a review of this book, says "Je connais cette pierre qu'on travaille dans la region; c'est un marble verte assez finement viené et non un jade". Later Pelliot saw Joseph Martin's letter to M. Daubrée written 5 January 1891 published in La Geographie, Bulletin de la Society de Geographie, Vol. 26, 1912, pp. 376-398, which reported Martin's discovery of nephrite in the Nan 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.D.1020-1101), positively stated that in his time jade, yü, was quarried 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. 155, note 18.

123 of his History, Shih Chi, on Ferghana or Ta Yuan.[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 23. This paragraph will bear restudy. 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. 167, 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 jadestone 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 Daria and the

Yurung Kash, "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 Lan 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 Ku 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 LouLan 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 of Loulan was visited twice by Aurel Stein, and some excavations were carried on there. Hissreports 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, C122.0054, 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 LouLan. 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 LF3.03. 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 Yü T'ien" is toshow how well his account of this area accords with geography and with archaeologically ascertained facts. It also shows thtt he was right in including the people of Yü 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 beforethe 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 Tamerlane 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 Ku 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 ko similar to Ko 28-31. Pelliot, P., Jades Archaiques de Chine were said to come from Loyang. Laufer, B., Archaic Chinese Jades were also said to come from Loyang. Karlbeck, 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 Freer Gallery houses the two great jade ko: 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 Khotan. 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 NB.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, 6th. 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 Societé de Geographie de Petersbourg, after his death in Central Asia and this confusion resulted. Pelliot fails to report Martin's description of the jade, he says "Il y en a de toutes les couleurs; vert mat, vert d'eau, blanc mat, blanc de lait meme tres 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

definite scientific determination of the mineral composition of the specimens sent to Russia and in view of the analysis made by Professor Cayeaux 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" does not alter the evidence for the trade in jade 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 A.D., 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, Ko 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 Tombs of Old Loyang at Chin Ts'un. The beautiful jade pendant NB.4847 "of light yellowish green jade in the form of a long-tailed long-necked dog scratching itself by its hind paw" approximates in colouration and texture jade Ko 31.[1] Recently mined yellow jade is found in notched circlet NB.1970. This is similar in size and shape to a yellow jade circlet once in the possession of Yu Ta-ch'êng, and was probably made on

1. Tombs of Old Loyang, p.155, plate CXXVII, No. 5.

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. 554. Ku Index 42, 0325. Laufer Jade p. 104-112 Fig. 38, Wu Ta-chêêng 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 Nan 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 Nan 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 Goez 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, Cathay 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

similar to that of a large jade Ko now 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 Ko No. 33, 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 Ko, 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 Kunlun 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 Po 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 written down before the burning of the books in 213 B.C. records that "Wu Wang 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 Memoires 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 Ko used in the ritual services. Two main features in the graph pao are "jade under a roof". Jade Ko 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 Ko, 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 Ko 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 Ko, 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-

-ing factor creating in the Shang Dynasty jade lo 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 preceeding 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 grindston 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", li, to distinguish it from a"grinding stone", mo, used like an"ink slab", probably to grind "abrasives". Ch'eng-tzu-yai "polishing stone 2, drawing Pl. XXXIII, Fig. 2; photograph, Pl.XXXVIII, Fig. 3;"grinding stone"drawing, Pl. XXXIII, Fig. 3, photograph, Pl. XXXVIII, 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 and3 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 Hsün Hsien but no photographs or measurements are yet available; three had holes for suspension; one had a handle grip, and one was broken. T'ien-Yeh-Kao-Ku-Pao-Kao No. 1, p. 193. Such a whetstone may have been called a ts'o. Giles 1.1770. Ode 184.1 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.M.A has a number of finer whetstones from Anyang; NB.3365, without suspension hole; NB.3366 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 Columbia[3]

2. The R.O.M.A. houses a collection of these tools made by Lieut. George T. Emmons; axes, adzes, chisels, scrapers, and a few knives (HK.1575, HK.1576). The cores (e.g. HK.1541 and HK.1591) show what remained after long strips had been cut off. The sandstone saws (HK.1549, HK.1550, HK.1551, HK.1552, HK.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 HK.1720.

would yield strips long enough for large Shang Dynasty jade Ko. On the reverse side of Ko 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 Ko 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 ko, 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 grindstone. This method was certainly used to shape also Ko 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 Khotan, 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 MB.5271, said to be from Chin ts'un, see W.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, whichaallows 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 w 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 f 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 magicians 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 Ko. 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 checquer 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 Ko No. 10, and completed holes on sickle No. 7, Ko 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 Ko 13, 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.

A. 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. There are extant at least three thousand bronze ritual vessels with Shang inscriptions. Probably as many more uninscribed vessels are known. About twenty different kinds were used in preparing and serving food and drink in the ceremonies. Elaborate 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; armour 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 Ko. This study concerns the Ko only but it is impossible to understand the Ko apart from its context. The technique used in making and decorating the Ko 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 Ko.

When King P'an Kêng 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

appears to have ended about 2000 B.C., i.e. about the time generally accepted for the close of the Early Bronze Age in Palestine, which is the point of contact of the Aegean, Egyptian and Mesopotamian cultures. The Middle Bronze Age, while it added no new essential elements, covered the period of refinement in technique and the expansion of the use of bronze into other fields such as the decorative as opposed to the merely useful. At 1500 B.C. the end of this expansion and of this period was reached, a date some 500 years later than the close of the corresponding phase in the Near East. The Late Bronze Age was the period of gradual decline. From its height in 1300 BC This decline was due to deteriorating craftsmanship and to the use of poorer materials rather than to the introduction of a new material such as iron. Less good tin and copper and more impure copper and lead, mark edthe decline in bronze composition The end of the Late Bronze Age in China must be brought down to ca. 500 B.C., for there seems to be no trace of iron weapons or tools before this time. More again China lagged far behind the West, for in the Near East, iron was coming into use ca. 1200 B.C. Bronze continued in common use in China along with iron until the third century after Christ. The Late Bronze Age in China, ca. 1500 to ca. 500 B.C. covers the three historical culture periods which we have called in this monograph Shang II, Chou I and Chou 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 before 1050 B.C. The inscriptions on them have been called "totem marks" and "picture writing" which imply that they were too primitive to be given any equivalent modern name. It is, however, recognized by these scholars that they do "represent" the names of persons, families or tribes for whom these bronze

ritual vessels were made. One glance at the elaborate vessels themselves, which show so fine a mastery of technical skill, should have convinced these scholars of the great incongruity in their interpretation of the inscriptions. Many of the names inscribed on the ritual vessels are found also on the Oracle-bones from the "Waste of Yin". By means of the dates ascribed to these bone inscriptions (on entirely other evidence), we are able to determine the time when those persons or families flourished. From the beginning of the first bone-script period, shortly after 1311 B.C., we find names inscribed on the bones which are also found cast on sets of bronze ritual vessels and the inscribed bronze Ko associated with them. Photographs of the ritual vessels cited, some of them to be excellent examples of the bronze caster's art, comparable to the best work of other nations in any age.

These vessels are not at all primitive in form or craftsmanship and give a much better idea of the skill of the Shang dynasty artisan shortly after 1500 B.C. than do the simpler bronze Ko associated with them in their sets. Indeed it is only possible to understand how the bronze casters came to decorate their Ko in such an elaborate way and to use some of the methods they did by understanding the more intricate problems involved in casting and decorating these ritual vessels. It is evident that this art of bronze casting did not originate at Anyang, for unless the Academia Sinica has unearthed some other information not yet published, the writer is aware of no objects or traces whatsoever among the many thousands of artifacts found at the Waste of Yin that would indicate any primitive stages in the development of the art of bronze casting. This art, together with the 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 high 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 waste 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 P'an Mo 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 plainer 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 in the alloy at such places, for it requires this much extra tin to weld these secondary castings into position. 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 artizan usually attempted to erase the traces by scouring the surface.[1]

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

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

B. The casting of the Ko.

All Ko examined by the writer show traces of having been cast in double moulds. Ko 79 shows the overflow which exuded between the upper and lower parts of a flat double mould. It was poured from a "gate" at the point of the weapon. Socketed Ko 144 was poured from the butt end where some of the overflow remains. The moulds used for Ko 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 R.O.M.A. No.3970 said to be from Anyang. R.O.M.A. No.3153 and Yên Chung One 3.30.6 are parts of double moulds for sacrificial knives similar to knife R.O.M.A. No.4049, 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.

One characteristic piece of the bronze caster's equipment is a crucible which well represented among the artifacts excavated at Anyang. Because of its shape it is called by the peasants "a general's helmet, chiang chün k'uei. The writer has found many fragments of these thick, 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 Waste of Yin near furnace sites where charcoal, burnt earth, bronze slag and fragments of bronze moulds were common. The Academia excavated many fragments but none complete. One had a piece of bronze slag, t'ung lien cha, attached to it.[1] Mr. Liu Hsü-hsia's discussion of this crucible.

1. Liu Hsü-hsia, "A study of the Yin dynasty art of metal working, Yin tai chih t'ung chu chih yên chiu", Anyang Report, III, 1933, p. 681-696, with five plates and a drawing of a "general's

helmet" reconstructed from two fragments, p. 685 and photograph, Plate 2.

lien Liu, 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 technique.

The writer once owned a "general's helmet" which balanced perfectly on its high foot with a flat base not more than 50 m.m. (2 ins.) in diameter. Another vessel had a second inner funnel-like lining which sloped down to an opening at the bottom leading into the vessel proper. This inner part was made of clay inferior to that of the thick outside vessel, as though it were a temporary addition. Other fragments showed traces of this inner lining which was not mentioned by Mr. Liu. The inside of the funnel-like lining was blackened. None of the fragments of these vessels is blackened outside. In the writer's opinion, they cannot have been crucibles placed in a furnace and fired from the outside. They may have been containers into which the alloy from the stationary 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 lifted to pour 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 Shang 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 Ko did not come perfect from the mould. The surfaces of all bronze vessels and weapons intended for practical use show traces of a finishing process. As Ko 79 shows the point and edges must have been filed off and ground down on whetstones into their finished form. Filemarks are visible on many Ko. 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 Hsün Hsien railway station[1] were in the Honan Provincial Museum in Kaifeng.

1. Twenty five miles west of Hsün 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 ferric red to ferrous 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 Shang 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 chilling in water are correct or not, the Shang vessels and weapons show clear traces of surface manipulation. The feather-bone hammering on Ko 142 attests the annealing of the blade. Ko 149 has the porous, bubbly surface of an unfinished weapon. Ko 121-125 on the other hand, all show finished surfaces and some indication of the annealing and finishing process done with a hard polishing stone. Ritual vessels were finished by filing the seams and polishing the whole surface with a jade stone burnisher. 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 the color of the alloy in all shades and combinations of malachite green, azurite blue and silver gray. Traces of the same finishing processes are visible on the decorated butts of Ko.

The annealing process was probably meant by the expression "Tuan", as in Legge III, p. 622: "Temper your Ko and your spears, Tuan nai Ko mao". 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 Cn'ien Commentary of the Han dynasty. Hence Legge (IV, 488) translated Ode 250.6, "and gathered whetstones and iron, Ch'ü li ch'ü tuen," and Waley rendered the verse "taking whetstones and pounding 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, E. Koizumi and Dr. S. Komatu 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 34. 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 champlevé. 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, (R.O.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

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. 33-55, (two specimens), Plate 1. C2 (Ko 138A) and C17 (Ko 70A). Analysis by Professor C.H.Desch of the Sumerian 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 T'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. Tsurumatsu Dono: "On the Metal Ware Making in the Ancient China seen through Chemical Analysis", Tôhô Gakuhô, No. 4, Nov. 1933, Tokyo. Three specimens, Plate 1, Ting or D4 (156A), Wu or D5 (41B), Chi 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(ettens) states "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." This abstract makes no mention of the presence of lead, although the original report makes it clear that specimen A (156A) had 15.08 per cent and specimen C (423) 5.80 per cent. Specimen A can not be called pure copper although the absence of tin may technically exclude the term "bronze".

3. Tsurumatsu Dono: "On the Copper Age in Ancient China III", Bulletin of the Chemical Society of Japan, IX (1934), pp. 120-124, Illus.; abstracted in Technical Studies, Vol. III (1934), p. 117. Three specimens D8 (38A); D9 (40A); D 10 (91A). The abstract reads: "A spear head and three halberds from the same site have been analysed 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. Umehara: "An Archaeological Observation on the Chemical Constituents of Bronze Weapons of Ancient China", Tohô Gakuhô, No. 11, part 3, October, 1940, plates 1-3. Kyoto; based on Y. Yamauti, S. Koizumi and Dr. S. Komatu. "Chemical Investigations of Ancient Weapons of China", Toho Gakuho, No. 11, Part 3, July 1940, Kyoto. Specimens U1 (Ko 116A); U2 (Ko 177A); U3 (Ko 121A); U4 (Ko 159A); U13 (Ko 48D); U 14 (Ko 176A); U 15 (Ko 144A); U 16 (Ko 92D); U 17 (Ko 60A); U 19 (Ko 67A); U27 (Ko 152A); U 28 (Ko 164A).

The present writer judges all these Ko to be Shang in date unless it be U2 (177A) and U 14 (Ko 176A) which are on the border line

between Shang and Chou dynasties.

5. Through the good offices of the late Mr. Archie Brankston and Mr. Basil Gray, officer in charge of Oriental Antiquities at the British Museum, permission was granted to present the following unpublished analyses of fragments of Chinese bronze ritual vessels made by Dr. A.A. Moss of the British Museum, 18th January, 1940. (Letters from Basil Gray Nov 16 1940, Febr 10 1941) The analyses were made for Mr. Brankston who secured and dated the specimens no doubt from definite information obtained with them. All nine specimens are presented in order to complete the record although specimens B.M. 21, 24 and 25 are definitely of Late Chou date. The present writer has carefully examined full-size photographs of the nine specimens and considers that B.M. 6, 10 and 12 are certainly of Shang date and that B.M. 14, 17 and 19, as well are very probably of Shang date. .1

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

By means of these analyses the composition of alloys used in various types of Ko 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	Sn	Pb	Fe	Ni	As	Sb	S	Total
IIIA	38A	D.8		88.14	T	6.64	0.08	Nil	Nil	-	-	94.90
IIIA	40A	D.9		85.86	T	13.05	0.06	Nil	Nil	-	-	99.02
IIIA	41A	D.5		97.60	0.60	0.58	0.08	0.04	Nil	-	-	98.93
IIIA	42B	D.6		88.85	2.19	5.85	0.08	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	18.09	1.12	0.07	1.65	Nil	0.22	99.98
IVA	60A	U.17	86	80.35	14.16	2.36	0.08	0.11	0.10	0.07	Nil	97.22
IVC	67A	U.19	84	80.49	14.40	2.81	0.11	0.06	0.08	0.05	Nil	98.00
VA	70A	C.17	-	79.66	16.67	T	T	Nil	-	-	-	96.33
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	0.08	0.07	0.04	Nil	98.11
VID	116A	U.1	79	89.93	8.23	0.09	0.72	0.09	0.04	0.07	Nil	99.57
VIIB	121A	U.3	80	85.26	13.86	0.13	0.26	Nil	0.05	0.10	Nil	99.66
VIIE	138A	C.2	-	93.30	T	T	1.70	Nil		-	-	95.00
VIIE	139A	U.4	87	80.36	15.52	T	0.13	Nil	0.15	0.04	Nil	96.20
VIIF	144A	U.15	38	96.39	0.05	2.97	0.15	0.11	0.04	Nil	Nil	99.71
VIIIA	152A	U.27	70	73.31	9.43	17.00	0.03	Nil	0.17	0.02	Nil	98.99
VIIID	156A	D.4	-	77.20	T	15.08	2.80	0.03	Nil	-	-	95.15
IXE	164A	U.28	62	88.89	7.09	4.38	0.02	0.09	0.12	Nil	-	100.59
XC	176A	U.14	70	81.52	10.50	6.94	0.23	0.08	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.

Date	Ref.	Cu.	Sn.	Pb.	Fe.	Ni.	As.	Sb.	Total.
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	70.30	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

The twenty-one Ko listed above 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 P'an Keng moved to Yin.

The four classes of "bronze" are:

1. Tin-copper-bronze alloy as in 70A, 91A, 116A, 121A, 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 BM 6.10.12). 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 156A. These were ming-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 34 to 52.

3. Tin-lead-copper alloy, as in 60A, 67A, 92A, 152A, 164A, 176A.

This bronze appears to be somewhat similar to the purer tin-copper alloy of Group 1. It is of the same composition as the metal of ritual vessels with lead content such as BM 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 purer 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 ming-ch'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 8.23 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 dressing 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.

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

The rejected ore found at the Waste of Yin, together with the large pieces of slag and the charcoal also found there[1] 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 cone[2] about

2. This was lost in 1927.

five inches in diameter and two and one half inches thick. This may be taken as 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.C. Young, "The Mammalian remains from the Archaeological Site of Anyang", Palaeontologia Sinica, Series C, Vol. 12, Fasc. 1; Nanking, 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 southern 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 1038 B.C. The south land was known as Ching 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, chin, 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, wu i chu ping'. For this reason the Baron of Cheng cast three bells from it".

This historical reference to the attitude of Ch'u 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 T'ai yuan, capital of Shansi province) because of Tung An-yü he took the copper pillars, t'ung chu, of the public palace, Kung Kung, and made them into arrows[1]. When the First Emperor of Ch'in united

1. Records of the Warring States, Chan Kuo Ts'e, Chao state.

the six states under his sway, 221 B.C., he gathered together all the weapons in the country, T'ien hsia chih ping, and melted them down to form twelve bronze men[2]. These and many other references to the

2. Shih Chi History, Shih Huang Ti pên 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 Ko 70, down to the end of the period, (1038 B.C.), which is the probable date of Ko 177. A pure tin-copper bronze alloy was used for most of the more important bronze ritual vessels and the war Ko 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 Ko 70A, Type V, made by Professor Desch for Mr. Collins, of Ko 139A, Type VII, made by the Japanese scientists for Professor Umehara, as well as of the ritual vessels BM 6, 10 and 12 made by Dr. Moss of the British Museum for Mr. Archie Brankston 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 more complete picture of Shang dynasty metal work should be possible. Even now we have more reliable evidence for the composition of Shang bronze than seems to have been available to the author of the K'ao Kung Chi which reads: "There are six classes, chi, of metal alloy, chin. Six parts copper, chin, and one part tin, hsi, is called bell-and-tripod-class metal alloy, Chung ting chih chi. Five parts of copper and one part tin is

called end-socket-axe-and-adze tool class, fu ch'i chih chi. Four parts of copper and one part tin is called Ko-and-chi-weapon class, Ko Chi chih chi. Three parts of copper and one part tin is called great-blade or sword class, Ta jen chih chi. Five parts of copper and two parts tin is called knives and killing arrow class, Hsiao sha shih chih chi. Copper and tin one half each is called mirror reflector class, Chien sui chih chi." These proportions have given rise to much 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 artizan, 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:

	Copper	Tin
Bells and tripods, Chung Ting	85.71	14.29
End-socket axes and adzes, Fu Chi	83.33	16.67
Ko and Chi weapons, Ko Chi	80.00	20.00
Great blades (swords), Ta jen	75.00	25.00
Knives and arrows, Hsiao sha shih	71.43	28.57
Mirrors and reflectors, Chien sui	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 importations 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, a high content of tin; clapperless bells, chung, were not common until Chou II, 770-481 B.C.

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

2. Yetts in Lumorfopoulos Bronzes, Vol I, p. 34 presents proportions different from those of the K'ao Kung 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 metallurgy of the Shang dynasty except to suggest the mixture of metals and not ores. It also uses one word, Tin, Hsi, to cover all the metals added to copper. These include lead, iron, nickel, arsenic, antimony and, at a later Han 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 Lü Shih Ch'un Ch'iu 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 K'ao Kung Chi, leads only to confusion about the methods used.

Class 2

The metal of Class 2 is a "mixture" of lead and copper[1]. The Chinese knew that lead did not make an effective

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. Huai Nan tzu in the section on lessons from the customs of the State of Ch'i, Ch'i Hsü hsün, says, "Lead must not be used in making blades", Ch'ien pu k'o yi wei jen". Lead was considered "black tin". The yü p'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, chih, 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. Ko 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. Later, for Class 3 more waste scrap was used, the content could not so easily be assigned to its source. The impure copper of Class 4 offers no clue as to its source as yet.

An examination of the tin-copper bronze of Class I 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 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 Ko (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 ming-ch'i 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 ming-ch'i.

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

Tests for zinc, according to Dr. Moss, had negative results. Zinc was not used until the Han dynasty although Chinese Pakton as imported into Europe in the 18th century had a content of copper 40.4, nickel 31.6, iron 2.6, and zinc 25.4 percent.

THE DECORATION ON THE BUTT OR BLADE

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

1. The so-called plantain leaf or "blade" is in reality an isoseles triangle projected upwards or downwards into the plain spaces on 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 lightening. The rounded scrolls are called cloud patterns yün 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.

2. Branches of this same art are called Sino-Siberian and Ordos. Among the most striking and frequent motifes 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.

3. Animals were often pictured naturalistically on the Shang Dynasty gravy-boat-like bronze vessels called kuang. See the elephant on the [illegible].O.M.A. example NB.4027, Jorg Trübner, Yu und Kuang, 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 Po Ku 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 Lü Shih Ch'un Ch'iu compiled under the supervision of Lü Pu-wei (290-235 B.C.), a thousand years after this Shang Dynasty design was common. This description of the design describes a man being devoured , apparently similar to the motif on the Sumitomo wine pail figured in the London Exhibition Catalogue No. 238, or its companion in the Cernuschi 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 ppwerful 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 swamp 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 silkworm 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. K. 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 Yü (AD 768-824) "The sacrifice to the crocodile", trans, Evan Morgan, Wenli Styles and Chinese Ideals, Shanghai, 1912, edit 1931 pp. 112-115 Giles Biog. Dict pp. 254-256, written at Chao Chou north of Swatow.

not yet been discovered along the Yangtse 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, slimy, serpent's way
It stretches on and on O.
O'er mountains high and forests deep and dangerous precipices steep,
Tigers and panthers prowl O.
Here goblins, ghouls shriek, and short fox fairies flit,
King 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 1311 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 B.C. 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. Somehow 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 Hankow Changsha 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, Kuang Tung, Kuang 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 sea. Jaku 17A. see p. 28. This was probably Ch'u state.

des gns on the butts of the Ko 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 the 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 luxurient 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 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, Ta wu, or court ceremony. Designs similar to those on the Ko 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 was similar to that of the decorated butt of the Ko to its blade. The vigorous design of the coiled dragon on Ko 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 would 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 Kwangtung province north of Swatow ca. Lat. 23°, Long 117° when Han Yü was magistrate there ca. A.D.820. The writer has seen the mugger (Giles 3328) 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 Ko 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 Hsün, 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 20-30 feet (1 foot Han measure corresponds to 231 mm.) They have 4 feet like a house lizzard. See Tzu T'ung p.233. The blade of the Ko 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 Ko striking the neck of a man. Dragon designs changed as time went on. W.C.White, Tomb Tile Pictures of Ancient China, plate LXXX LXXXI and LXXXII, appears to depict the dragon described by Han Fei Tzu (280-233 B.C.). In his book, Chapter XII 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 discourse without knocking against the contrary scales of the dictators of men he must be astute indeed". The "contrary scales" are depicted on Plate LXXXI; the rider on plates LXXX and LXXXII 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) Menzies 660; 2256, Ch'ien -pien 4.54.3, 5.38.5; Hou-pien 3.6.15; Ching-hua 11.3; Chien-shou 5.15. same as Hsü-pien 1.31.5; Shih-yi 1.3; T'sui-pien 463. 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 2.23.15; Shih-yi 3.7; Hayashi 2.23.17; Ts'ang Kuei 109.3 same as Hsü pien 6.25.6 and joins Hsü pien 5.33.6, same as T'ien-jang 88. Chien shou 8.12. same as Hsü pien 5.25.5; 46.3 same as Hsü pien 5.25.5. Ts'ui pien 1231; 1260. Variation 3 Manzies 127 1409; 1861; 2188; 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; Hsü-pien 5.20.2; Chien-pien 6.46.2 and Yi Ts'un 968 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 p'ang "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 suggest 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 equalscombatants in the cock-pit, while the dragon-croccdile 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

held 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 Ko of Type V and Type VII there are full-face animal masks (Ko 88, 92, 133). These are usually grouped under the title T'ao-t'ieh, often translated "glutton". Giles, Dictionary, 11 159 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 34-48. 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 mongoloid 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 in the opposite direction from the elephant's trunk. Above these again are two tassel prongs which have no symbolic connection with the design.* [* 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 Ko 35 36, 37 and other similar Ko not recorded here clearly show the different parts of these three animals.

The significance of this design on many ming-ch'i Ko seems important for the symbolism used in funeral rites. The writer has not been able to find any straightforward 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 yü. The set of vessels and weapons similarly inscribed has been discussed under Ko 35. The date is apparently about 1200 B.C. The origin of this design must be very early, possibly before the occupation of the waste of Yin in 1311 B.C. More than one thousand years after this the Li Shih Ch'un Ch'iu section, Hsien chih records "upon a Chou tripod there was engraved a T'ao 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. Chou ting cho t'ao t'ieh, yu shou wu shen, shih jen wei yen, hai chi ch'i shen". The design on Ko 35 and on all of Type IIIA fits this description. The devourer without body is the elephant, the devoured is a bird, not a man; the tiger on the head of the elephant brings destruction to its body. This term t'ao t'ieh seems to have been associated with the tradition of an ancient people in China called the "Three Sprouts" or San Miao. T'zu-T'ung Dictionary, p. 2467, quotes the comment on San Miao in Huai nan tzu, Hsiu wu section: "T'ao t'ieh means the posterity of the three tribes San tsu who are therefore called the "Three Sprouts" San Miao." The T'zu t'ung also quotes under T'ao t'ieh two words of somewhat similar sound tao chih from the Classic of History, Document 38, "Hsia daily honoured the devourers of the people" "Numerous Regions", To fang, cf. Legge III, p. 497

1. Ku Index 58.0166-39 gives the two Chinese characters.

translates "(Hsia) daily honoured the covetous and cruel." This document belongs to the beginning of the Chou dynasty. A bone inscription (Hou pien 2.26.16) dating about 1200 B.C. records the words "order the three tribes Min san tsu." All this suggests that the idea of t'ao t'ieh, meaning as a cruel devourer associated with three tribes San tsu of the Shang dynasty, and points to some symbolic

meaning of the three-animal design on Ko 34-48 of Type IIIA.

This design may have to do with three tribes of the ancient past and may be totemistic in its symbolism. The design may only symbolize the devouring of death. The term t'ao t'ieh has been very much misused by scholars in descriptions of Chinese animal masks. The t'ao t'ieh devouring on bronze Ko or vessels is much more vividly pictured. 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 carniverous. 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 Elegies of Ch'u, Chu Tz'u, 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 72, 82, 127, 135 and 131. Headless dragons forms flank the graphs on Ko 71, 75, 76, 79, 81, 83, 84, 132 and 133.

Triangular Ko 162 presents an intricate design in various planes which is a three-animal puzzle mask. In the design are two dragons, lung, viewed sidewise, while a bos or water buffalo occupies the middle portion of the design. The whole ensemble suggests the tiger mask.

Ordinary Shang dynasty full face masks on ritual bronzes can be divided into two halves down the middle so that each half suggests a side view of the animal. In this example, however, the bos forms the central part while the side views of the dragons form the open jaws. This may be only a puzzle, 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 Indo China. The shapes 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 jingle, for instance shows two figures with elaborate hair dressing and bent arms,[1] which suggest the little squatting men on Ko 168 169 and 170. which appear to be late in date but to carry on the shape and hafting of the Shang Ko.

1. C.T.Loo, An exhibition of Chinese Bronzes, 1939, plate XXII, No. 5.

THE NATURE OF INSCRIPTIONS ON THE BUTT

The number of inscribed Ko.

Comparatively few Shang Ko were inscribed, possibly not more than five percent. In this monograph the proportion of inscribed to uninscribed specimens does not indicate the true proportions among all the extant Ko of the Shang period, because only the uninscribed examples in ROMA were used, except for important variations in Type. Apart from the archaeological context, which is very rarely recorded, the graphs are the only evidence which can assist us in fixing the absolute dates of the Ko. The writer therefore gathered together into this corpus all the inscribed specimens for which he could obtain complete data. Most of the objects he has examined and excluded any that seemed unreliable and also set aside some few rubbings of inscriptions which were not accompanied by the shape or measurements of the blades. Seventy two examples were obtained. Excluding duplicates even on Ko of different types and counting all the graphs on both sides of the same Ko only as one unit, there are fifty-four different inscriptions:

1. The graph on Ko 158 is omitted as the writer now fears that it is cut rather than cast, and that it is a copy of that on Ko 72. He has not seen the specimen but prefers not to include the graph lest it prove misleading for the date of Ko 158. The Ko, both in form and decoration, remains a valuable example of the narrow Type IXb.
The graphs on Ko 171-174 are also regarded by the writer as false and so are not listed.

Types of Ko most frequently inscribed.

The writer considers that the following analysis of the comparative frequency of inscriptions found on the various types of Ko represents a fair sample of what most probably would be found on all inscribed Shang Ko as far as known at present.

TABLE I Inscribed ko in this monograph's catalogue.

Comparative frequency of inscriptions on various types of Shang Ko

Group A. Frequently inscribed Types.

Type	Harting	Butt	Ko Cat. No.	No. of examples	No. of different inscriptions
VII	socket	square	117-124	24	17
V	flat	square	70-87	18	15
VI	flat	rounded	95-112 and 115	19	13
VIII	socket	rounded	151-155	5	5
			Total	66	50

Group B Infrequently inscribed Types.

III	flat	tasseled	35 and 41-46	4	2
IX	flat	two slots	159	1	1
II	jade Ko		16	1	1
				6	4

Graph on Ko 158 is now suspect and so is not listed. Graphs on Ko 171-174 are believed false and are 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 shape 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. Hsü Yin 2.80.5; socketed Type VII; same graph as Ko 134 (Type VII socketed)
2. Hsü Yin 2.80.7; socketed Type VII; same graph as Ko 84 (Type V flat)
3. Hsü Yin 2.80.8; socketed Type VII; additional graph.
4. Hsü Yin 2.80.9; socketed Type VII; same graph as Ko 81 (Type V flat)
5. Hsü Yin 2.81.1 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. Hsü Yin 2.81.4 and 5, same as San-tai 19.7.10 and 9; flat Type V; additional graph.
7. Hsü Yin 2.82.8 and 9, same as San-tai 19.7.7 and 8; flat Type V; additional graph.

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

Group A Frequently inscribed Types.

Type	Hafting	Butt shape	No. of examples	No. of different inscriptions
VII	socket	square	28	18
V	flat	square	20	16
VI	flat	rounded	20	14
VIII	socket	rounded	5	5
Total Types V, VI, VII, VIII			73	53

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			6	4

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
Sixty-six inscribed 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 "living name", were much more
frequent than on other types. Only six Ko and four different
Group B
inscriptions belong to 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 diff-
Socketed Ko Type VII are more frequent than flat Ko Type V
erent inscriptions. 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 (1311-1197 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 page 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 "Horse" 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, and 102-107 all have the graph cast on the same side.

The orientation of graphs cast on Shang Ko.

In most cases the inscriptions on Shang Ko consist of one graph cast 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 16 and three apparent exceptions to be noted later, follow one rule. The graph was upright and properly read when the shaft was held by the right hand in a horizontal position with the point down so that the graph appears to be based on the shaft. Since the shafts are now missing, the point of the blade should be held in the hand with the butt up 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 simple pictographs are often misunderstood as has been the case with Ko 127. The graph on this specimen really shows a man standing on his head and not, as has been thought, a man standing on his feet, two quite different ideas.

The graph "Ko" for the weapon itself appears to be an exception to the rule of orientation. It is found on Ko 110, 117 and 118. The drawing of the Ko blade follows the axis of the actual blade and the shaft is drawn parallel to the actual shaft, as though the person striking a blow with the Ko wished 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" Kao on Ko 11[illegible] 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 Hsü pien 3.40.2, in the succeeding bronze inscriptions and in present day writing the graph "horse" is drawn as though walking up 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 congruity 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 sentence[1]. From these apparent

1. See Ch'ien pien 6.51.5; 7.12.1; 7.34.1 and Ts'ui pien 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 Ko. Some few followed the old Shang tradition.[1]

1. San-tai 19.21.2; 19.25.2; 19.26.1.

On others the graph was upright when the shaft was held perpendicular.[2] This rule seems to have predominated, but on still others

2. San-tai 19.29.2; 19.29.3; 19.32.2; 19.33.1; 19.24.2 and a number of weapons excavated by the Academia Sinica at the early Chou site near Hsün Hsien railway station.

the graph was oriented in a direction opposite to that of the Shang. The precision of the Shang artisan and the carelessness of the Chou are nicely illustrated by this minor point. Later in Chou II and Chou III longer inscriptions were cast on the hu or curved part of the blade at the fore-edge of the shaft. In late Chou III and Han times inscriptions were cut on the weapons after they had been cast. Inscriptions on the blade such as those on Ko 171-174 were not found in any period of antiquity.

The meaning of the graphs.

The graphs cast on these Shang Ko are the names of their owners. These persons were important figures in the life of the Shang dynasty. Some of their names have been found also on oracle bone inscriptions. This suggests that they were the names by which these persons were called during their lifetime. In the Shang dynasty we know that the temple names were given after death. A Shang king was known by his cyclical 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 grandfather.

The names found on the Ko appear also on sets of bronze ritual vessels with which the Ko were associated. Thus Ko 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, hsiung, grandfather, tsu, or grandmother, pi. On the oracle bones the names of these fathers, mothers, elder brothers, grandfathers, grandmothers and other temple titles are restricted to the royal family. Since more than twenty thousand oracle bone inscriptions have been examined without this restriction being violated, it seems probable that similar ancestral names cast on the bronze ritual vessels which likewise were used in ancestral ceremonies, should also have been restricted to the royal family. Most scholars consider that bronze ritual vessels inscribed with "father" followed by a 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 Shang dynasty inscriptions on bronze ritual vessels are the actual records of royal relationships. Most of these inscriptions consist of only three graphs: (1) a "living" name of the owner which we will designate X, (2) a relationship for which we will use "father" and (3) a cyclical name day, one of the cycle of ten days on which the "father" is "remembered", possibly the day of his birth.

Consider a hypothetical set of ritual vessels. The "living" name of the owner is cast on each article. The set includes Ko, spears, mao; horse jingles, luan; socketed axe, fu; butcher knife, tao; liquor ladles, pi; four-posted torch stand; cups, chüeh; vases, ku; liquor pails, yu; large beakers, tsun; small beakers, chih; square ritual cooking pots, fang ting; large round-bottomed cooking pots, ta ting; small-lobed cooking pots, li ting; hollow-legged cooking pots, li; food bowls, kuei; animal-covered gravy-boat-like vessel, kuang; large liquor heater, chia; steamer, hsien; tall liquor jars, hu; large liquor jar, lei; round liquor jar, pou and high food stand or basin, pan. Most of these articles have only 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", "X grand father Tsu Ting", "X elder brother Wu", "X elder brother Ting".

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 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 Wu and Ting are known from oracle bone inscriptions; Father Chi also is known from an oracle bone[1] 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 I.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 18th generation, since that would put the bone inscription in

> the 19th generation of King Lin Hsin and K'ang Tsu Ting 1156-1143 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 Hou pien 1.25.9 which lists in order Father Chia (Hsiang Yang Chia); Father Kêng (P'an Kêng) 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 X 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, 95, 79, 81, 96, 111. Other graphs on the bones, apparently names of generals are found also on Ko 72, 87, 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 80, River People; Ko 117, horse; Ko 136, Battle Axe; names of officials, e.g. Ko 153, Historian; Ko 132, Prime Minister; Ko 134, Protector; Ko 138, Son; names of places, e.g. Ko 85, 86, 87, 119-125; names of women's families, e.g. Ko 154, Fruit-tree, Ko 110, 118[1]; Ko 80, River.[2]

1. Ko is sometimes written on the oracle bones with a graph for woman beside the Ko, e.g. Ch'ien pien 6.26.8. indicating that the woman's family name was "Ko".

2. River is also written with woman on bone-end Ts'ui pien 1483.

In the Tso Chuan, eighth year of Duke Yin we read, "When 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 14, 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 sheng; 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 purports to give the origins of these names in the time of the Yellow Emperor, Huangti, and the model emperors Yao, Hsün, 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 Shih Chi, Yin Pen Chi section records, "Emperor Hsün chartered Ch'i, enfeoffing him with Shang, and giving him "Son" as a surname, Shih hsing Tzu Shih". The graph "Son" both alone and in combination with woman is common on bone and bronze inscriptions of the Shang dynasty, Ts'ang Kuei 127.1 et al. The surname "Son" Tzu 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.W.Yü 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.[1]

1. Shuang Chien Yi Ch'i Yin Ch'i Pien Chih Peiping 1940 p. 41

In the inscription mention is made of an elder brother whose cyclical day name is obscured. This writer suggests that it may be Kuei, elder brother of King Wu Tsu Yi/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 Ta Yi and it ends with the same graph for "dancing" with the addition of the three words "before God above", Wu Yü 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 thin and frail ming-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

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 Yü", 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 Yü 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 Yü, and "Great Fire Chief", Ta Huo, 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 Tin 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 tc 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 71[1] and the inscribed axe associated with Ko 134[2]. 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 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 readily be mislaid, but the tendency 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.O.M.A. and the Academia Sinica has also found brush writing on bone.

The single graphs cast on bronze Ko 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.

THE USES OF THE KO ILLUSTRATED BY LITERATURE

A. Uses in war.

The Ko appears to have had its origin in the beaked sickle (Nos. 1, 2, 3). This implement was usually made of slate or greenstone and was apparently still used by the peasant farmers of the Shang 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 ceremonials. 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 among 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. 6) 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, 1311 1039 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 Ko (See Nos. 55, 89, 90).

If the Ko as a weapon was simply an adaptation of the sickle, then, in its early history at least, it may be presumed to have had a short haft like the sickle. In the absence of any report of the direct measurement of scientifically excavated Ko shafts (which no doubt will soon be published by the Academia Sinica from some of the many Shang dynasty graves excavated at Anyang), a shaft length of 470 mm. (18½ ins.) [illegible] from the following arguments:

1. 470 mm. (18½ ins.) is the length of sickle No. 5 as it may most plausibly be restored. The common iron sickle of the North China peasant today is about this same length.

2. The shafts of Nos. 55, 89 and 90 have been restored as 470 mm. in plates XXV, XLIV, and XLV, 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 easy reach of the soldiers' hands. Long shafts, 1525 mm. (60 ins.) or 6 feet 6 inches, ancient Chinese *chi* measure, would not be congruous in these tombs. 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 graph on No 70, while not strictly to scale, shows a Ko with a short shaft, only twice the length of the blade which is about 9 ins. and many graphs on bronze ritual vessels picture the Ko held in one hand by the end of a short shaft, e.g. San-tai 11.6.7; 14.12.9; 14.28.8, and the set of bronzes inscribed with the graph "A boy with a Ko on his shoulder," Ho".1 (Giles No)

1. This interpretation seems more plausible than any of those suggested by Yetts, Eumorfopoulos Bronzes, I, p. 22, fig. 19. The graph may be written 子 or 子 or 子 the first is primitive.

These set consists of:
(1) Round Ting, R.O.M.A. MB. 3217, (2) Lobed Ting, Menzies, (3) Hsien, Menzies, (4) Chia, R.O.M.A. MB. 3315, (5) Yu, vessel, San-tai 12.48.2; lid, Menzies, (6) Kuei without handles, R.O.M.A. MB. 3214, (7) Tsun, Menzies, (8) Ku, R.O.M.A. MB.3215, (9) Ku, Menzies, (10) Chueh, R.O.M.A. MB. 3216, (11) Chueh, (12 and 13) Two others, Chueh, noted in possession of a curio merchant in Anyang, (14) Found

Lei with tip lug, without lid, R.O.M.A. NB. 3218, (15) Axe, Yüeh Chung One 2.8, and perhaps Tsun, Eumorfopoulos Bronzes Vol. I. 49. This set dates from the end of the reign of King Wu Ting 1255-1197 B.C. Each graph shows a short shafted Ko resting on the shoulder and grasped by the end of the shaft. This shaft must have been about 470 mm (18½ ins.) long since the arm holding it is shown with elbow crooked and the length of the shaft pictured is only twice that of the blade (9 ins). From this we see that before the middle of Shang II at 1200 B.C. the Ko had a short handle.

4. The width of the handle as attested by the corrosion of the Ko butts is almost uniformly 35 mm. for Shang dynasty specimens. This is the size of ancient and modern handles about 470 mm. (18½ ins.) in length, as, for example, the war-axe of ancient Egypt and Sumeria, and the modern machinist's hammer. The ordinary weight of the blade for usable specimens, not ming ch'i, varies from 225 grammes (8 ozs.) to 340 grammes (12 ozs.), although some (Ko 86) will weigh 450 grammes (1 lb.). These weights are suitable to a short handle but they are not heavy enough to have been swung on a long handle. It should be noted that a Shang Ko was used to strike a downward blow like a war-axe and not for thrusting like a spear. The chi which is pictured on Han tiles and stone bas reliefs as having a long handle was used for thrusting as well as for striking.

5. The angle at which Shang Ko blades are set to the shaft suggests the arc of a circle with a radius equal to the length of a shaft of 18 ins. (minus the grip) together with the normal length of the human arm a total of about 40 ins. The angle of hafting would thus seem to have been calculated to give the most efficient blow when the weapon was used with a short haft and was swung from the shoulder.[1] With a radius of 1000 mm. the height of the segment for a chord 400 mm. long (twice the length of a Shang Ko blade Type V, VI, VII, VIII, measured from handle centre to tip) is a little over 20 mm. which is the normal dip of Shang Ko from a right angle.

1. The K'ao Kung Chi, a document from late in the Warring States Period or from early in the Han Dynasty, does, to be sure, specify the length of the shaft of the Ko as 6 feet

6 ins., i.e. ca. 1525 mm. Such weapons are seen on the tomb tiles, e.g. White, Tomb Tile Pictures of Ancient China, pls. XXVIII, XL, XLI, LVI, LXVII. But between the Shang period and the time of this document (with which the tomb tiles may be approximately contemporary) the sword and dagger 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, mao, they bear long-handled weapons which are inscribed in the weapon itself sometimes as chi, sometimes as Ko.

The Ko was the ordinary weapon of offence used by the Chinese soldier of the Shang dynasty. It is the only weapon so far reported found in the burials of individual soldiers (Nos. 55, 89 and 90). Few literary records go back to the Shang dynasty and therefore there is little evidence from contemporary literature, apart from the brief inscriptions on bones 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 Shang dynasty customs. Nevertheless there are several early Chou documents which may carry over the earlier tradition. In the Classic of History, Shu Ching, we find the graph "Ko" used 5 times.[1]

1. Documents 17 and 23 are "spurious", wei, and should not be quoted as being written in the Shang Dynasty or the beginning of the Chou.

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

Ku Index, 22.0074; cf Legge III 301: King Wu of Chou made a speech at Mu before his troops attacked Shang. He said, "Lift high your Ko, try out your shields, set up your spears, ch'i erh Ko, li erh kan, li erh mao".[2]

2. Legge translates "lift up your lanced, 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 Ko was for close combat, both were necessary. The terms applied to the Ko and the spear are quite different. For the Ko it is "Lift high, 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 graph Ko. The two words would then mean "shafted Ko". In this quotation where they are used separately the second operation is ordinarily translated "Try 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; Legge III, p622: "Temper your Ko and spears", Yuan nai Ko mao.[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 Fo 1.2.

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

Ode 133.1: "Prepared are my Ko and spear", Wan wo ko mao. cf Legge (IV p. 201) translates, "I will prepare my lance and spear"; Waley (142), "I have made ready both axe and spear".

Ode 151.1: "Shoulder a Ko on service", Kan ko yu yi, cf. Legge (IV p. 221) translates, "have their carriers of lances and halberds"; Waley (85), "Bears halberd and spear".

I have rendered the second two words as the second two in Ode 66 66 (Legge IV, p. 112) and elsewhere in the Odes.

Ode 250.1: "Shafted Ko flashing together", Wen ko o'i yang, Legge (IV 434), renders "With shields and spears and axes large and small", Waley (239), "Shield and dagger, halberd and battle axe." The second two words are certainly descriptive of the first two as they are in the preceding line "bows and arrows at the draw, Kung shih ssu chang". This line is reminiscent of the warriors lined up for the Speech at Mu", ready to march off.

Ode 273: "Put under your arm your shafted Ko, Tsai ch'i kan Ko, Legge (IV p. 573), "He has called in shields and spears", Waley (221), "Then put away your shields and axes". This line is parallel to the following line "put into their quiver your bow 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. Waley's fresh renderings but Legge is more consistent. Surely it is straining literary license to render Ko by "axe" in Ode 133; by "halberd" in Ode 151; by "dagger" in Ode 250; and by "axe" in Ode 273.

The close parallel in ideas between the lines of poetry of Odes 153 and 280 and the two prose quotations from the Classic of History confirm one another. Odes 151 and 273 show the Ko carried on the shoulder, when on service and under the crotch 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 must be the case in a monograph of this sort.

B. The use of the Ko in Ceremonies

The Testamentary Charge[1] portrays ceremonies at the time

1. Legge III, p.544-561, Ku Index 42.

of the death of King Ch'eng (1052-996 B.C.) and the investiture of King K'ang (995-970 B.C.). This document appears to be as nearly contemporary with the events as is possible with literary texts transmitted from a time so early. It has undoubtedly undergone many alterations at the hands of interpreters. Literary evidence is not as sure as the archaeological, but the Testamentary Charge has preserved much of the social setting, which conjecture from the objects alone can never supply. The entire text may be read in Legge'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 and early Chou weapons (such as axes, cleavers, chi, spears etc.) as well as the various types of Ko considered in this monograph. The interpretations of commentators ancient and modern have been consulted, but they have been counted 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 995 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 Shih, 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 (Ku Index 43.0207) and a hundred men of the guard, nu pên pei jên, and turn back "Son Ch'ao" (the heir apparent later installed as King K'ang) 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

hall was prepared by the servants for the ceremony of investiture. This hall which opened on the courtyard to the south, was divided into three parts, west, east and middle. Four "benches"[1] were set

1. These were probably like the Tuan Fang bronze altar, in the Metropolitan Museum, New York, 180 mm. high by 900 mm. long, (London Exhibition 1935, No. 319A).

on thick mats. The articles spread out in various parts of the hall have been the subject of much debate which, however, is not pertinent to this discussion. In the east room, Tung fang, a Ko a bow, and arrows were laid out[2]. Evidently these were the personal

2. Ku Index 42.0647.

accoutriment of the King. Han scholars said they were made by famous artificers of antiquity named Tui, Ko and Ch'ui[3]. The graph

3. Legge, III, p. 555.

Tui[4] may possibly be equated with the graph Tui[5] which means

4. Ku Index 42.0545.
5. Ku Index 42.0408.

"pointed". The writer considers this term to be descriptive of the King's war Ko which may have been similar to the better inscribed or inlaid specimens of Type V, Ko 70-88 or Type VI, Ko 95-112. There is an interesting definition of a Ko in the Shih Ming under weapons, Ming, according to which the Ko was primarily a pointed, piercing weapon. In the Shih Ming appears first the ordinary definition of Han Commentators, "A Ko is a single hooked Chi". Chi is the name of the ordinary iron weapon used in the Han dynasty and found pictured on the Han bas reliefs. The definition continues "Ko means to pass through, Ko, kuo yeh; whatever is stabbed with a pounding blow will certainly be passed through, so tz'u tao tse chüeh kuo; whatever is hooked and drawn, this the point will not pass through", so kou yin tse tz'u chih

fu te kuo yeh.[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 hu.

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 carriage, the curtained sleeping or travelling carriage, and a first and second chariot[2].

2. Ku Index 42.0358-383.

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 yü[4]. 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. These 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

Anyang

but no "great mace", chieh kuei. The maces described by Wu Ta-ch'eng in his Ku Yü K'ao (whose interpretation was) and followed by Dr. B. Laufer in his book Jade 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 mm. (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 the recut surfaces are weathered alike so that the blade must have been reshaped in ancient times (probably the Han Dynasty). The graph Kuei is found in the Tribute of Yü[1].

1. Ku Index 06.1192)

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 Yü. In any case the word Kuei was not in use in 995 B.C. The graphs chieh kuei, however, are found in the Testamentary Charge[2] and can only be explained as a later editor's

2. Ku Index 48.0488.

alteration from the original great jade Ta-yü, to conform to later ideas. Fortunately the editor did not change the words for the great jade Ta-yü which was laid out in the east part of the Hall[3]

3. Ku Index 42.0324.

along with other ritual objects which he could not explain. Wang Kuo-wei in his essay on these jade objects, Ch'en Kao Shuo in Kuan T'ang Chi Lin, Vol. 1, confused the matter by suggesting that the red knife Ch'ih tao laid out in the west part of the hall was similar to the great jade Ko 17 (840 mm. 33 ins. long). (The red 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 "great mace", chieh kuei and pictured as similar to Ko 33 recut. With it was associated a round jade disk, pi. Wang Kuo-wei implies that the great teachings of Wen and Wu were written on the jade disk, pi.[1] The Metal Bound Coffer 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 yü and that the object can only have been the great jade Ko similar to Ko 13-27 and the originals of Ko 32 and 33. The miniature jade Ko 28-31 were more probably used as ming-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 Testamentary Charge. The hall was prepared and the guard set. The new King entered the Hall by the guests' steps for he was not yet the King. The Prime Minister and the rulers of states, hsiang chün took places in the court. The ceremony was conducted by three persons robed in red, and not in mourning. The

Great Protector, T'ai Pao, acting as regent for the deceased King, carried the symbol of kingly rank, viz. a great jade Ko, Ta Yü written in the text as "great mace", Chieh Kuei. He was accompanied by the Great Master of ceremonies in the Ancestral Temple, T'ai Tsung, who was also called the Senior Officer of the Ancestral Temple, Shang Tsung. This Great Master or Senior Officer carried the ritual vessel, T'ung, from which the libation was poured out.[1]

1. The present text adds a "mace cover" mao. This is a marginal intrusion into the text of an alternative word for the cup, T'ung, which is not an ordinary name for a sacrificial vessel. The use to which it was put in the ceremony makes the identification of T'ung as a ritual vessel certain.

The Great Protector ascended the royal steps on the east attended by the Senior Officer of the Temple acting as bearer of the ritual vessel. The Great Historian, T'ai Shih, bearing the tablets of the edict of succession, mounted by the guest steps on the right. He read the edict to the Prince saying, "The King leaning on his jade table spoke out his last command. He commands you to follow the teachings and become ruler of the Chou nation, complying with its great laws, giving harmony to the world, T'ien Hsia, responding to and manifesting the glorious teachings of King Wen and King Wu". The Prince made obeisance twice, arose and replied, "Little, little am I, the last small child. How can I rule the four regions in reverent awe of the dread majesty of Heaven?" The document does not fully describe the ceremony. The Prince possibly received from the Great Protector the great jade Ko as a symbol of kingly rank when he first ascended to the hall. He apparently laid the great jade Ko and the tablets of the edict on the altar table before he made obeisance in reply. The Senior Officer of the Ancestral Temple gave him the ritual vessel.[2] He advanced three times, pouring out

2. The mace cover mao is an intrusive duplicate word at this point a second time in order to correspond with the first instance.

three libations and setting down the ritual vessels three times. The Senior Officer of the Ancestral Temple announced, "They (the ancestors) have partaken." The three objects used in this ceremony symbolized the three phases of Chinese life and government: the ho stood for kingly authority and military power, the tablets for law and civil authority, the cup for ancestral religion.

The Grand Protector received the ritual vessel, descended from the hall, ceremonially washed his hands and again ascended to the hall with another ritual vessel of the same type, and with a "half mace", chang, in his hand[1] in order to make the responsive sacri-

1. Ad Index 48.0590.

fice, too. He gave the ritual vessel to the Temple attendant. He made obeisance to the King. The King returned the obeisance. The Great Protector descended from the hall. The Kingship had been handed over. All the nobles went out of the temple gate and waited outside for the new King.

The King went out and stood inside the Gate of Greeting. 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, pin chêng fêng yü chien pi".[2]

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

4. The Great Protector carried a "half-mace", chang when he made the responsive sacrifice. No jade objects answering to the classical "half mace", chang have been found at Anyang but only

smaller jade Ko such as Ko 10, 11, 12, 20 and 21 and marble ming-ch'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, yü 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, 37, 62, 63, 80 and 116, but these might well be accounted royal in their perfection and in no way inferior to the great jades, Ta yü, 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 hui[1]. 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, yüeh[3] 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, liu.[1] These were apparently two headsmen, one

1. Ku Index 42.0412.

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 K'ang", K'ang Hou is said to have been found south of the Ch'i river at Hsün Hsien near the village of Lu Lu Ts'un.

axes. Under the eaves stood two other officers, the one on the west carrying a ch'ü. If interpretations of this weapon as a socketed Ko are correct, then Type VII, Ko 117-150 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 119-125 are similarly inscribed and other examples with the same graph are known to exist. Ordinary examples like Ko 145-150 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 Hsün Hsien station. The ceremonial use of this Shang Ch'ü 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, yüeh and socketed Ko, Ch'ü.

6. On the east side under the eaves, a fourth officer stood bearing a K'uei.[3] 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 Ch'ü 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 IX are Shang dynasty in date; none was found at Hsin Hsien. But their appearance on the east side of the hall may indicate that they were also well known in the Chou dynasty. Certainly Ko 168, 169 170, do not conform to Shang canons in their decorative design. In later classical times this graph K'uei was written with a metal Chin signific and not a Ko. This graph is inscribed as the name of the Chou III. weapon on the King of Yen's Ko[1] which has a long hu, or downward extension of the lower cutting edge along the shaft. It is possible

1. San-tai 19.50.1.

therefore that a K'uei is a Chou Ko with a long hu. It might even be one of those peculiar Chou weapons called chi found at Hsin Hsien, for they have four points, viz. the blade, the lance point, the butt and the long hu or lassing bar. The bronze weapon alone without the haft has four points like the bone graph for kuei (Giles 6453), the tenth stem in cycle of days. This weapon, called by modern writers a Chou dynasty chi, is not found at the Shang site of Anyang but is very common in the Chou site of Hsin Hsien.

7. Four men in spotted deer-skin caps held Ko on their shoulders with blades pointing upwards ready for action[2]. They were stationed

2. Ku Index 48.040 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, hsien ma, who always carried Ko[3].

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 States[1] records "Duke Mu put his carved Ko on his shoulder and went out to meet the ambassador, Mu Kung hêng tiao Ko, ch'u chien shih chê.

1. Kuo Yü, Chin state, Chin yu, ninth chapter.

This is a late survival of a Shang dynasty custom such as is vividly pictured on Ko 70 and perhaps even more clearly on a set of bronze vessels, now in the R.O.M. This set was found in a brick kiln near Anyang. railway station and was seen there by the writer and called the "boy 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 "grasped a Ko point up", chih Ko shang jen, to a spear with an extra point turned up at one side. Legge, 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.

8. 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 great tortoise shell, and the great drum were placed in the west room. The war-dance of the Tê Wu 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 K'uei in the text was the symbol of kingly 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 Yü.

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 K'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 Kē", tui chih 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.B.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-branched lance Ko sometimes called a K'uei, and frequent weapon found in the early Chou tombs at Hsün Hsien. It was possibly a representative of Chou dynasty weapons.

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

8; Ko were also used in the war-dance pantomime Ta Wu 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 Ko 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. 23-220) who had the point of view of their own time and not that of the Shang dynast . 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 honoured 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, outmoded 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'etre 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 maintainance 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 impoverish 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) a more complete set as a greater expression of respect.

In the writer's opinion the contents of Shang dynasty tombs were always consistently (homogenous). 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]

1. [In a Chou dynasty cemetery at Hsun 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 (appropriate to the ancestral relationships of) 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 168, 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 man 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 Charge[1].

1.(Legge III, 544-561; Ku 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 Hou Chia Chuang, Anyang in 1934-35.

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 Ming. 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 preceeding two dynasties, Hsia and Shang and said, "I follow Chou, Wu ts'ung Chou".[2] By Confucius' time the propaganda 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 Pien and A.W. Hummel, The Autobiography of a Chinese Historian) Leyden, 1931.

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 Hsün o pressive 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 Chou, 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'o 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 3000[1] inscribed Shang vessels, most

1. The two books Yin jên and Hsü 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, kuei, 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.T. 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 Yen Chiu (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 Pi Wu and King Wu

(Tsu) Yi illustrious ones, ho; one wild boar". The vessel was made in 1071 B.C. A general, shih, named "Composite Bow" gave to one whose personal name was Hsi "twenty pails, yu of sacrificial liquor and shell 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 (Ti Yi). The occasion for which the vessel was made was a special ceremony well attested also on the bones, conducted in honour of Queen Fi Wu and her consort King Wu (Tsu) 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" hsing[1] which seems to be the symbol of authority. This owner's important name may be transcribed lü, the modern meaning 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, lü," and Father Yi. Precisely these three graphs are found both on the lid and body of the pail, yü, belonging to this set[2]. The associated steamer,

1. Prisoner Hsing is mentioned under Ko 76.

2. Hsü Yin 1.72.6 and 7, same as San-tai 12.49.1 and 2. Hsien, (Yin Wên 1.29.7) is inscribed "standard bearers", lü, "Grandfather Tsu Ting" i.e. King Wen Wu Ting. The three vessels of this set thus bear the names of three generations of royal ancestors of the owner, "Standars bearers, lü". Standard bearer lü is the important living name of a member of the royal house belonging to the same generation as Shou Hsin 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 (Lin) Hsin immediately following the death of Tsu Chia in 1157 B.C.[1] In the

1. See Ko 138.

writer's opinion, the three-graph inscriptions without the additions 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 Shang Ko 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 bronzes 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 Shan 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. Mo 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. Ou-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 Hsüan Ho Po 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 set and the man with the jade circle 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 wishes or propositions made to the "wish bone" in the name of the king. The answer was given by the divination crack, pu, produced by singeing the tortoise shell or bone. On the bones the "living names" of people and places as used in the royal court were recorded. While oracle bone inscriptions do not provide a connected historical record, 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 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 Ko 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

1. Mr. Tung Tso-pin, Criteria, p. 373, seems to restrict bone script period I to Wu Ting's reign, 1355-1197 B.C., but this writer considers that many oracle bone inscriptions antedate this reign. Some may immediately follow 1311 B.C.

2. Ko 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 Ko became a link between the thousands 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 ritual vessels. Thus we learn that the owners of Shang Ko whose names were cast on the butt of the weapon were important persons living when the bone-script of period I, was in use (1311-1197 B.C.) and that they possessed elaborate sets of bronze ritual vessels. (See the various discussions in the Catalogue for bone-script periods See appendix D page 514-517)

It also becomes evident that these sets of vessels are to be dated in the early part of the Shang II period, (1311 - 1197 B.C.) 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 sources[3] and to prove that

3. See the writer's Chia Ku Wen Chih (Oracle Bone 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 Ko 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 pien 7.31.4 we read that a divination wish was made "asking about commanding 'standard bearer Chü' (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 Shuo Wen dictionary compiled about A.D. 100. Unfortunately most Chinese scholars base their interpretations on the Shuo Wen definitions which are filled with Han dynasty theories current 1400 years after the floruit 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 ceremonies, and other members of the royal house who, though they 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 B.C. based on the ancient text of the Annals found with the Bamboo books excavated in A. D. 281 from the tomb of King Hsiang 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 two 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 few parallels on the Ko have been found, except the inscription on Mr G.L. Winth rop's jade Ko Ko le. 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 Linchih in Shantung by means

of the inscriptions in the second group and it should be possible from the hunting and journeying divinations to map out the area covered by these place names in the latter part of Shang II period. The number of days separating the divinations at 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 cultivatible land area of North China and many of the places correspond roughly to the walled cities and administrative centres in use today. See Cheeloo University Journal No 2, Tsinan, 1933, pp. 127-129.

A few of the place names in the wars of Script Period I are found among the names of places recorded in Script Period V, but many of them are different. This leads the writer to conclude that the later wars were carried on in a different area. Mr. Tung Tso-pin (Criteria, p. 366) has put 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 300 mm. rainfall line which was later fossilized into the great wall separating the nomadic peoples 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 Ko 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 Ko and the associated bone inscriptions extends from the Tibetan, Ch'iang, (see Ko 99, 102-107) people in the far west to the most important enemy nation in the north-west transcribed by Mr. Tung as K'u fang. (Giles 6258 The alternate pronunciation HU instead of K'U is used for the reputed birth place of Lao Tzu) The "earth mound region" T'u fang seems to be located in the north. These are

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 1387-1266 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 Tsung (King Wu Ting) punished the terrible (demon) region, kuei fang, and in three years subdued it".[2] The history of the period preceeding Wu

2. Legge, Yi King or Book of Changes, p. 205.

Ting's reign is told in the three sections of the P'an Kêng document in the Classic of History[3]. 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-shih Hsien and the move thither took place from north of the river at Kêng or Hsing. This confusion was based on the misinterpretation of a graph in the introduction to the Classic of History which seemed to identify Yin with Po; western Po was supposed to be at Yen-shih Hsien. The graph was not Po 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 Wu 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'u 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 P'an Keng, Hsiao Hsin 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 1.28.6 records the name K'u fang and Mother Chi the wife of Tsu Ting. This fragment belongs to the earlier reigns from 1311to 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'u 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 Tsu Ting on Hou pien 1.39.4 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 ethnic name K'u fang. Mr. Tung 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'u fang and of the seven only three, Kan 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'u fang's in-

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

Oracle bone Hayashi 25.14 has two sentences. The lower and first of them reads, "Inquire about the matter in a ceremony in honour of Ancestor Tsu Ting." Chêng chih yü Tsu Ting. The second records, "Inquire about not calling out troops to war with K'u fang". Chêng wu hu chan K'u fang. "To war" is here pictured by the blade of one Ko striking at the blade 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 Ko as a weapon of war. It is an interesting fact that among the many weapons found in China the Ko, 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 Pan Keng 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-Thuringa,

Sweden, Lithuania and Slovakia but never to have been adopted in Silesia, Czechoslovakia, Hungary, southwestern 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.86, Oxford, 1936, pp. 195-321, Distribution map. p. 277, fig. 58.

Both Childe and Riordain (p. 233) mention the supposed halberd with gold-capped rivets from Shaft Grave VI at Mycenae. They apparently depended on Evans' Palace of Minos, II, p. 171, fig. 87, which gives no impression that the weapon is as much as 550 mm. long. Cf. Karo, Die Schachtgräber von Mykenai, 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-examined 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 Seskle 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. 77. Harald Ingholt, Hama In Syria, Copenhagen, 1940, p. 87, note 5, plate VII.5.

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 Ur 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 (1311 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. Mordain's plate of Chinese Ko, op. cit. p. 282, Fig. 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 Dynasty (206 B.C. - A.D. 220)". Only the non-Chinese ones are so late. The writer dates these Ko as follows:
   No. 3 is Shang II, Type V, 1311-1069 B.C.
   No. 5 is Shang II, Type VII.
   No. 6 is Chou I, 1068-771 B.C.
   No. 1 is possibly Chou I.
   No. 2 is possibly end of Chou II, 770-482 B.C.
   No. 4 is end of Chou III, 481-307 B.C.
   Nos. 7-10 are probably Chou III to Han I, 481B.C.-A.D.220.

   The rivet holes of No. 8 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 age culture area and the Chinese lies roughly along the great wall of China and not west at the Ural mountains. The interrelation between the Sino-Siberian bronze age of ca. 1300 B.C. and that of the Shang dynasty has yet to be studied; there is as yet no bronze age halberds of so early a date, available from southern Siberia.

From the point of view of strict typology, there is only one European halberd which resembles the Shang ko in shape, size and hafting. It is Riordain, op.cit. fig. 65, Spain No. 19; see list p. 320, also p. 356 and p. 291. A halberd in the Hall collection, St. Albans, is very similar in size and shape to a socketed Shang Ko type VII or VIII except that it has no butt protruding beyond the socket.

According to Tallgren, swords are absent in the areas from which the Ural and Siberian halberds came. Finsk Museum, XXII, 1915, 90, see Riordain, op. cit., p. 292.

Many copper sickles are found in the fields of the Yenisei and the Ob river basins. The people of the oldest bronze age in the region were settled agriculturists and not nomads. M.P. Minns, Scythians and Greeks, Cambridge, England, p. 346, fig. 162, hafted bronze sickle, length, 150 mm. (6 ins.).

APPENDICES

A.

A TENTATIVE CHRONOLOGY OF THE SHANG II AND CHOU I PERIODS

This proposed new system of dates attempts two things:

(1) to revise the orthodox chronology which gives ca. 1400 B.C. for the occupation of the waste of Yin at Anyang and 1122 B.C. as the date of the destruction of the Shang Dynasty.

(2) to present a framework into which may be fitted individual historical events recorded on the bones and dated inscriptions in order to facilitate comparisons between the Shang Dynasty and the already known ancient world.

This new chronology is based on three sets of data:

(1) the orthodox system of dates for the kings of the Chou Dynasty.

[illegible] are considered correct to 781 B.C. so far as the Kings of Chou are concerned.

(2) "The ancient text of the chronological record found among the 'Bamboo Books', Ku Pen Chu Shu Chi Nien, discovered in A.D. 280 (Tai K'ang 1st year) after the incorrect orthodox chronology had been calculated in the Han dynasty. The last item in this document was written in 299 BC and buried in King Hsiang's Tomb before the burning of the books in 213 B.C.

Data 2 are in three parts, made up of three sets of dates.

1. The reigns of the Kings of the Shang and Chou dynasties until the founding of the state of Chin (Shansi) in 781 B.C. All permutations of various long periods within this time.

2. The reigns of the Dukes of Chin until the founding of the state of Wei.

3. The reigns of the rulers of Wei down to the burial of King Hsiang, 299 B.C.

The second and third parts of data 2 are covered by data 1.

From the very nature of this document the summation, 257 years covers the first part of the Chou dynasty until the beginning of the second part in 781 B.C. Giving the destruction of Shang as 1088 B.C.; 276 years more until "the move to Yin" gives 1311 B.C.; 496 years until the beginning of the Shang Dynasty gives 1534 B.C.

(3) Into this framework the lengths of the various reigns have been fitted according to Mr. Tung Tso-pin's calculations for the Shang Dynasty and the accepted historical data of the Bamboo Annals and the Han historians for the first part of the Chou.

This chronology is not considered final. It is hoped, however, that the detailed presentation of exact dates will make it clear that in China there is a mass of historical and epigraphic records which should give an accurate chronology back to 1500 B.C.

The 273 years of the Shang dynasty from the move to Yin until the end have been divided in various ways among the reigns of the Kings. Column 1 gives the chronology tentatively adopted by the present writer. Mr. Tung Tso-pin using the evidence of the bone inscriptions gives the best published division. His evidence is summarized in the Quarterly Bulletin of Chinese Bibliography, New Series, Vol. 2, No. 3, Sept. 1940, page 302 Chinese edition. In the writer's opinion it is unfortunately presented as based on the accepted orthodox chronology which gives 1122 B.C. as the date of the destruction of Shang. Column 2 gives the number of years assigned to each reign by Mr. Tung. Column 3 gives the number of years according to the present text of the Bamboo Annals.

Mr Tung's dates are each 84 years greater than the tentative Chronology here presented. Thus he gives Wu Ting's reign as 1339-1281 instead of 1255-1197 B.C.

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 4 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. Tung'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, Tung and adopted.	Present Bamboo	Orthodox	Orthodox Chronology.	Present Bamboo See Chavannes MH. appendice III Vol.I. p ccXLII.
P'an Keng	1325	28	28	28	1401	1315
Move to Yin	1311	14	14	14	1387	1301
Hsiao Hsin	1297	21	5	21	1373	1287
Hsiao Yi	1276	21	10	28	1352	1284
Wu Ting	1255	59	59	59	1324	1274
Tsu Keng	1196	7	11	7	1265	1215
Tsu Chia	1189	33	33	33	1258	1204
(Len) Hsin	1156	6	4	6	1225	1171
K'ang Tsu Ting	1150	8	8	21	1219	1167
Wu Tsu Yi	1142	4	5	4	1198	1157
Wen Wu Ting	1138	13	13	3	1194	1124
(Ti) Yi	1125	35	9	37	1191	1111

(Chou or Shou or Ti) Hsin	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 257 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 257 years by adding 24 years at the beginning before the supposed transfer of the Tripods to Lo Yi, making 281 years to which he added 11 years of King Yu, making a grand total of 292 years, see Legge III, p. 158. (Legge's dates are all one year short as a result of a misunderstanding of the year 1 A.D.) The Chinese editor however did not follow his own computation, for the years he gives to the individual reigns total 850 to 770 B.C. or 869 to 781 B.C. The latter is 12 years in excess of the needed 257 years. The writer has taken the length of King Li'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 Fang Kuo-Yü's edition of the Ancient text of the Annals of the Bamboo books, Ku pên chu shu chi nien which refer to Kung Ho.

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

2. The second begins "Ho of Kung in the 14th year" and ends "in that year King Li of Chou died and King Hsuan was enthroned", "Kung Ho shih ssu nien"..."Ch'i nien Chou Li wang ssu Hsuan wang li".

This is the evidence that Li reigned 14 years. The lengths of these reigns, recorded in the 3rd century B.C., [illegible] are not to be considered unalterable. They have yet to be adjusted to the total corpus of inscribed bronzes. San-tai 4.26.1 records a 15th year of King Kung which is more than the 12 in the chronologies. But the existence of these problems must not be used as an argument for accepting the orthodox chronology when a more probable one is available and necessary. It must be emphasized however that the writer's main interest at this time is to suggest that the most probable date for the destruction of Shang is 1038 B.C., the end of the period studied here.

Chou dynasty	Tentative Chronology	Length of Reign: Adopted	Length of Reign: Present Bamboo	Length of Reign: Orthodox	Orthodox	Present Bamboo See Chavannes. MH appendice III Vol I. p CCXLII.
Wu	1038	6	6	7	1122	1050
Ch'eng	1032	37	37	37	1115	1044
K'ang	995	26	26	26	1078	1007
Chao	969	19	19	51	1052	981
Mu	950	55	55	55	1001	962
Kung	895	12	12	12	946	907
Yi	883	25	25	25	934	895
Hsiao	858	9	9	15	909	870
Yi	849	8	8	16	894	861
Li	841	14	26	37	878	853
Kung Ho				14	841	

Hsuan	827	46	46	46	827	827
Yu	781	11	11	11	781	781
P'ing	770				770	770

After the move to Lo Yi at the beginning of King Ping'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 waste of Yin, Anyang, in North Honan. This period has a cultural unity which may be designated Shang II for purposes of general description. The span of time is 275 years from 1311-1039 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 1587-1133 B.C. The dates 1395-1113 B.C. are a modern combination which adds the 275 years of the Ancient Text to 1133 B.C. of the orthodox chronology.

The Ko was already in use before the beginning of Shang II, i.e. in Shang I. The Ancient Text ascribes to Shang I 323 years, from 1534-1311 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 Hsia 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, 89 and 90, 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 Shang-Yin people came". This implies that the Black Pottery period is to be dated before Shang 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 Pan-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	Tentative 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

B.

A TABLE OF THE SEXAGENARY CYCLE OF DAYS

The Sixty Day Cycle was formed by combining the Ten Stems: Chia (1), Yi (2), Ping (3), Ting (4), Wu (modern) or Mou (an earlier pronunciation--forbidden) (5), Chi (6), Keng (7), Hsin (8), Jên (9), Kuei (10), and

The Twelve Branches:

Tzu (A), Ch'ou (B), Yin (C), Mao (D), Ch'en (E), Ssu (F), Wu (G), Wei (H), Shên (I), Yu (J), Hsü (K), Hai (L).

The method of combination is indicated in the following table by employing the Arabic numerals and Roman letters in proper sequence.

	10	20	30	40	50
1A	11K	21I	31G	41E	51C
2B	12L	22J	32H	42F	52D
3C	13A	23K	33I	43G	53E
4D	14B	24L	34J	44H	54F
5E	15C	25A	35K	45I	55G
6F	16D	26B	36L	46J	56H
7G	17E	27C	37A	47K	57I
8H	18F	28D	38B	48L	58J
9I	19G	29E	39C	49A	59K
10J	20H	30F	40D	50B	60L

The following is the Chinese Cyclical Table as written on the oracle bones of the Shang dynasty by nine-year old boys when they began to learn their tables. The tables are usually written in two parts of thirty days each.

First Part.

1 Chia Tzu	11 Chia Hsü	21 Chia Shên
2 Yi Ch'ou	12 Yi Hai	22 Yi Yu
3 Ping Yin	13 Ping Tzu	23 Ping Hsü
4 Ting Mao	14 Ting Ch'ou	24 Ting Hai
5 Wu Ch'en	15 Wu Yin	25 Wu Tzu
6 Chi Ssu	16 Chi Mao	26 Chi Ch'ou
7 Keng Wu	17 Keng Ch'en	27 Keng Yin
8 Hsin Wei	18 Hsin Ssu	28 Hsin Mao
9 Jen Shen	19 Jen Wu	29 Jen Ch'en
10 Kuei Yu	20 Kuei Wei	30 Kuei Ssu

Second Part

31 Chia Wu	41 Chia Ch'en	51 Chia Yin
32 Yi Wei	42 Yi Ssu	52 Yi Mao
33 Ping Shen	43 Ping Wu	53 Ping Ch'en
34 Ting Yu	44 Ting Wei	54 Ting Ssu
35 Wu Hsü	45 Wu Shen	55 Wu Wu
36 Chi Hai	46 Chi Yu	56 Chi Wei
37 Keng Tzu	47 Keng Hsu	57 Keng Shen
38 Hsin Ch'ou	48 Hsin Hai	58 Hsin Yu
39 Jen Yin	49 Jen Tzu	59 Jen Hsu
40 Kuei Mao	50 Kuei Ch'ou	60 Kuei Hai

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 classed "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 crudely written, naturally enough in view of the youth of the writers. The Ritual, Li Ci, says "At nine years teach them (boys) to count days, chiu nien chiao chih shu jih. The Han commentator, Cheng Hsüan, says "days" are the six chia tables jih, liu chia yen. Chia was the simplest bone graph. It was written as an upright cross. Each of the six columns of the table of sixty days began with a chia graph. "At ten years (boys) are to learn to write records, shih nien nüen shu ch'i"[1].

1. Legge, Li Ki, Vol. I, p. 478.

C.

THE GENERATIONS OF THE RULERS OF THE SHANG DYNASTY

The accompanying table of the kings of the Shang dynasty is based on an earlier work of the writer: [illegible], Chia Ku Yen Chiu (Oracle Bone Studies), [illegible], 19[illegible], pp. [illegible], where the evidence of the bone inscriptions is presented in detail.[1] The

1. [illegible], The [illegible] History [illegible], [illegible], 19[illegible], Vol. 1, [illegible], pp. [illegible], presents the evidence of the Shih Chi History. [illegible], "The [illegible] of the Shang Dynasty, B.C. 1766-1154", Journal of the Royal Asiatic Society, London, 191[illegible], pp. [illegible], used the evidence of the bone inscriptions from Lo Chen-yü, [illegible] Ch'i K'ao Shih, 191[illegible].

bone-script forms of the names has been made. The alternate names found in the Shih Chi History, Yin Pen Chi section, have been included in brackets. The generations of the names were counted from Shang Chia. In the Shang dynasty the succession was from elder brother to younger brother before passing on to the next generation. The relationships are here indicated by placing the names of elder brothers, hsiung, in chronological order in the column to the left of the 'direct-line' name which handed on the succession to the next generation. The names of younger brothers, ti, are placed in chronological order in the right hand column. The order of succession to the throne is indicated by the arabic numerals placed in brackets after each king's name. Persons with subsidiary letters (A, B, C) added to the numbers did not ascend the throne, but are remembered as ancestors in the bone inscriptions and on bronze ritual vessels of the royal family.

The number of kings beginning with Ch'eng T'ang or Ta Yi, the founder of the dynasty is given in the Shih Chi History as 30. The

present list has 31 names down to Shou (Chou or Ti) Hsin (31), the last king of Shang. The bone inscriptions record King Ta Ting (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 Ting is one greater than that given in other lists, e.g. P'an Keng is here listed as the 20th king rather than the 19th from Ta Yi. Wu Keng (32) the son of Shou Hsin (31) is placed at the end of the list. He was permitted by the Chou conquerors to preside at the Shang ancestral ceremonies which continued after the fall of the dynasty. No doubt there were sets of ritual vessels belonging to his generation (XXIV).

Beginning with Queen Pi Kêng, the grandmother of Ta Yi, the names of the queens of each king in the direct line of succession were recorded on the bones. The queens of other kings who reigned themselves but did not have sons who reigned are not recorded. This information is not found in the later literary records. When a reigning son presided at the ceremonies 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 XIII Tsu Yi (14) had two queens, Pi Chi and Pi Keng, and in generation XIV there were two brother kings, Tsu Hsin (15) and Ch'iang (Wo) Chia (16). Tsu Hsin (15) had two queens, Pi Chia and Pi Keng, and there were two brother kings in generation XV, Tsu Ting (17) and Nan Keng (18). Tsu Ting (17) had two queens Pi Chi and Pi Kuei and there were four kings and two other brothers in generation (XVI), Hsiang (Yang) Chia (19), P'an Keng (20), Hsiao Hsin (21), Father Chi (21A), Father Kuei (21B), and Hsiao Yi (22). Wu Ting had three queens,

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

The ancestral title of (Lin) Elder brother Hsin (26) is not recorded on the bones. He was simply called "Elder brother" in the same manner as the persons recorded on 23A, 23B, 24A, 26A, 28A, who did not reign as kings but were in the royal succession. If the number of Shang kings was 30 and not 31 then the evidence of the bones points to the omission of (Lin) Elder Brother Hsin (26) and not Ta Ting (2)

The present table includes several additions to the writer's table of 193[illegible] suggested by this study of the Ho. Father Chi (21A) (Ch'ien pien 1.27.1 and 5.25.4, diviner Yun I) and Father Kuei were manifestly brothers. Many bronze inscriptions mention them together as fathers of owners of Ho [illegible], 74, 84-98, 102-107, 130, et al. They belong to the generation of P'an Keng (20) and Hsiao Hsin (21) and must have died before Hsiao Yi (22).

Elder Brother Ting (23A) was elder brother of Wu Ting (23) (Ts'ui pien 145.5; 354.2, same as Hou pien 1.[illegible]; see Ho 70). Elder brother Yu (23B) who was called Father Yu and (Ancestor) Tsu Yu by later generations, was elder brother of King Wu Ting (23) and not younger brother Ts'ui pien 121.3 (diviner Nan I.1) Yi Ts'un 171, [illegible] 5037.

Elder Brother Ping (26A) was elder brother of (Lin) Elder Brother Hsin (26) and Kang Tsu Ting (27), not of Wu Tsu Yi as Kuo Mo-jo suggested in his note on Ts'ui pien, 379. The script is somewhat earlier than Mr. Kuo 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 bone inscriptions (Ch'ien pien 5.30.1; Hayashi 1.25.10). Among 37 vessels recorded by Jung Keng, Shang tai tien, 1939, Supplement, Vol. 1, p. 13 are Father Ying, Jan-tai 15.10.3 and 4; Father Hsin, Jan-tai 5.17.1; 7.3.8; and Father Ying, Jan-tai 6.14.2. Ying was, therefore, elder brother of (Lin) Hsin (21) and P'an Tsu Ying (17) and not of Wu Tsu Yi (20).

This present table has been used to determine the dates of sets of bronze ritual vessels from the ancestral relationships inscribed on them. In the light of further knowledge the absolute dates indicated in the accompanying table of comparative chronology may be subject to change, but the generations given in this table may be considered correct. It is based on a multitude of contemporary oracle bone inscriptions. The only exception to this is Father Kuei (21) of generation VII, whose place in the list was determined from his association with Father Yü (21A) in inscriptions on sets of bronze ritual vessels. The absence of Father Kuei (21) from the bone inscriptions may be accounted for on the supposition that he was a son of King Pan Keng (18); it is stated in the Shih Chi History that Pan Keng (18) was son of Chiang (16) Chia (21), the son of Tsu Yi (14). Father Kuei would then be related to the direct line of succession only through his great grandfather, Tsu Yi (14). If this were so, Kuei might well have been omitted by the reigning sovereign from the ancestral ceremonies recorded on the oracle bones. Then because his father Pan Keng (18), was a king 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 sets of bronze ritual vessels would include the names of the sons of King Pan Keng [18] while kings of the direct line might omit them 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.

Generation	Elder brothers	Direct Line	Queen	Younger brothers
I		Shang Chia		
II		Pao Yi		
III		Pao Ping		
IV		Pao Ting		
V		Shih (Chu) Jen	Pi Kêng	
VI		Shih (Chu) Kuei	Pi Chia	
VII		T'ang or Ta (T'ien) Yi (1)	Pi Ping	
VIII		Ta Ting (2)	Pi Wu	
VIII				Wai (Wai) Ping (3)
VIII				Nan (Chung Jên (4)
IX		Ta Chia (5)	Pi Hsin	
X	Hsiao (Wo) Ting (6)			
X		Ta Kêng (7)	Pi Jên	
XI	Hsiao Chia (8)			
XI	Chung (Yung) Chi (9)			
XI		Ta Wu (10)	Pi Jên	
XII		Chung Ting (11)	Pi Kuei	
XII				Pu (Wai) Jên (12)
XII				Chan (Ho T'an) Chia (13)
XIII		Tsu Yi (14)	Pi Chi Pi Kêng	
XIV		Tsu Hsin (15)	Pi Chia Pi Kêng	
XIV				Chiang (Wo) 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) Chia (19)			
XVI	P'an Kêng (20)			
XVI	Hsiao Hsin (21)			
XVI	Father Chi (21A)			
XVI	Father Kuei (21B)			
XVI		Hsiao Yi (22)	Pi Kêng	
XVII	Elder brother Ting (23A)			
XVII	Tsu or Elder brother Wu (23B)			
XVII		Wu Ting (23)	Pi Hsin	
			Pi Kuei	
			Pi Wu	
XVIII	Tsu or Elder brother Chi (24A)			
XVIII	Tsu Kêng (24)			
XVIII		Tsu Chia (25)	Pi Wu	
XIX	Elder brother Ping (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)		

D.

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 Ko. 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 cycle of ten days. The Temple titles used were: "great" ta, "middle", chung, "little" hsiao, "Ancestor" tsu, "warrior" wu, "peaceful" k'ang, and others such as "mover" pan, for King P'an Keng[1] who moved the capital to the Waste of Yin. When a

1. The word "move" pan, is now pronounced unaspirated, the later orthodox graph 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" hsiung, 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 Ko 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 Chêng 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 1189-1157 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 K'ang Tsu Ting, 1150-1145 B.C.

Diviners: 1, Yi; 2 (?); 3 (?); 4, Chu; 5, Ti; 6, I'eng; 7, Shen; 8, K'ou (the same as II.5); 9, Lu (the same as II.2)

Script period IV — Reign of Wu Tsu Yi, 1142-1139 B.C. and of Wen Wu Ting, 1138-1126 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 Yi[1], 1125-1091 B.C. and of Hsin[2], 1090-1039 B.C.

1. This king was not given a temple title on bone 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 Shih 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 Ming Yi-shih (James M. Menzies) Chia Ku Yen Chiu (Oracle Bone studies) Cheeloo University, Tsinan, 1933, 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 Ting sometimes mentioned in these inscriptions with King Tsu Ting, father or uncle of Hsiang (Yang) Chia; P'an Keng; Hsiao Hsin; and Hsiao Yi. 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, belongs to the reign of King Tsu Keng, 1198-1190 B.C. Father Ting of these inscriptions would then be King Wu Ting and not P'an Tsu Ting 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 II 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 archaicistic reversion to earlier script forms between Period III and Period V is unnatural and lacks evidence. Oracle bone study Chia Ku 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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Chih-Yü:	Lo Chen-Yü, T'ieh Yün Ts'ang Kuei Chih Yü, 1915.	40
Shih-Yi:	Yeh Yü-sen, T'ieh Yün Ts'ang Kuei Shih Yi, Shanghai, 1925.	245
Chien-Shou:	Wang Kuo-wei, Chien Shou T'ang So Ts'ang Yin Hsü Wen Tzu, Shanghai, 1917.	655
Chalfant:	Drawn by Frank H. Chalfant, edited by Roswell S. Britton. The Chalfant Couling Collection, Shanghai, 1935; numbered consecutively.	1687
Bergen:	James M. Menzies (Ming I-shih), Po Ken Shih Chiu Ts'ang Chia Ku Wen Tzu, Tsinan, 1935; numbered consecutively.	74
Seven:	Drawn by Frank H. Chalfant, edited by Roswell S. Britton, Seven Collections of Inscribed Oracle Bones, New York, 1938 (less Bergen collection). Each collection is numbered separately, preceded by key letters:	446

T. Tientsin Anglo-Chinese College 25

S. Shanghai Museum N.C.B.R.A.S. 193

B. Bergen Collection

P. Princeton University 119

W. Wilhelm Collection 72

L. Sun Wen-lan of Lin Chih 31

R. Royal Asiatic Society, London 6

Hopkins: Drawn by Frank H. Chalfant, edited by Roswell S. Britton, *The Hopkins Collection of Inscribed Oracle Bone*, New York, 1939; numbered consecutively. 484

Yenching: Jung Keng and Ch'ü Jun Min, *Yin Ch'i Pu Tz'u*, Peiping, 1933. Formerly Hsü Fang Collection; numbered consecutively. 874

T'ien-jang: T'ang Lan, *T'ien Jang Ko Chia Ku Wen Ts'un*, Peiping, 1939; numbered consecutively. 108

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Ching-hua Lo Chen-Yu, *Yin Hsü Shu Ch'i Ching Hua*, Shanghai, 1914. 68

Hou-pien Lo Chen-Yu, *Yin Hsü Shu Ch'i Hou Pien*, Shanghai, 1916. 1104

Hsü-pien:	Lo Chen-yü, Yin Hsü Shu Ch'i Hsü Lien, Peiren, 1935. Of the 3016 rubbings most had already been published in 1, 2, 4, 19, 20, 21, but the reproductions were clearer in colotype. Those unpublished numbered about	500
T'u-lu:	Lo Chen-yu, Yin Hsü Shu Ch'i Ku I'u Lu, Shanghai, 1916. One large scapula	1
Menzies:	James M. Menzies (Ming Yi-shih), Oracle Records from the Waste of Yin. Plates printed in Peiping, 1916, introduction Shanghai 1917; numbered consecutively.	2369
Menzies:	James M. Menzies, (Ming Yi-Shih), Second Collection of Oracle Records from the Waste of Yin, Peiping 1927, 3 copies of ink rubbings. The numbers are consecutive with the preceding.	2700
Hayashi:	T. Hayashi, (Lin Tai-fu), Kuei Chia Shou Ku Wen Tzu, Japan, 1917.	1023
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Material unearthed after 1928.

Hsieh-pen:	Tung Tso-pin, Hsin Hu Pu Tz'u, Peiping 1939; drawings numbered consecutively.	381

Ta-kuei:	Tung Tso-pin, Ta Kuei Ssu Pan K'ao Shih, Peiping 1931. Photographs and drawings numbered consecutively.	4
Yi-ts'un:	Shang Ch'eng-tso, Yin Ch'i Yi Ts'un, Nanking, 1933. Rubbings from eight collections numbered consecutively.	1000
T'ung-pieh:	Luo Mo-jo, Iu Tz'u T'ung Tsuan Pieh Lu, Tokyo 1933. Unpublished rubbings appended to the T'ung Tsuan.	128
Yeh-chung One:	Huang Chün, Yeh Chung P'ien Yü Ch'u Chi, Peiping 1935.	241
Yeh-chung Two:	Huang Chün, Yeh Chung P'ien Yü Erh Chi, Peiping 1937.	101
Hou-chuang:	Tung Tso-pin, An Yang Hou Chia Chuang Ch'u T'u Chin Chia Ku Wen Tzu, Shanghai 1936. Rubbings numbered consecutively.	42
Kaifeng:	Sun Hai-po, Chia Ku Wen Lu, Peiping 1937; numbered consecutively.	930
Ts'ui-pien:	Kuo Mo-jo, Yin Ch'i Ts'ui Pien, Tokyo 1937; numbered consecutively.	1595
Ch'eng-chai:	Sun Hai-po, Ch'eng Chai Yin Wen Tzu, Peiping, 1940; numbered consecutively.	500
		21,118

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 inscriptions in modern characters";
"hand copies" means "hand-drawn facsimiles of the inscriptions";
"drawings" and "photographs" refer only to objects.
The word "only" does not exclude a transcript in modern characters, but indicates, that while the object may be named, there is no drawing or photograph of it.

Abbreviation	Title and type of record
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Ou Pa:	Ou-yang Hsiu, Chi Ku Lu Ja Wei, c. A. D. 1050, Transcripts only.
Ou Mu:	Ou-yang Fei, Chi Ku Lu Mu, A. D. 1063. Transcripts only.
K'ao T'u:	Lu Ta-lin, K'ao Ku t'u, 10 vols., A. D. 1092. Hand copies, drawings.
Po Ku:	Wang Fu et al, Hsuan Ho Po Ku T'u Lu, 30 vols. c. A. D. 1125. Hand copies, drawings.
Chao Pa:	Chao Ming-ch'eng, Chin Shih Lu Pa Wei, A. D. 1152. Transcripts only.

Kuang Ya: Tung Yu, Kuang Chou Shu Pa, A.D. 1137. Transcripts only.

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11. Sung Dynasty, Hsing Ping; Hsiao Ching Chu Su; 9 chüan.

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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

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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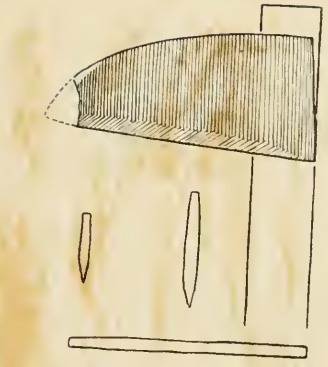

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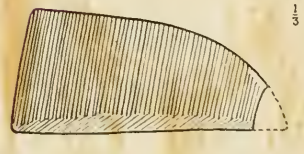

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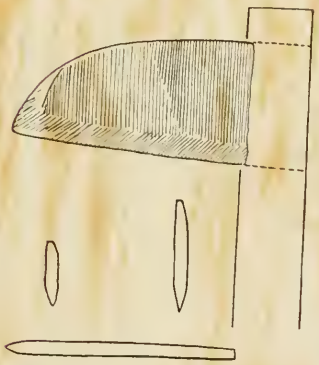

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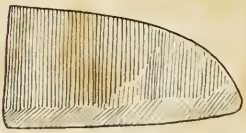

S1

2

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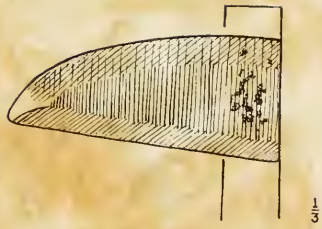

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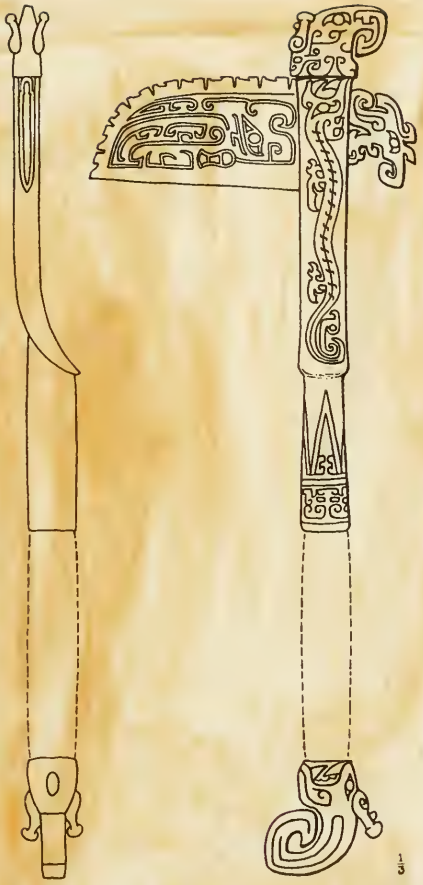
3

4

S 2

Type I A



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S 3

Type I B

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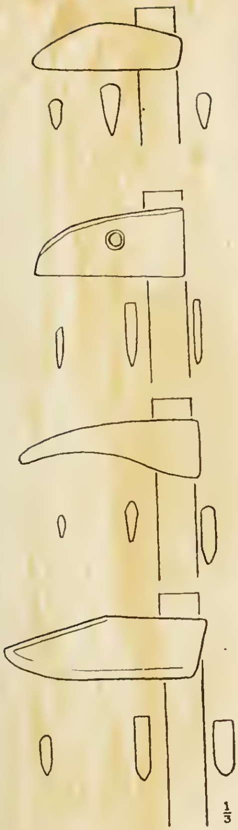
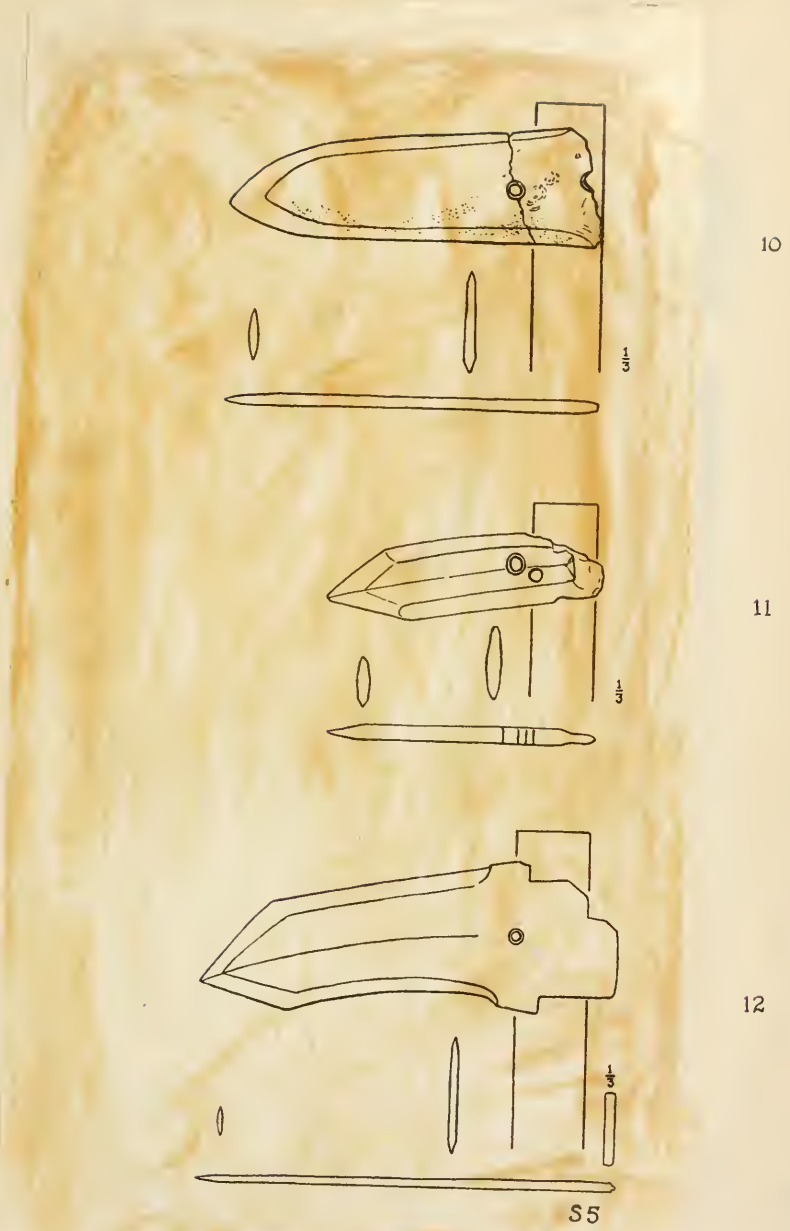


S4

Type II A



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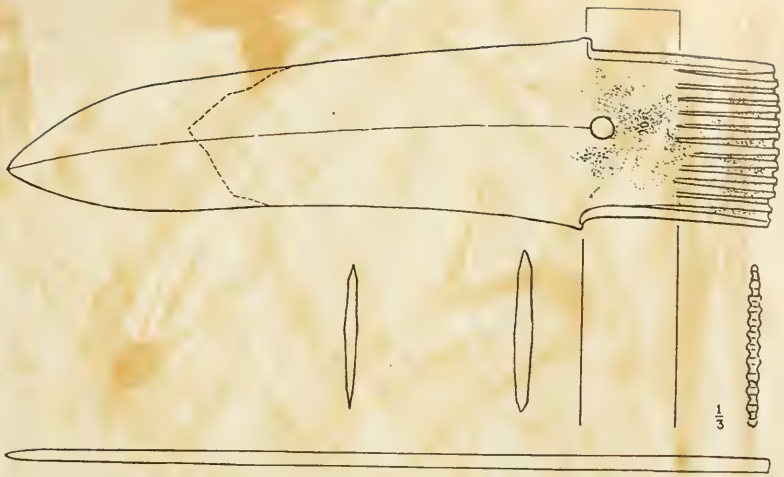

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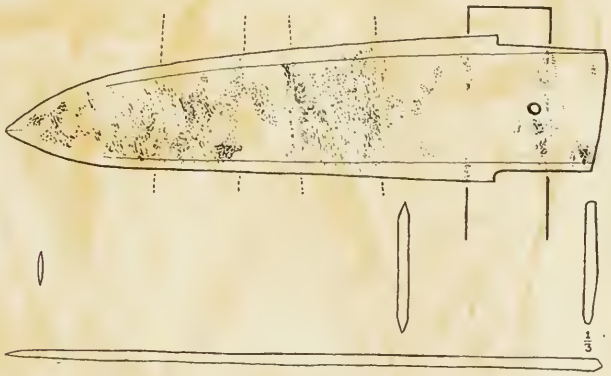

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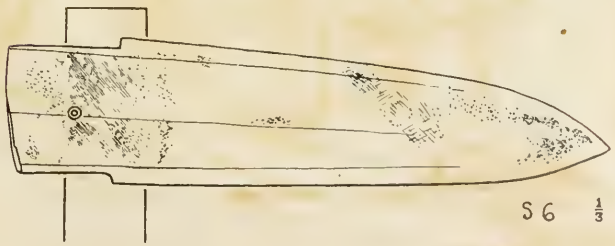

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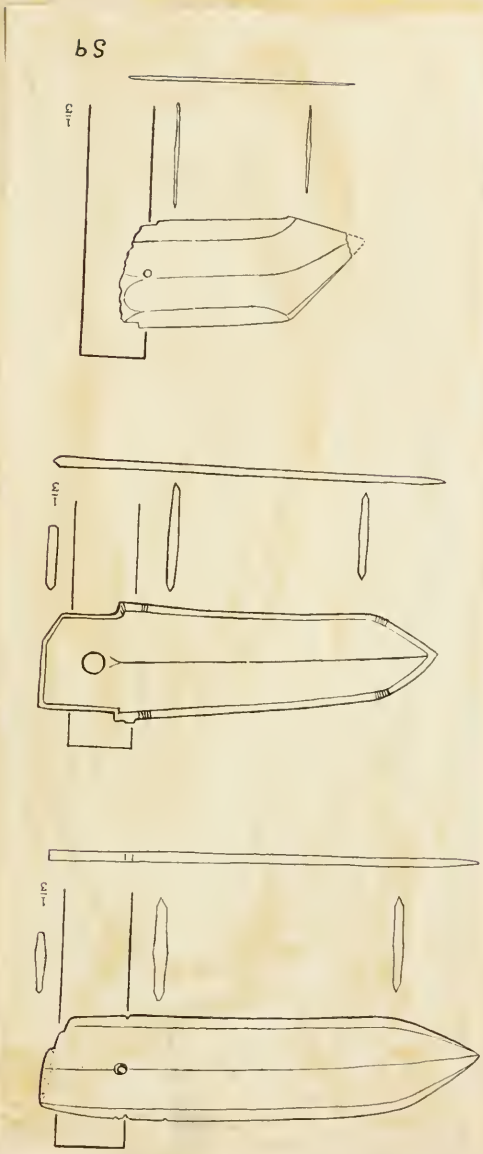

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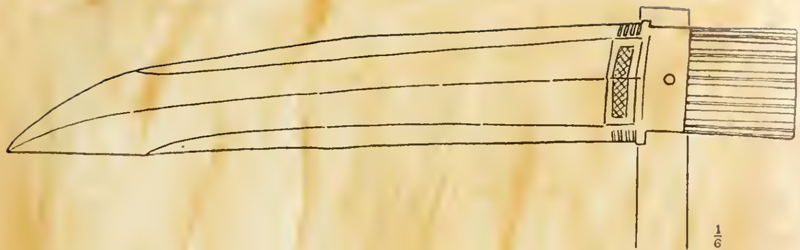

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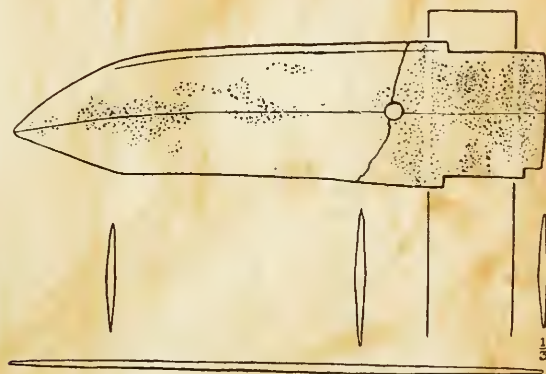

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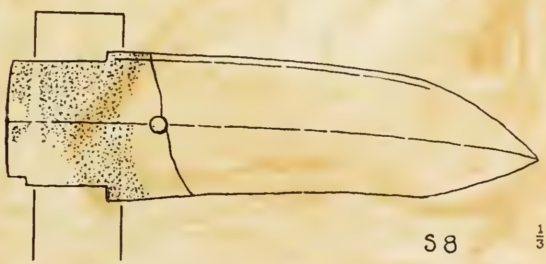

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S 8

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Type II B

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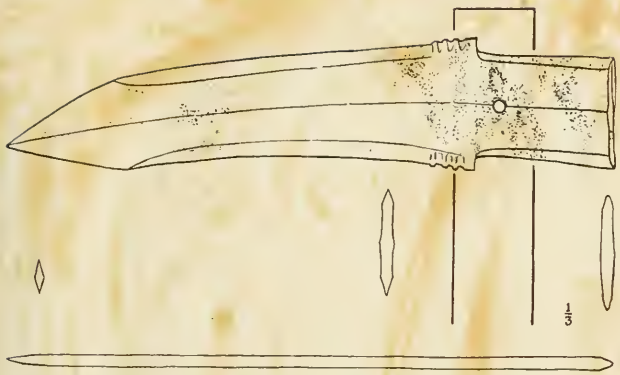

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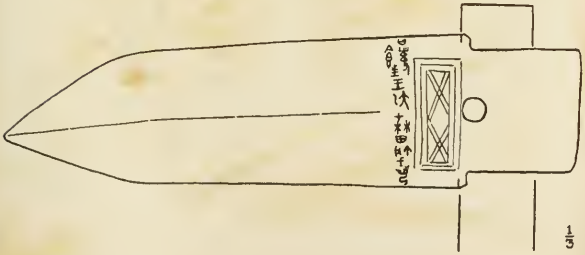

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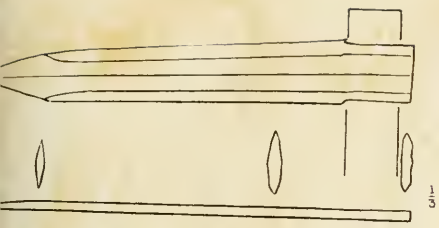

Type II C

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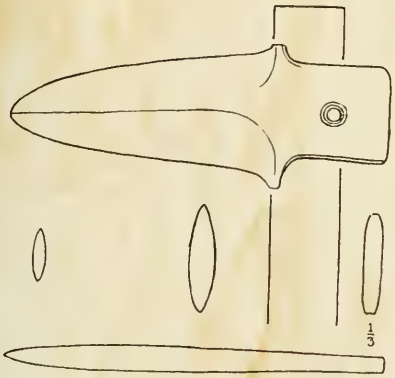

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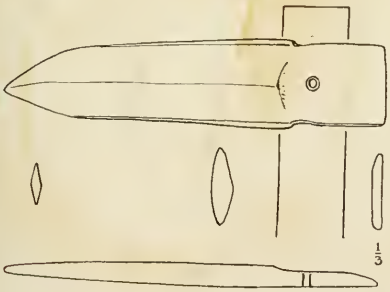

S 10

Type II D

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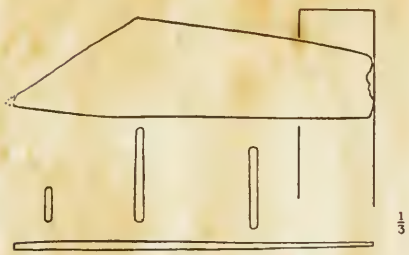
25



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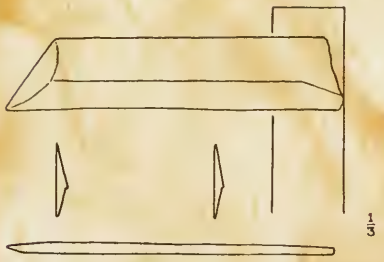

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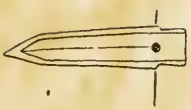
S 11

Type II E



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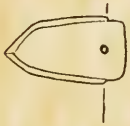

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S 12

Type II F

32

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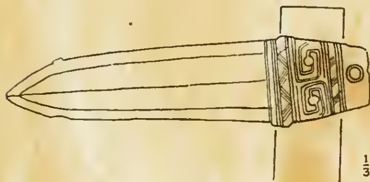

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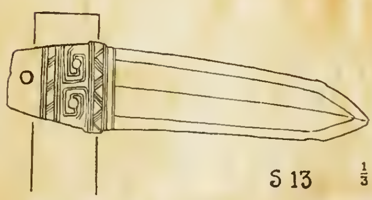

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S 13

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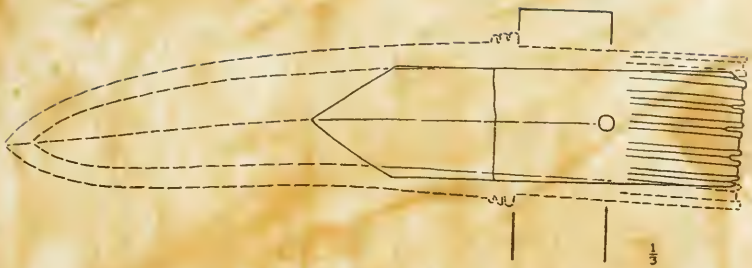
Type IIF



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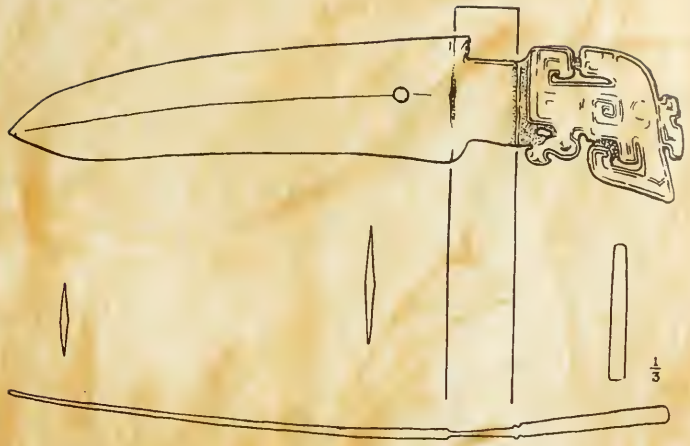
S 14



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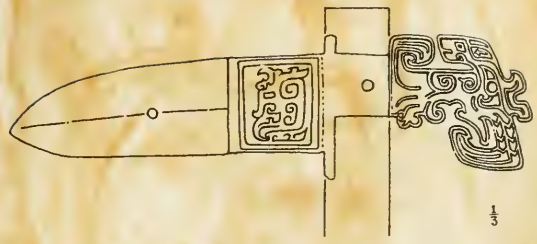
Type III A



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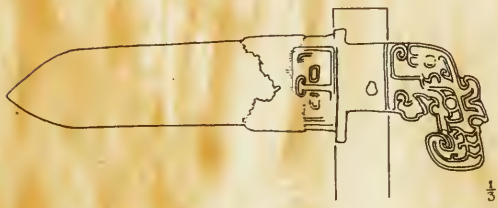

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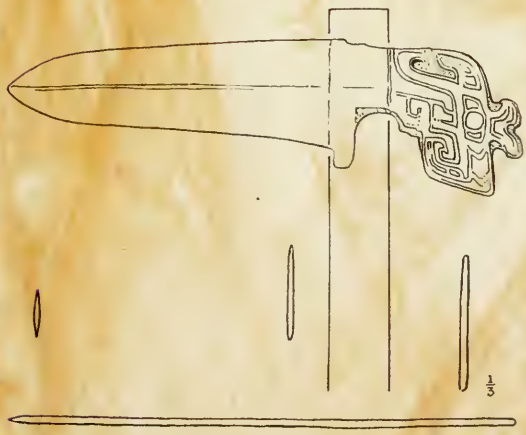

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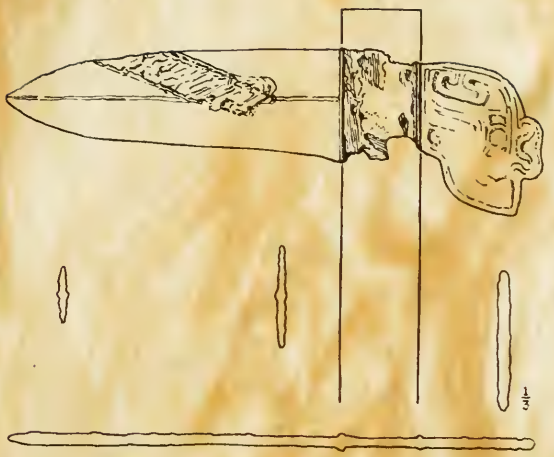
Type III A



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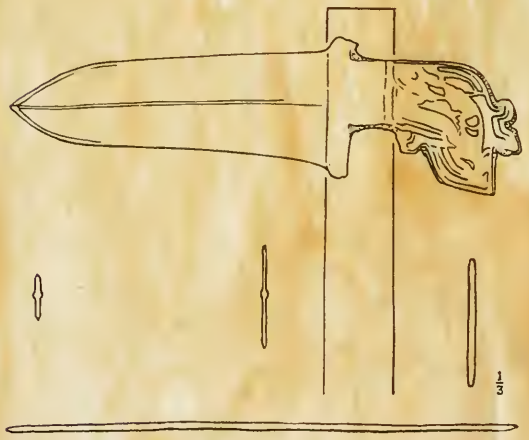

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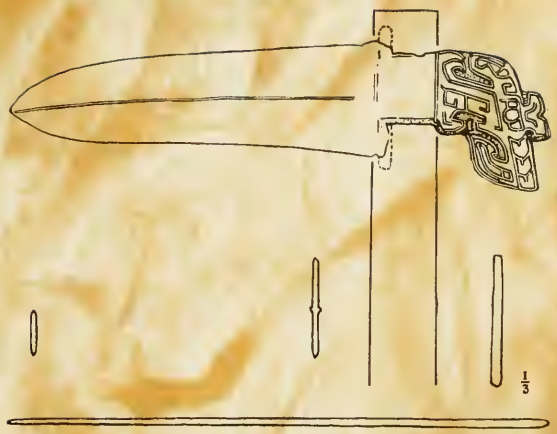

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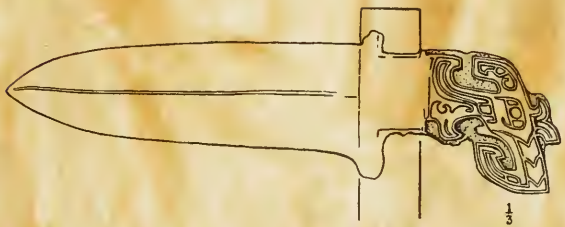

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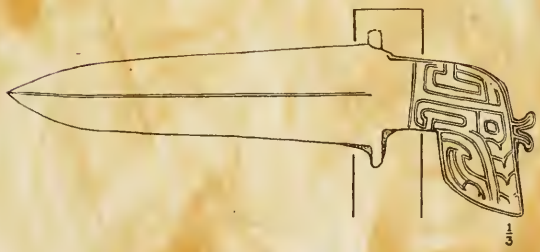

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Type IIIA

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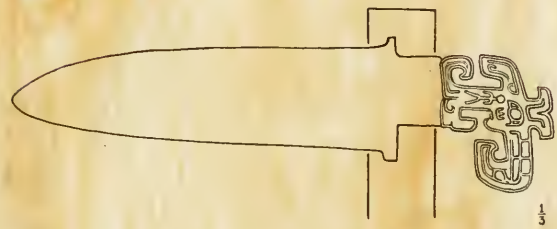

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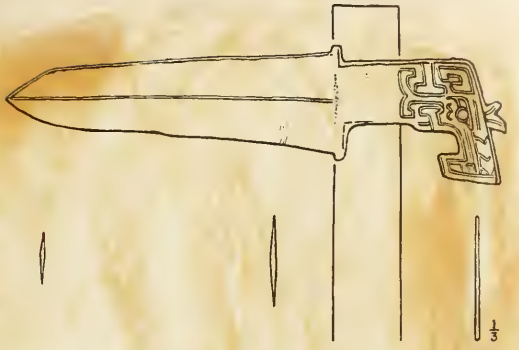

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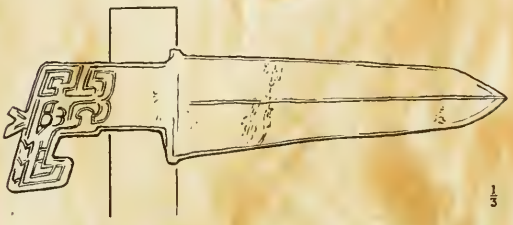

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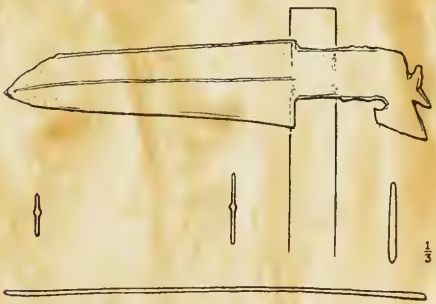

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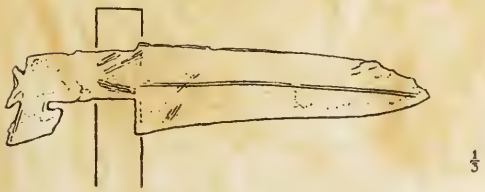

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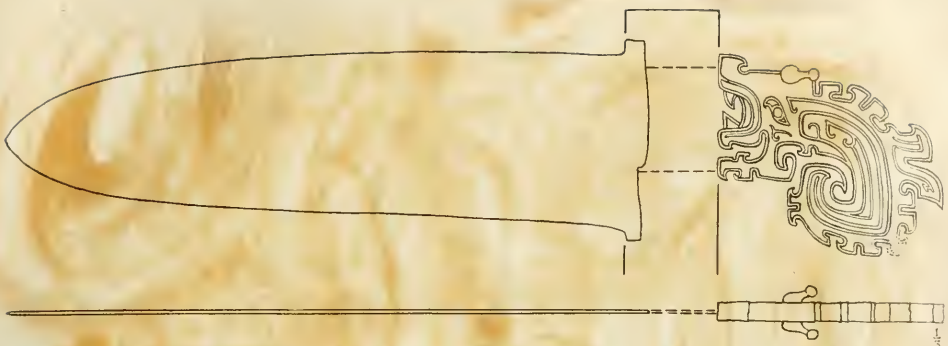

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Type III B

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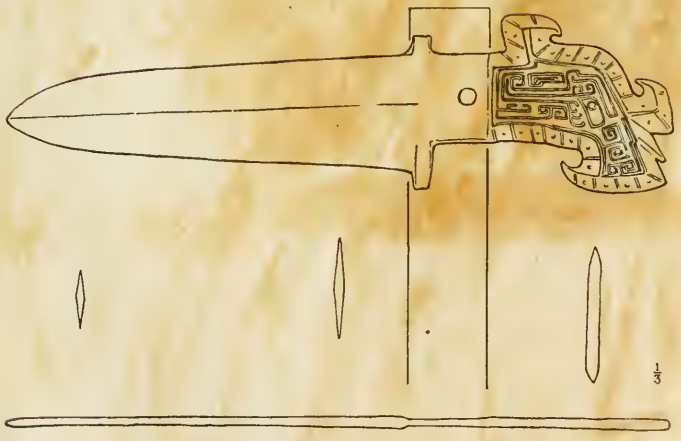

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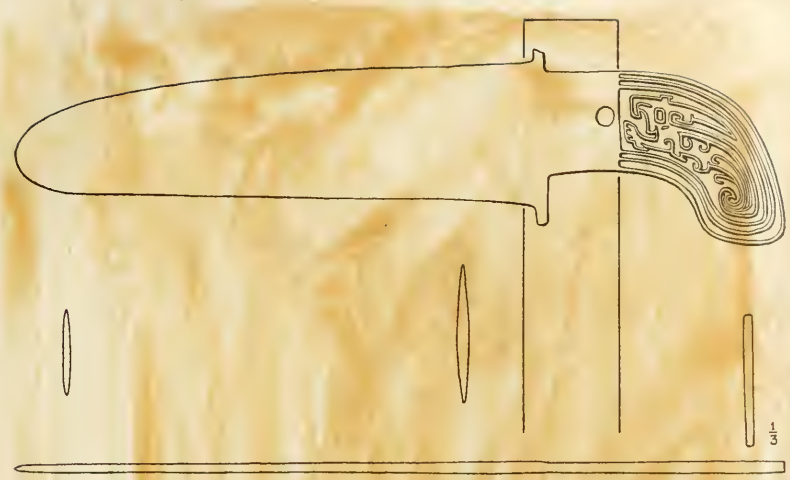
Type IV A



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Type IV A

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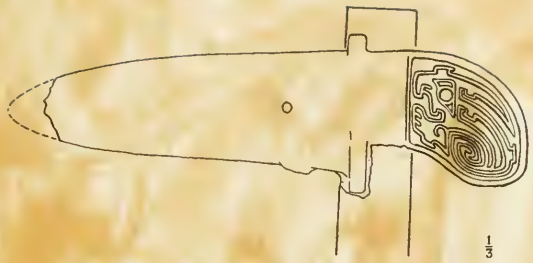
Type IV A



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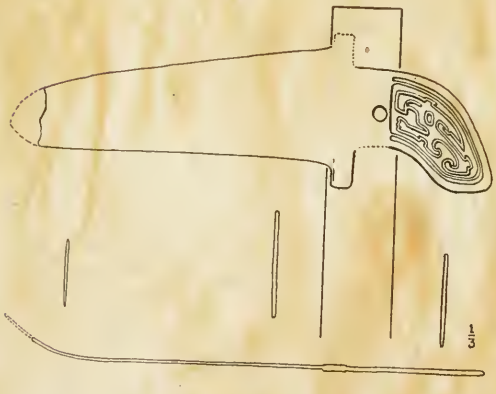

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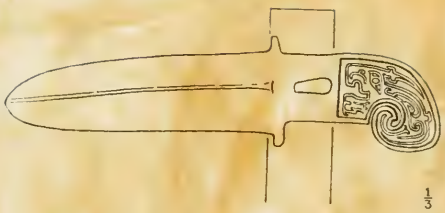
Type IV A



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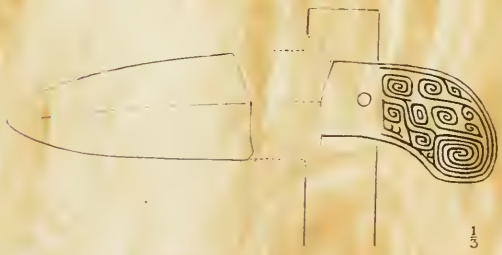

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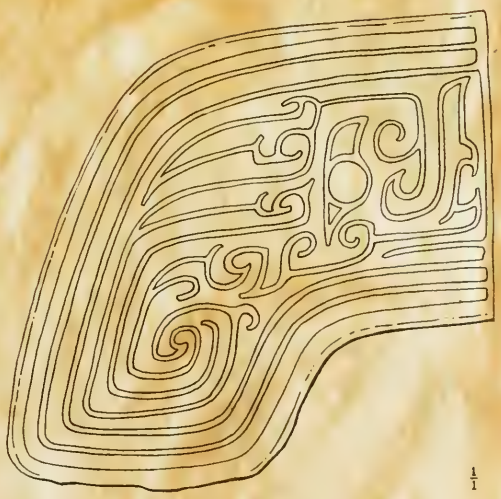

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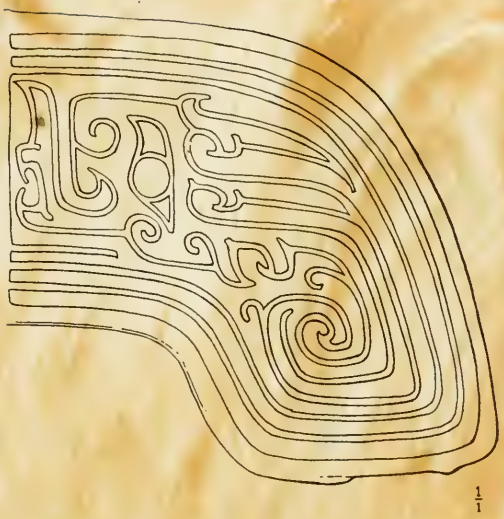

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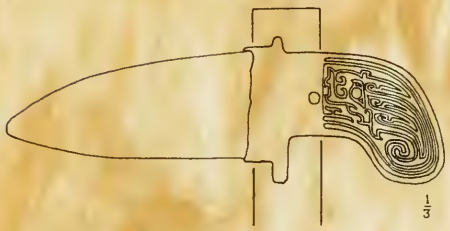

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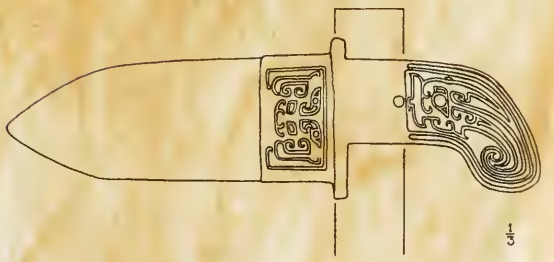

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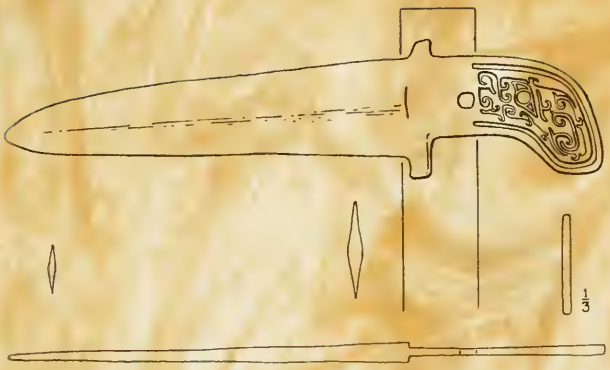
Type IV B



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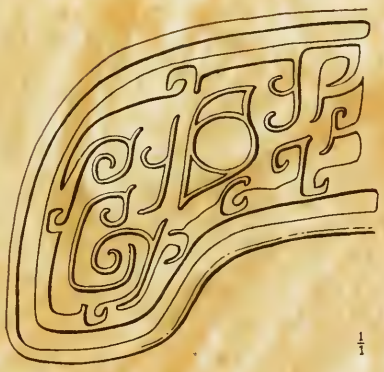

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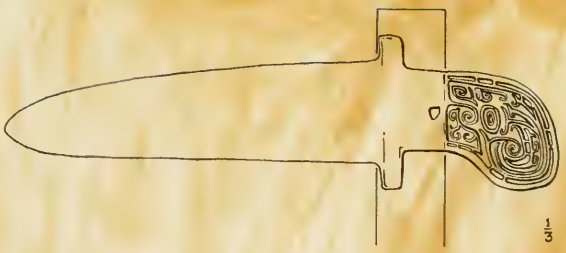
Type IV c



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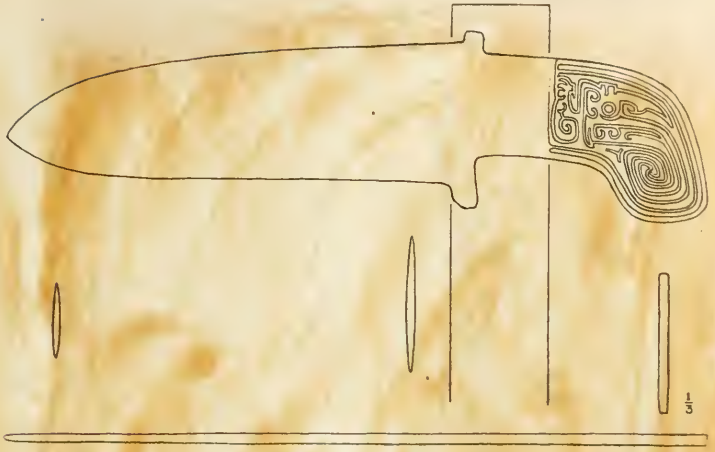

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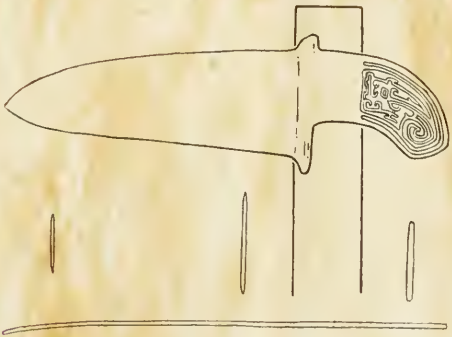

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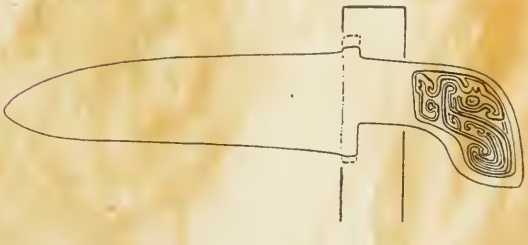

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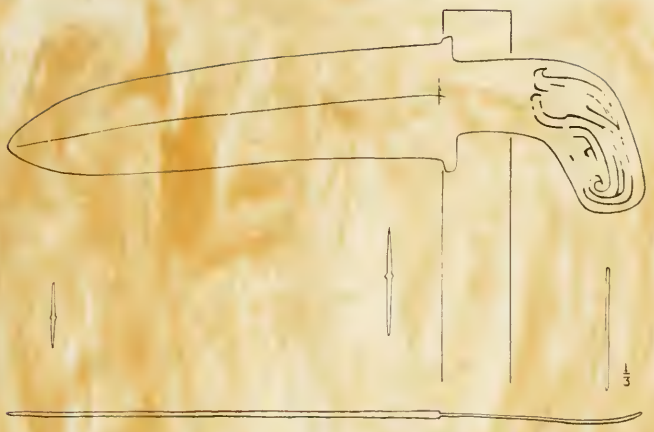

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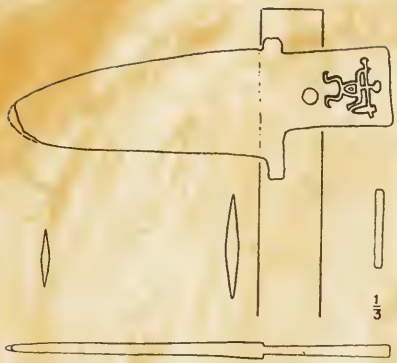
69

Type V A



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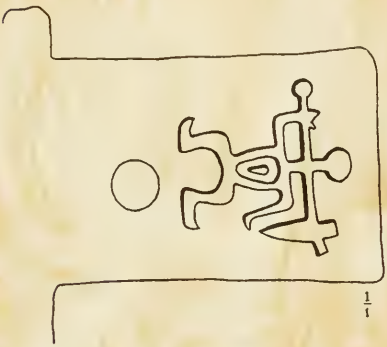

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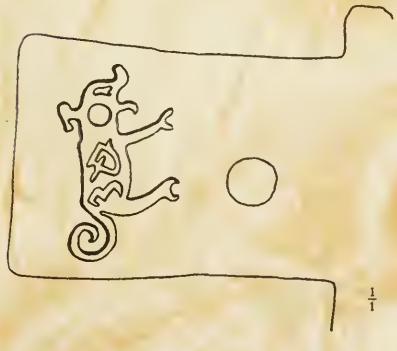

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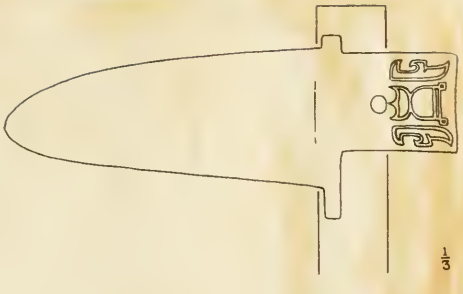

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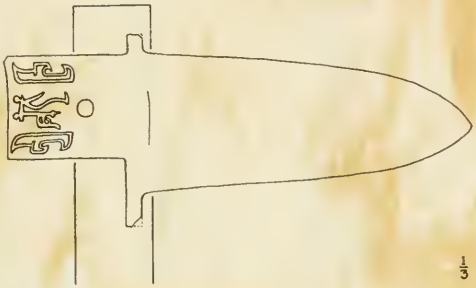

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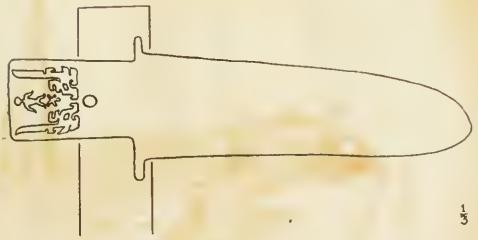
Type V B



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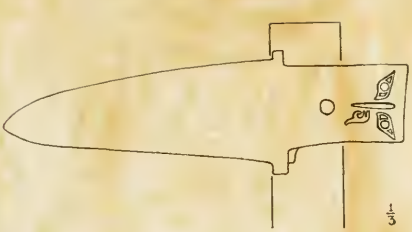

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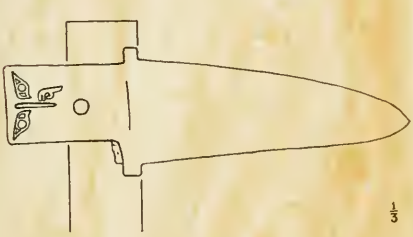

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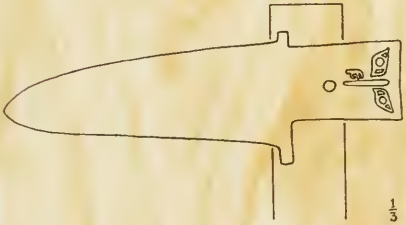

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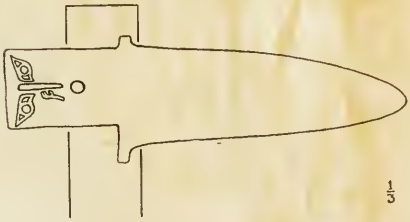

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Type V c

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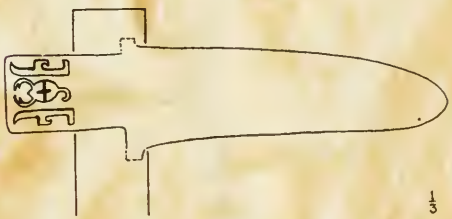

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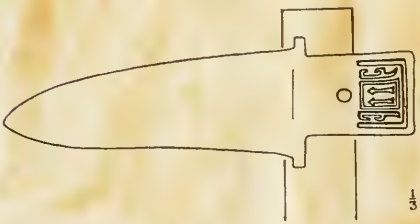

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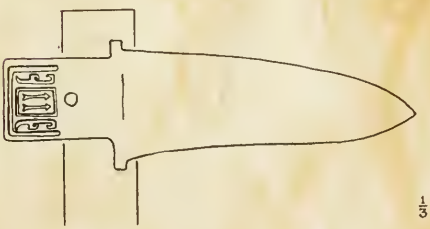

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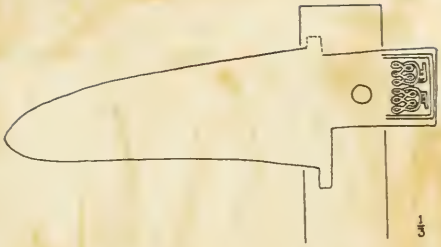
Type Ic



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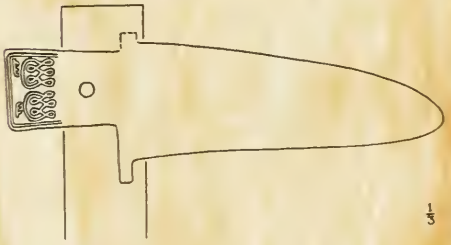

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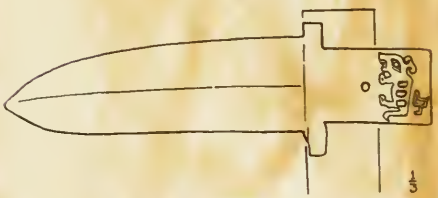

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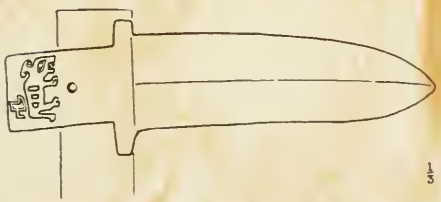

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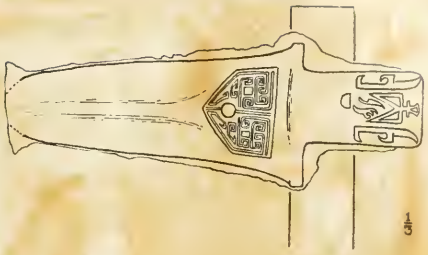

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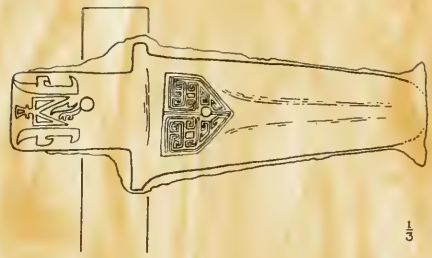

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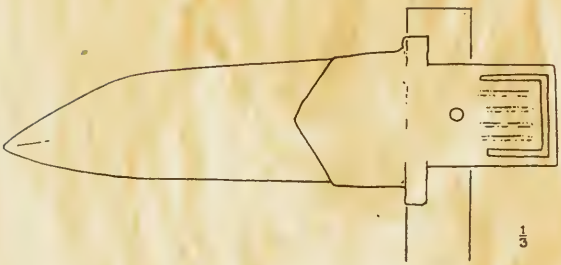

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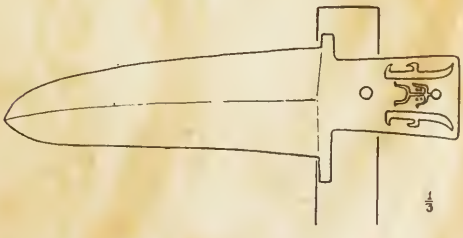

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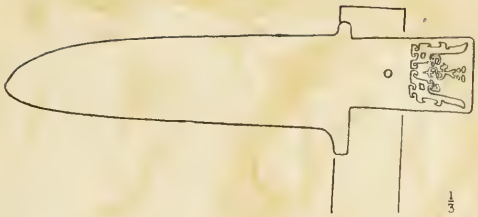

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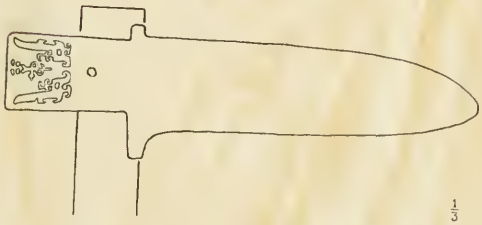

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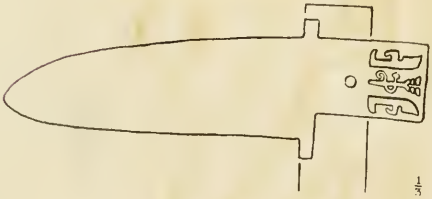

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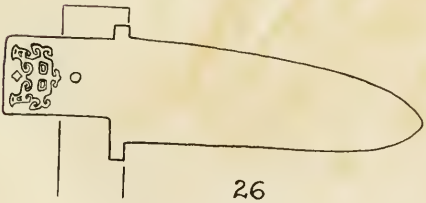

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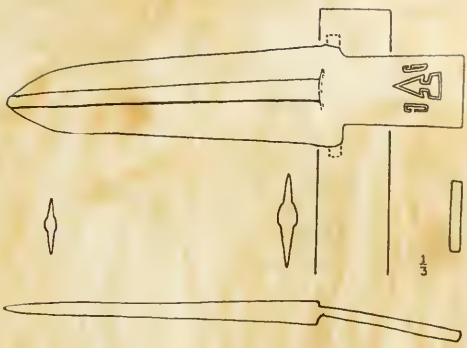

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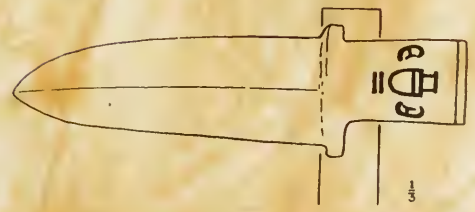

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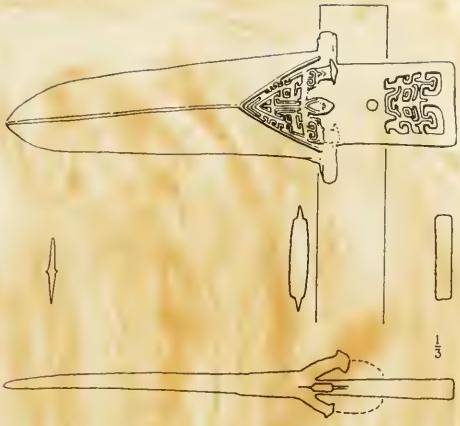

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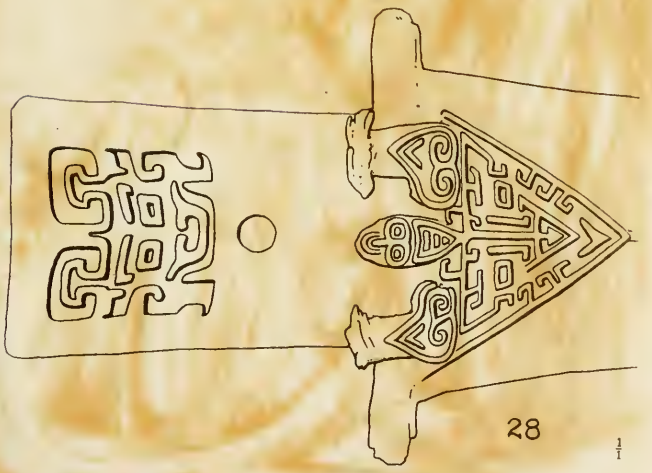

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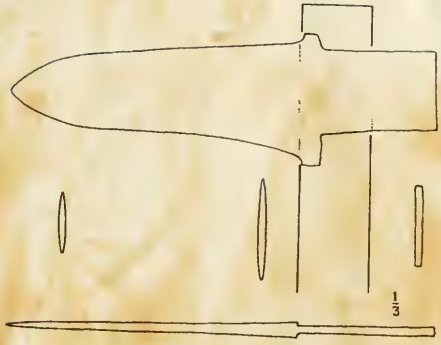

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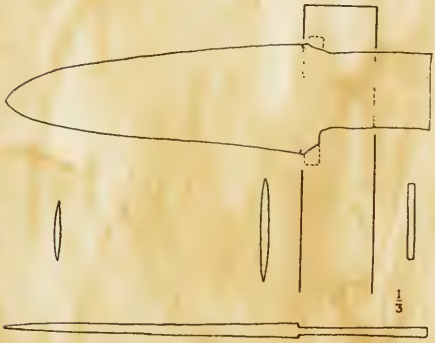

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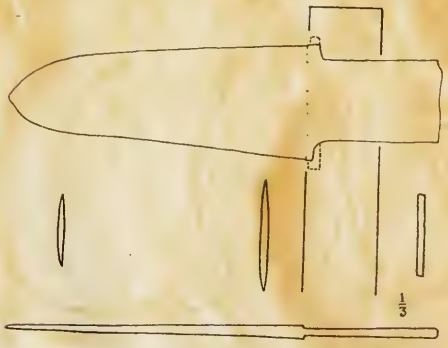

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Type V F

89

N 7° W 1/10

30

Type V F

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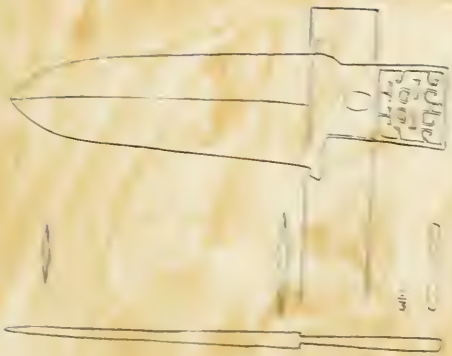

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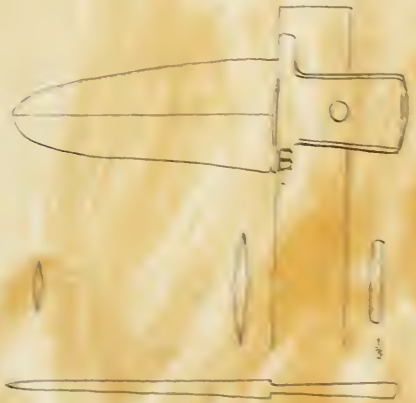

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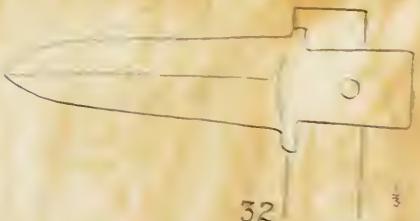

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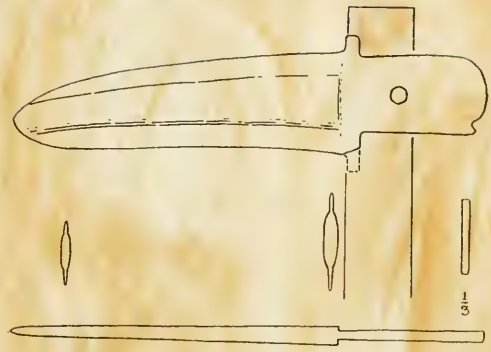
32

Type VI A



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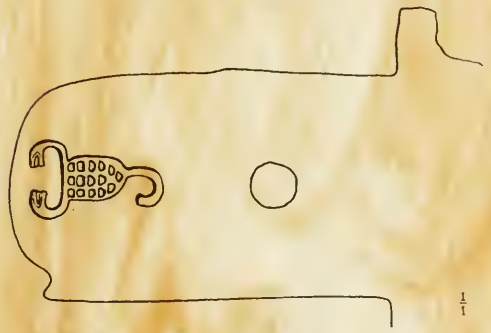

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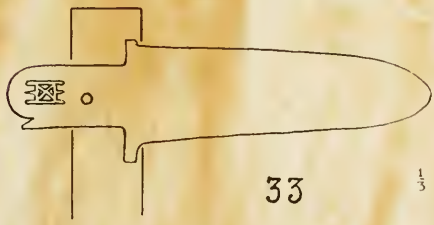

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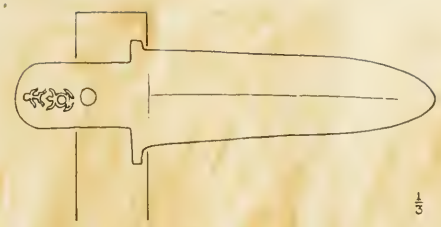
Type XI A



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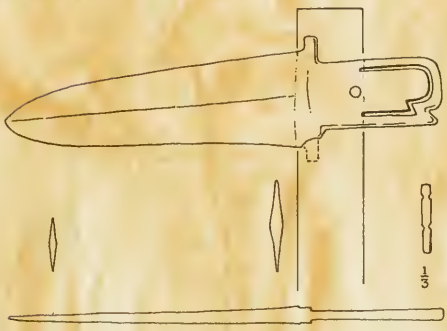

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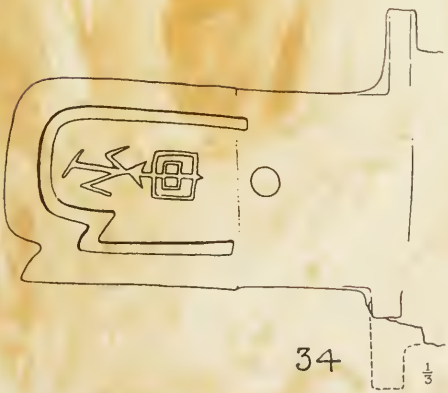

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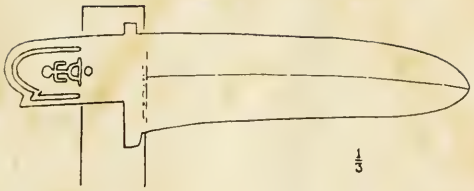

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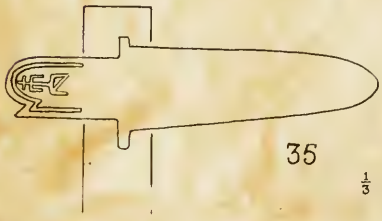

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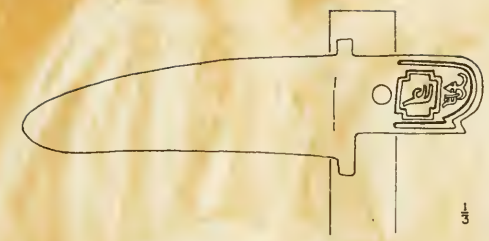
Type XIB



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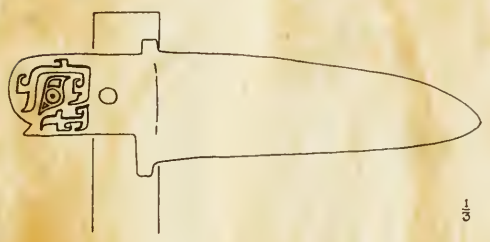

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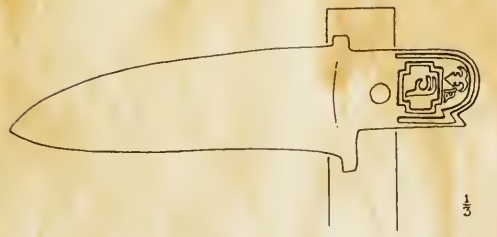

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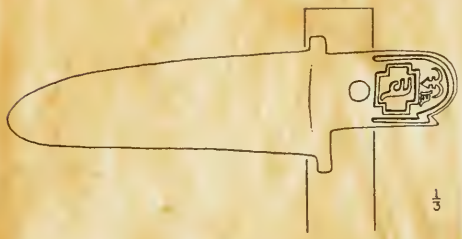
Type VI B

105



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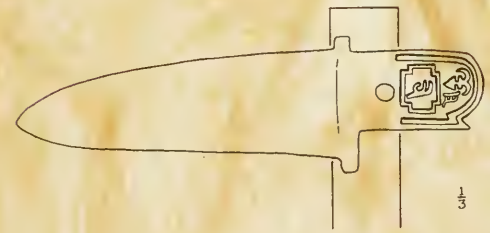

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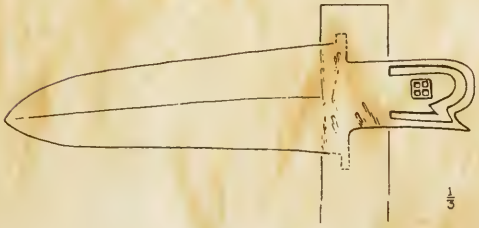

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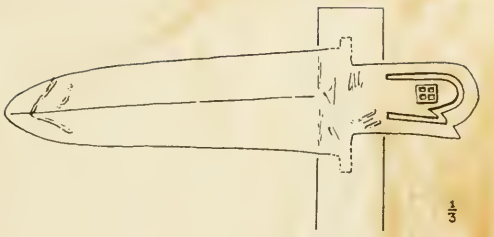

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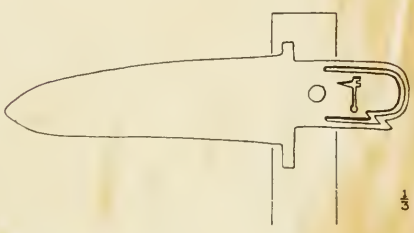

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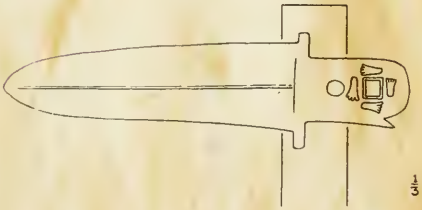

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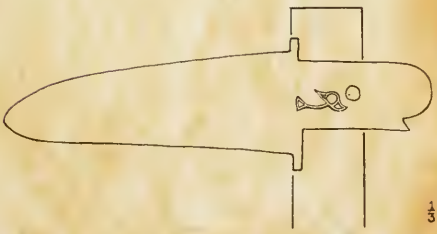
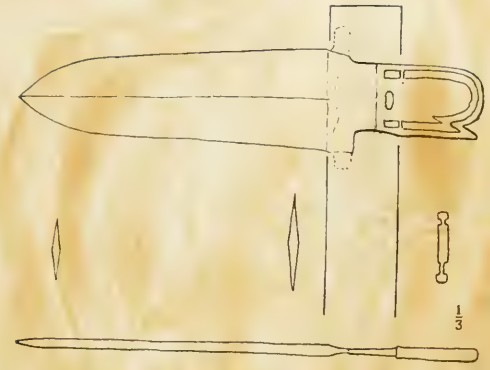


112

Type VIC



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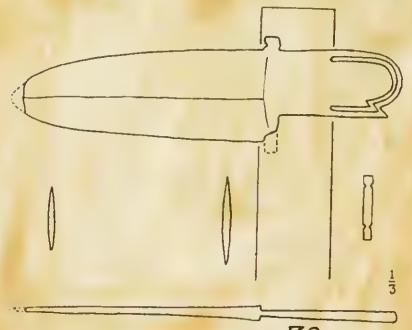
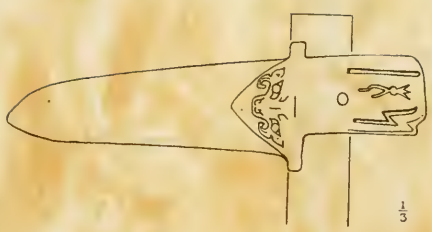


114

Type VI D



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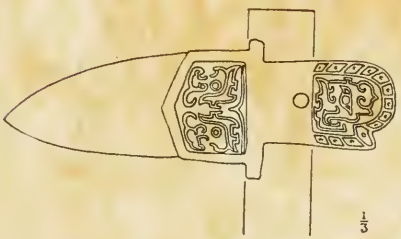

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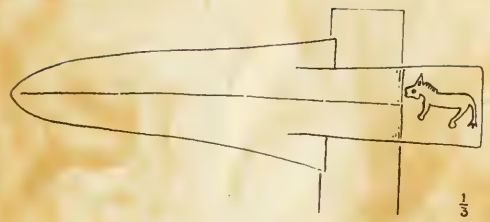

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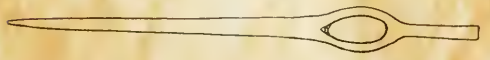

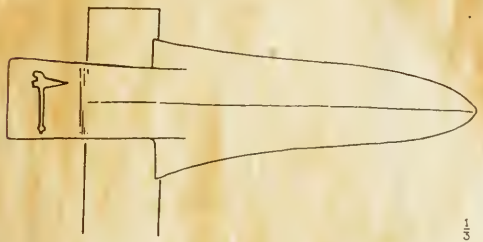

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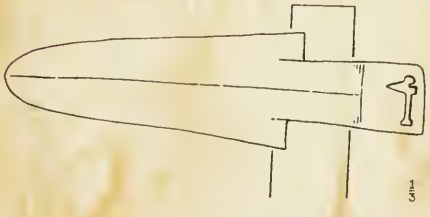

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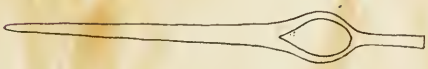

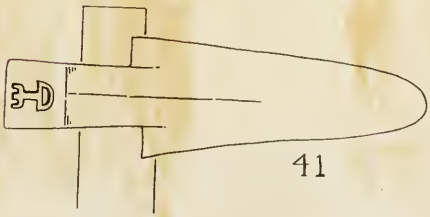

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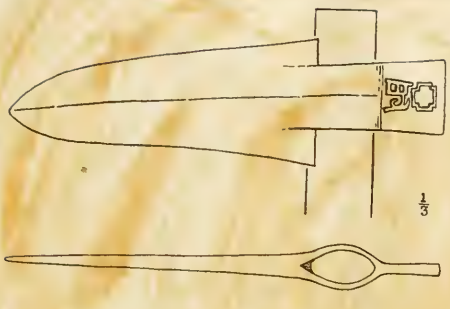

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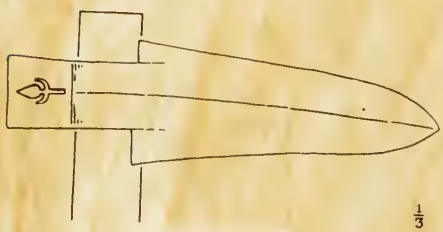

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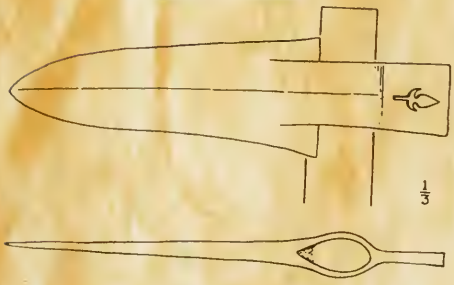

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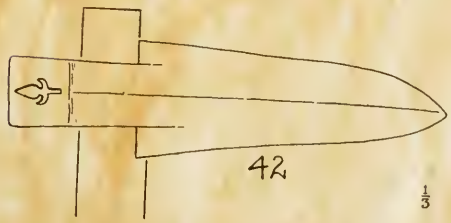

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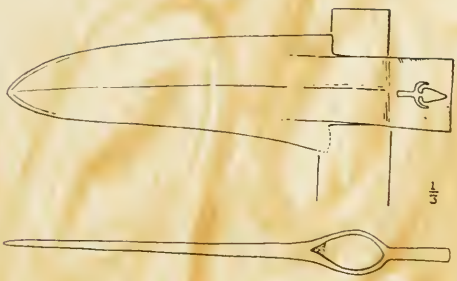

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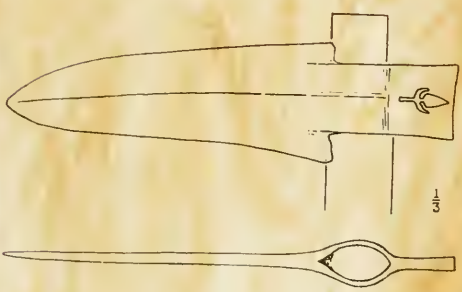

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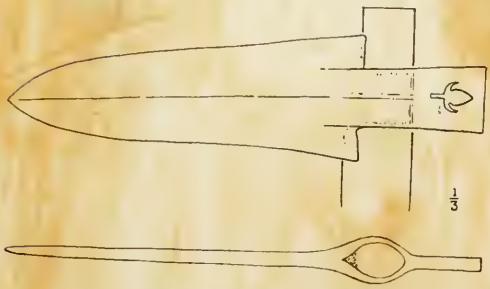

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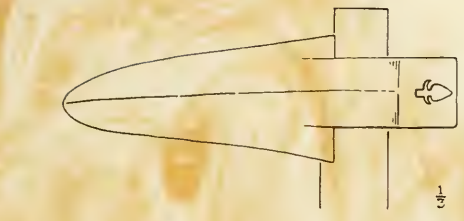

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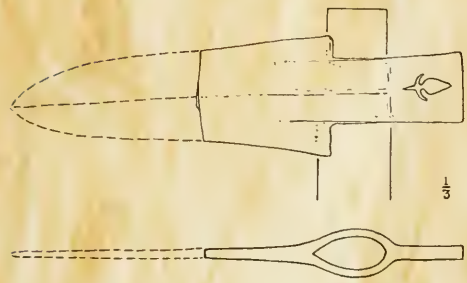

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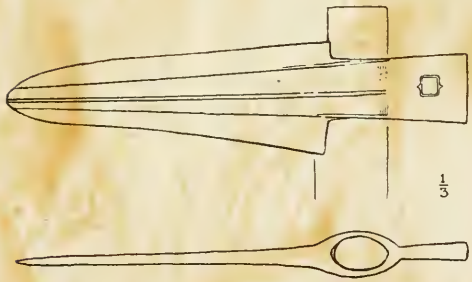

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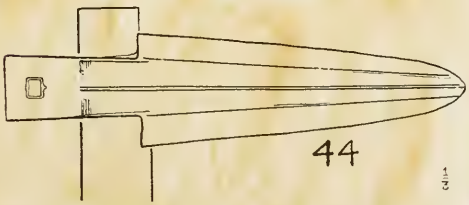

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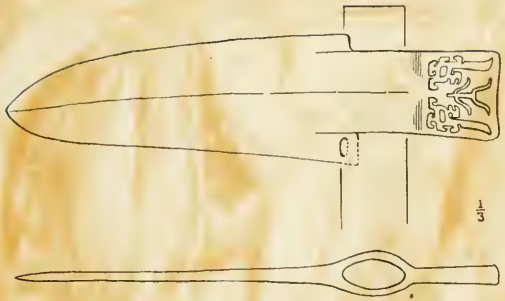

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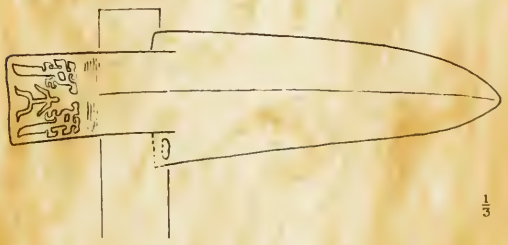

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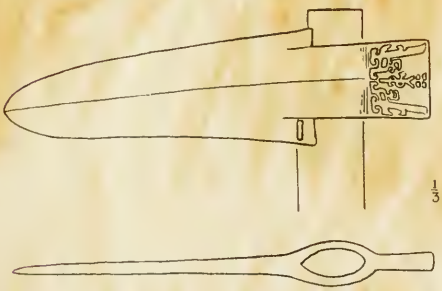

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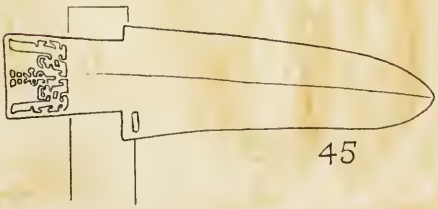

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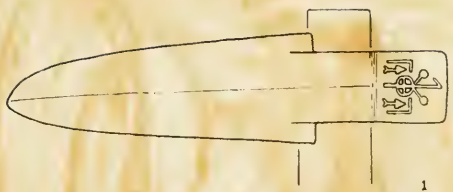
Type VIIB



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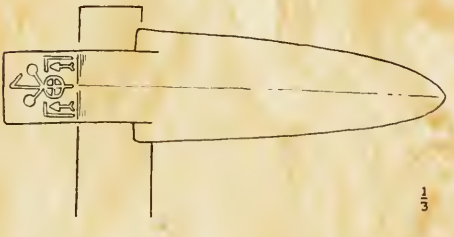

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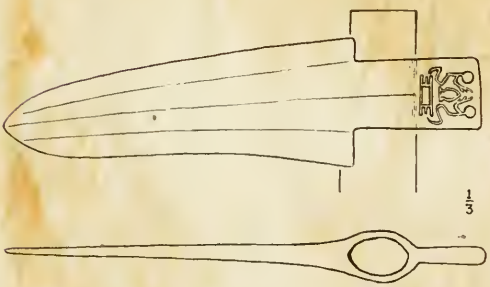

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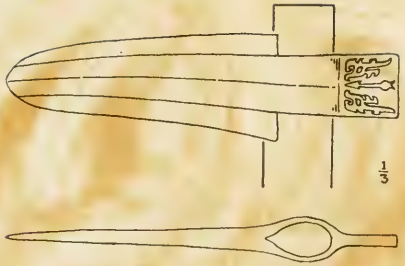

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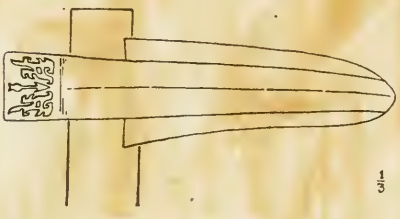

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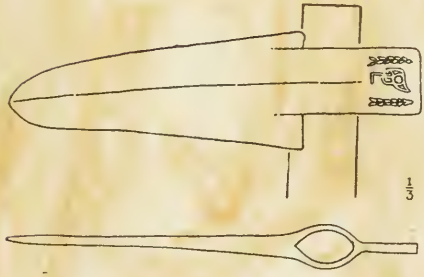

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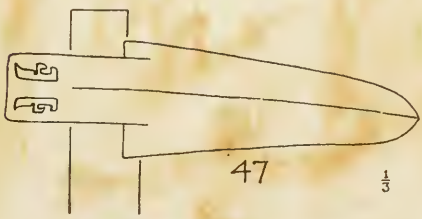

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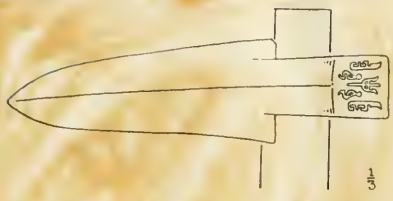

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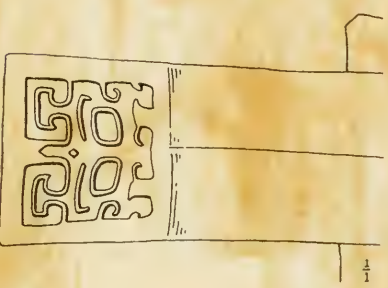
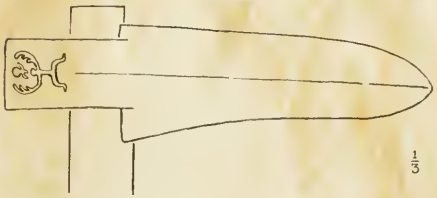


133

Type VII D



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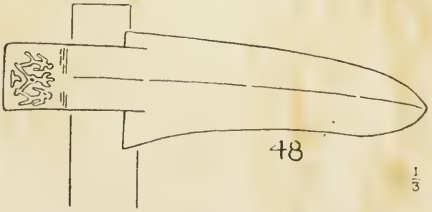

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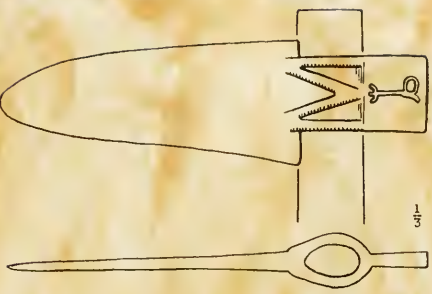
Type XII. E



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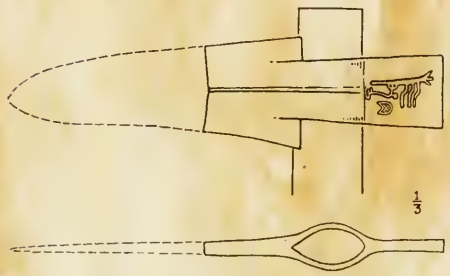

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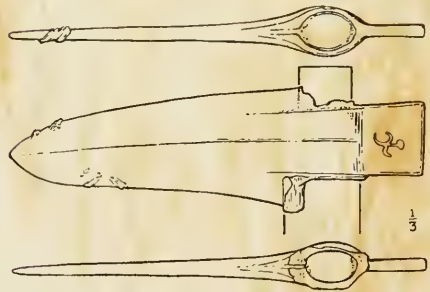

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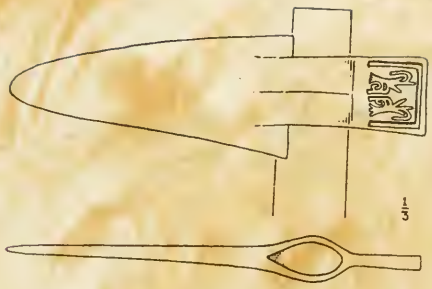
Type VII E



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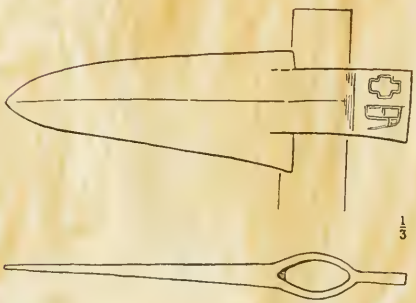

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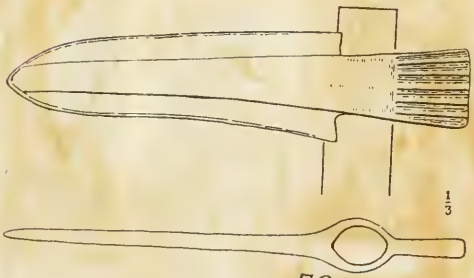
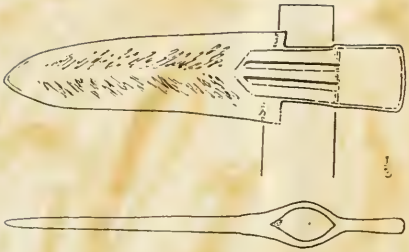
Type VII F



141

Type VIII F



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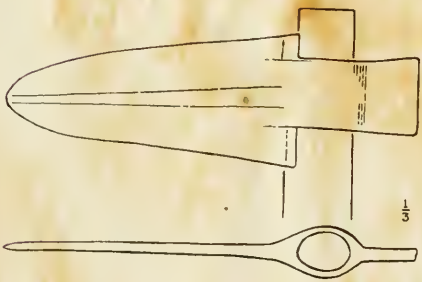

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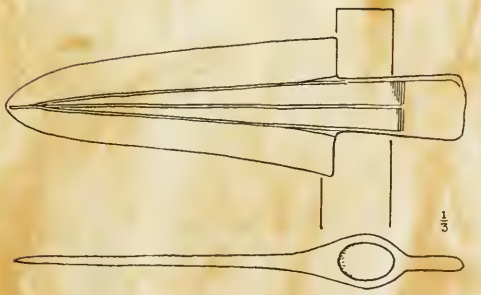

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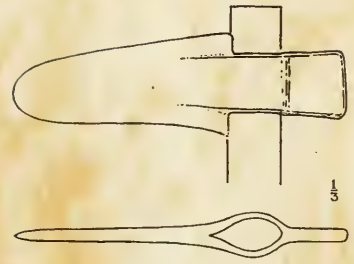

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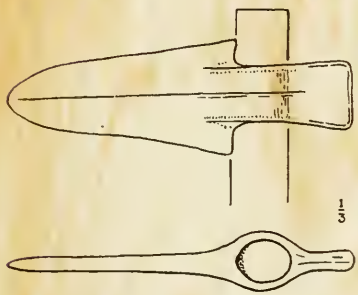

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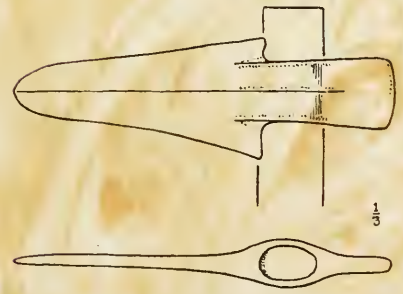

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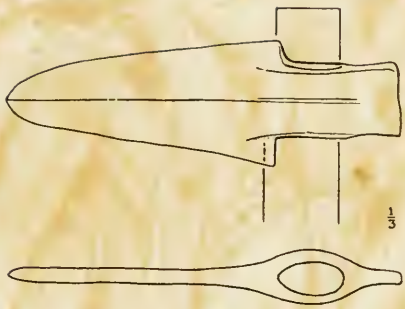
Type VII F



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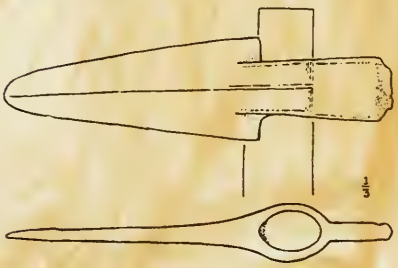

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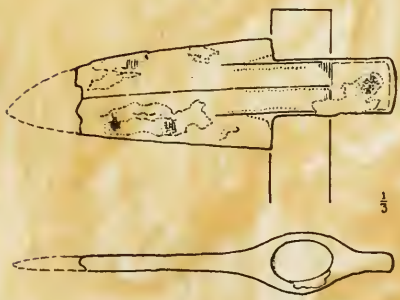

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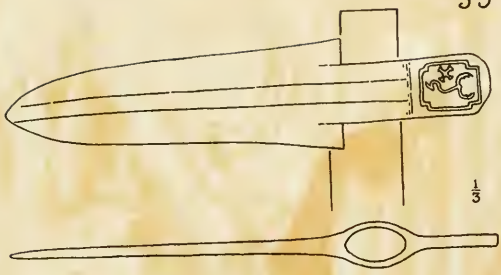

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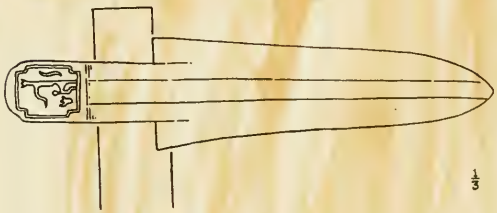

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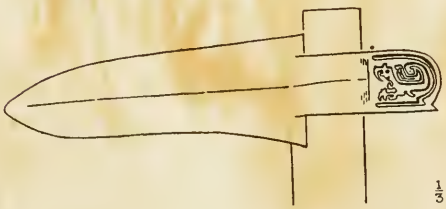

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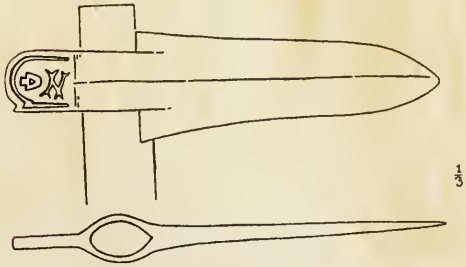

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Type VIII B

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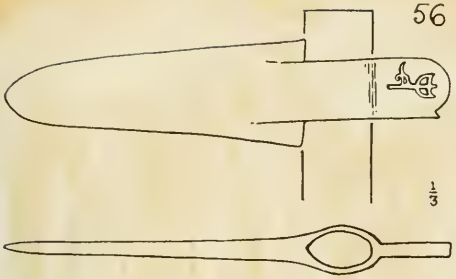

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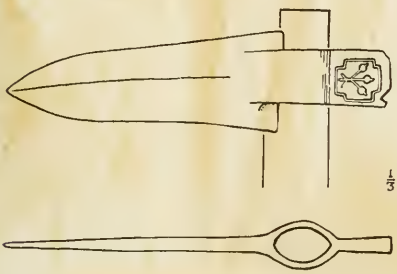
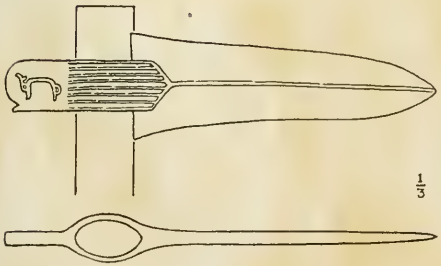


Type VIII C



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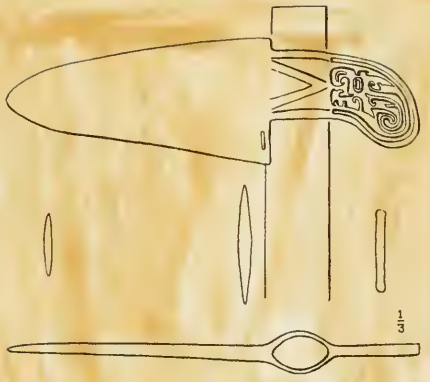
Type VIII D



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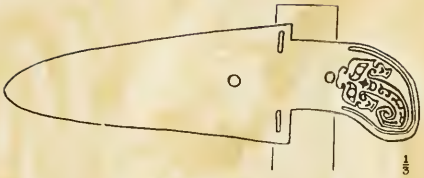
Type IX A



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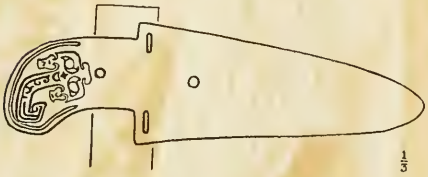

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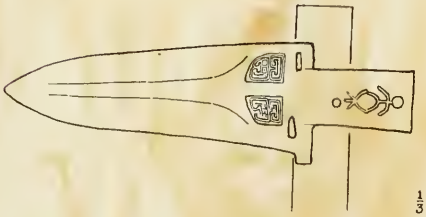
Type IX B 58



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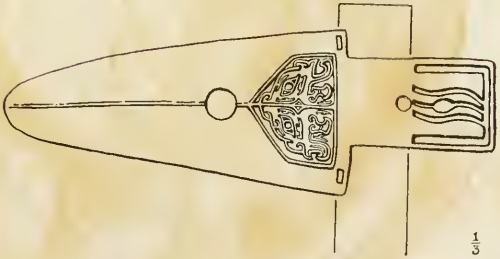

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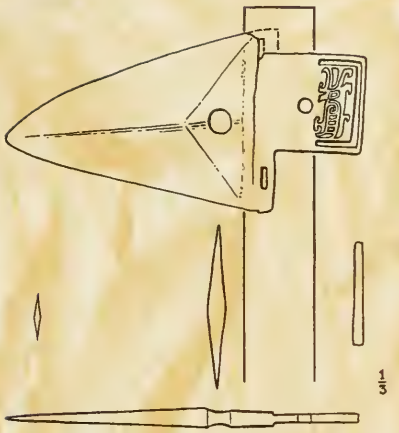

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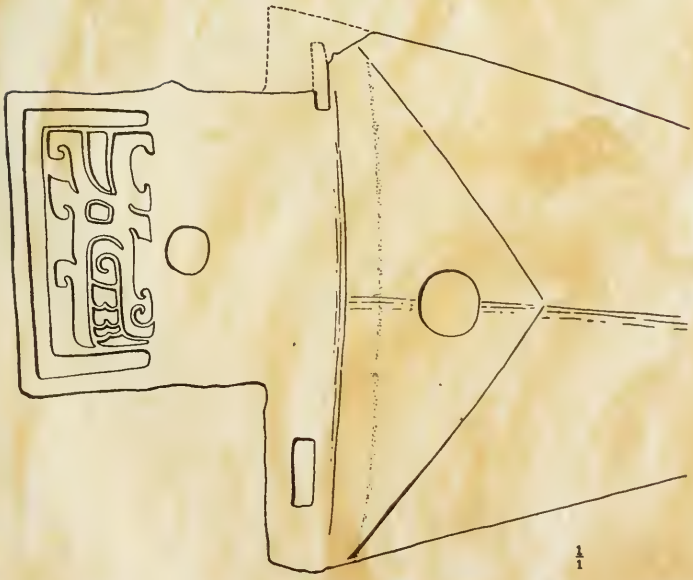

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Type IX c

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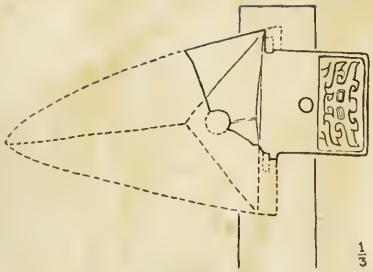

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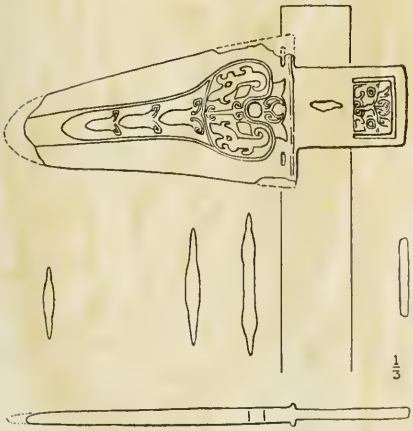

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Type IX E

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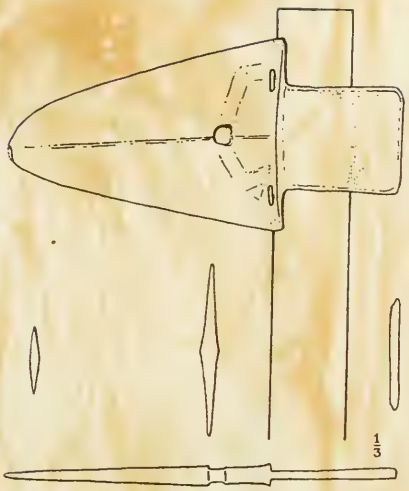

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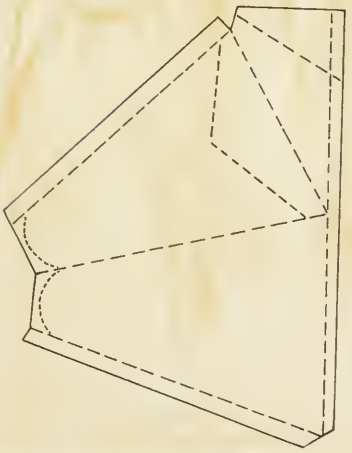

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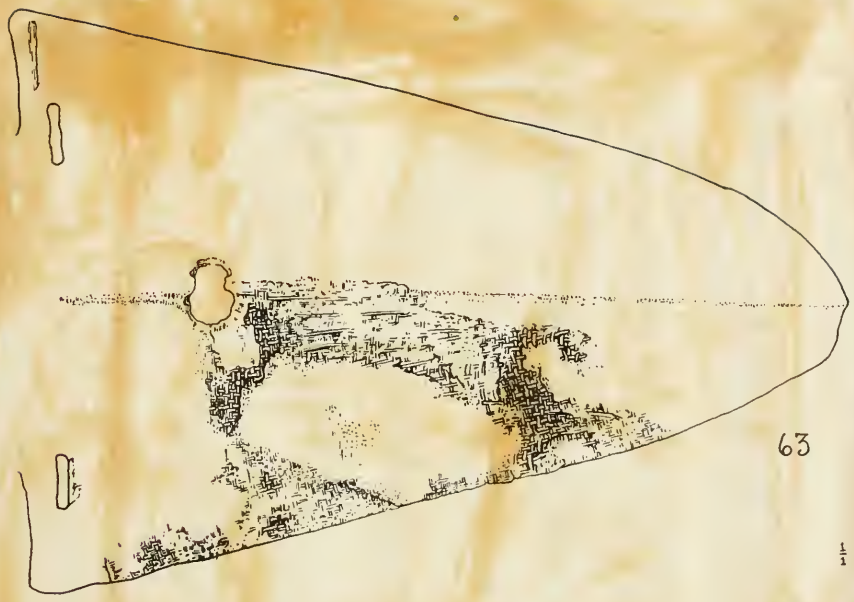

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Type IX E

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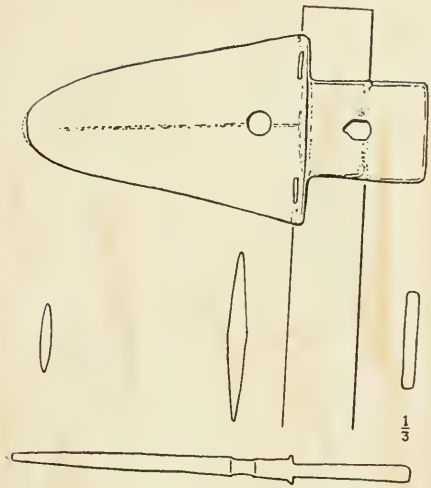

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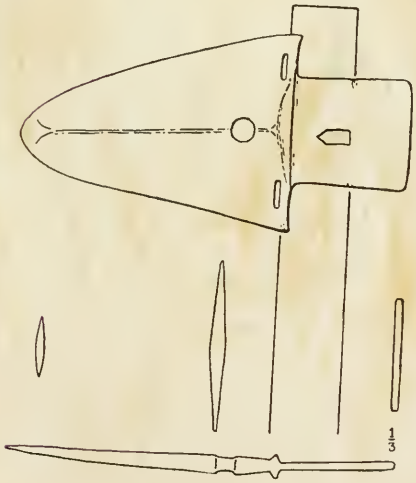

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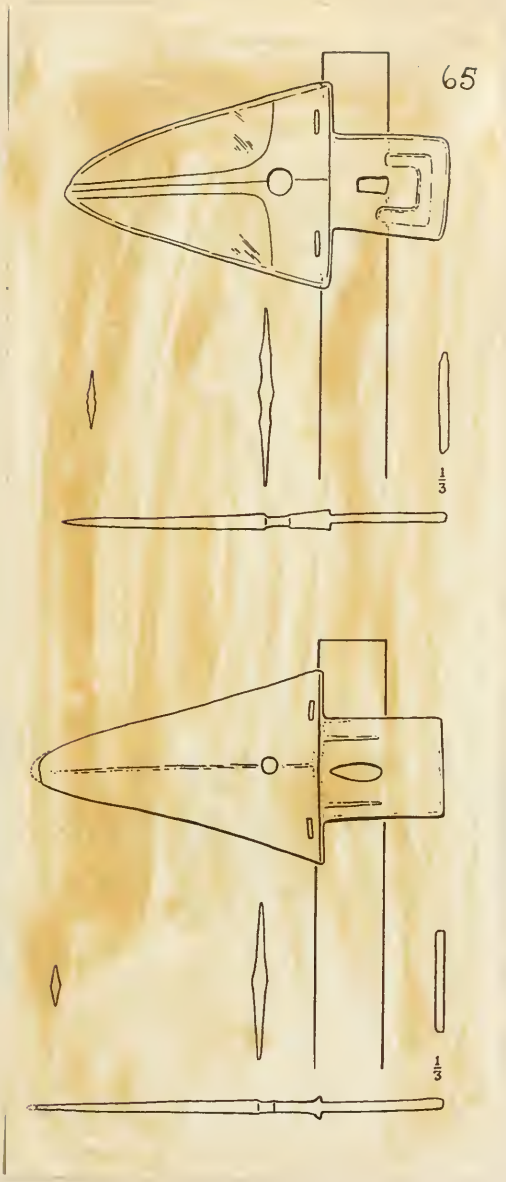

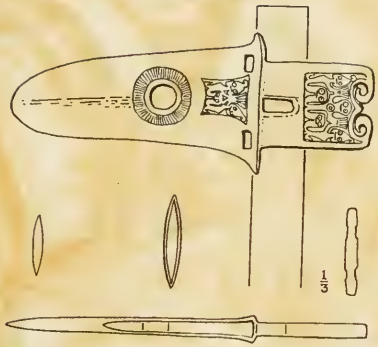

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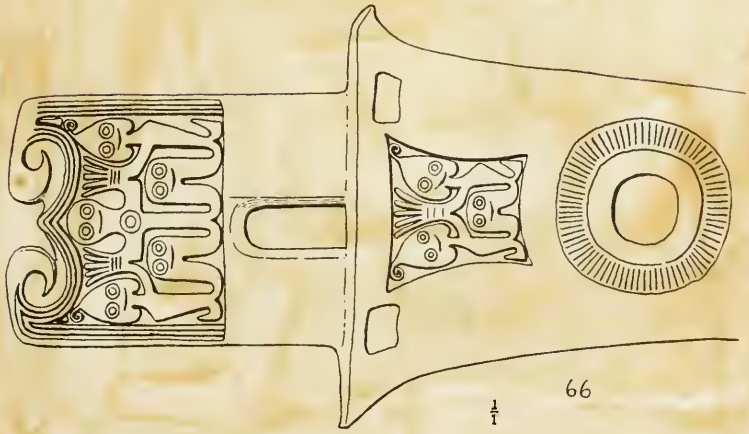

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Type X A

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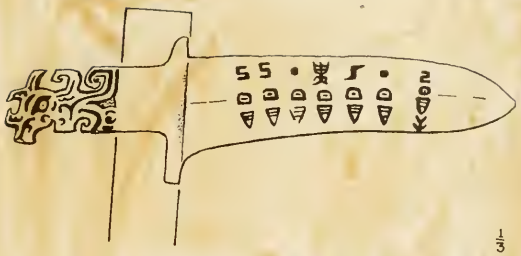

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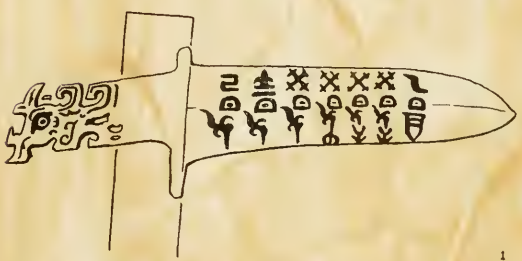

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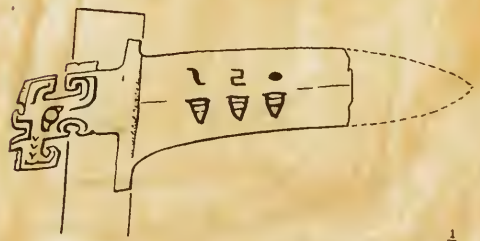

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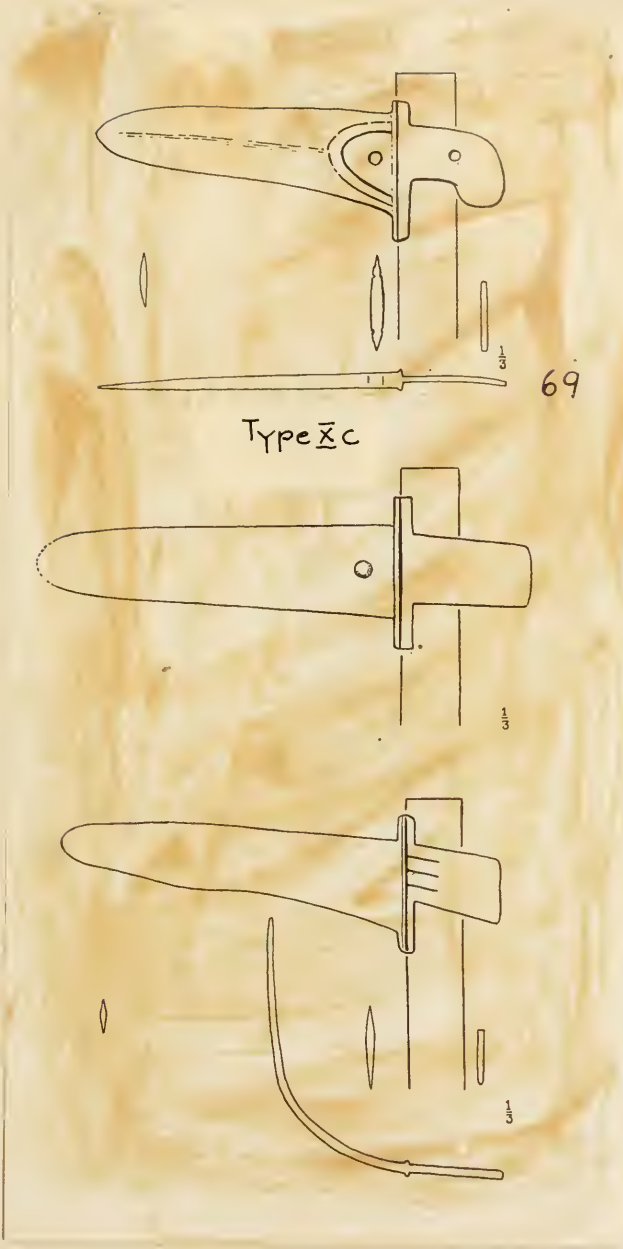

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Type X C

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Toronto, University of . PhD thesis.
(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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