

FIG. 1

Fig. 1 Map of Ban Kao, showing location of objects.

BAN KAO

by

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*Preliminary Report on the Investigations of the Thai-Danish
Prehistoric Expedition 1960-62 in the Hamlet of Ban Kao,
Kanchanaburi Province, Thailand.*¹

I. Ban Kao. The geographical position; investigations prior to the work of the Thai-Danish Expedition; the prehistoric sites, their position and surroundings.

On the one hand the hamlet of Ban Kao is like most hamlets in Thailand, with the most important part of its economy based upon agriculture. On the other hand it can, however, from a prehistoric archaeological point of view claim to be of some renown, as it is so far the only name, which has been put on the archaeological maps in spite of other sites having been known for a longer time.^{2 a)}

Ban Kao lies on the Ban Kao plain, a terrace raised about 12-15 meters above the lowest water level of the Kwae Noi River during the dry season. The Kwae Noi divides the plain into two parts, of which only the eastern part will be dealt with here. This part of the plain is from northwest towards north around to east, bounded by low limestone mountain ranges, giving the plain east of the river from Wang-Ta-Kian railway station^{2 b)} to a few kilometers northwest of the Ban Kao railway station a half-moon shape. The plain is drained by several minor tributaries to the Kwae Noi, of which the two most important in this connection are the Huai Maeng Rak and the Huai Hin (fig. 1). The surface of the plain consists of a lightbrown to redbrown fine grained deposit of probably river laid lateritic soil³⁾ of different depths, the deepest being close to the present river bed decreasing towards the railway station on the opposite side of which the firm rock begins to penetrate on the surface increasingly towards the mountains. In some places eroded remains of the mountains in the shape of "erected" stones have a superficial resemblance to "megalithic structures". In one place,

nearly midway between Wang-Ta-Kian and Ban Kao station, a river laid gravel bed was traversed and dug away for the construction of the railway track during World War II.

In this gravel bed Dr. H.R. Van Heekeren found some pebble-tools and near the present railway station he found two polished, square adzes⁴⁾. In order to try to get more evidence about the "Fingnoian",⁵⁾ Karl G. Heider went to Ban Kao in 1956 with the purpose of examining the former site⁶⁾. He failed to find the original site, but during his stay he located some other previously unknown sites bearing pebble-tools and got most valuable information from the local farmer Nai Lue Luang-Daeng concerning a neolithic site, which Nai Lue's father, Nai Bang had found several years ago. In honour of Nai Bang this site was called Bang Site⁷⁾.

When in November-December 1960 the Thai-Danish Expedition surveyed the whole river basin of the Kwae Noi from the Three Pagoda Pass on the Burmese frontier to the provincial town of Kanchanaburi all previously known sites on the Ban Kao plain were visited and some new ones discovered⁸⁾.

The total number of sites known so far from Ban Kao consists of:

A. Caves: From the two caves Tham Phra and Tham Thalu in the bordering mountains, pebble-tools are known from the talus slope of Tham Phra and as far as can be seen from Heider's map⁹⁾ also from the other cave.

B. Open-air sites. Quite a number of sites bearing evidence of a Hoabinhian tradition seem to be known. From Heider's map 5 localities can be read, but this expedition has not been able to discover any findings there for one reason or another¹⁰⁾, and it seems improbable, when comparing his map to fig. 1, that the new discoveries should correspond to his sites.

The new sites, found in November-December 1960 and in the cool season 1961-62, have a common feature in their situation, as they are lying in rather constricted areas, all but one northeast of the railway track at places where the firm rock penetrates the sur-

face. They have been given the local names (generally the name of the owner of the field) Tung Pong Sao, (fig. 2) Tung Nok Karian, Tung Nong Takong, Tung Nok Katoi, Nong Rae and Wang Wa (fig. 1).

H.R. van Heekeren's original site at point 147,1 on the railway track should probably be added to these sites.

While the open-air sites of mesolithic Hoabinhian tradition are thus generally situated on one side of the railway track, all pottery-bearing sites so far discovered are lying in the area between the railway and the Kwae Noi River. Besides Bang Site, which was reported by Heider¹¹⁾, they are Lue Site I-IV, all lying in a limited area immediately before the junction of Huai Maeng Rak and Huai Hin. Another group is located in the neighbourhood of the boat landing place in Ban Kao called Landing Site and Pottery Site¹²⁾. While the former seems to belong to the same cultural tradition-a neolithic complex-the expeditions work was confined to deal with this subject, whereas the two latter sites must await future research and excavation for their determination. What has been seen of them so far leaves the impression that they are not neolithic and if, then most probably of another tradition than the former sites.

The Bang Site and the Lue Sites, which will be main subject of this preliminary paper, are situated in a rather peculiar way. A short look at the map fig. 1 will show, that the area is drained by the two small tributaries mentioned above. Exactly where the sites are found, it is traversed by steep-sided narrow ravines, forested with dense bamboo, Yang trees etc. Many huge termite hills can be seen. The surface has a hilly look, and the ravines have separated out tiny "islands", which in the rainy season are encircled to some extent by water from the tributaries. How the landscape got this strange formation and what caused it can only be stated for sure after investigations by a quaternary geologist. An explanation might, however, be, that bamboo and termites together or alone at some places have putted the soil leaving other parts softer and accordingly easier to erode for the strong currents during rainy season. Furthermore the water level in the Kwae Noi may at different

times have been raised so much, that the level reached at least up to the beginning of the eroded area thus causing the greatest extension of water here, resulting in heavier erosions than could be found elsewhere. Levelling and characteristic features seems to support this hypothesis. What is sure, is that the major erosions have taken place before the neolithic settling in the area started, which means that erosions could not have been started by the unfortunate deforesting by farmers of the area. This evidence was extremely clear at Lue Site I and was supported from the excavations at Bang Site.

Today all Lue Sites are covered by dense bamboo forest, while the greater part of Bang Site is lying in a small plantation bordering the steep slopes towards Huai Maeng Rak. For this reason big clearings were made not only at the sites to be excavated, but a long "trench" was cut from beyond Lue II over Lue I up to Bang Site in order to serve any purpose from communication to science.

II. Excavation. The test-digging at Bang Site in 1961; the main excavations in 1961-62; method, duration and participants.

During the reconnaissance of the expedition in November-December 1960 a good and representative amount of findings were collected on the slopes towards Huai Maeng Rak. These finds had probably been washed out from some find-bearing layers at Bang Site. In order to obtain safer knowledge on this it was decided to carry out a small trial excavation here. On the 12th of January 1961 a 1 meter broad and 15 meter long trench was started at the terrace above Huai Maeng Rak, put out in a vertical direction to its course here. The trench was excavated meter by meter in layers. After a few days a burial was hit and it was decided to enlarge the excavation and as more burials appeared, to split the expedition into two teams, of which the author became leader of the continued excavations at Bang Site¹³⁾. As still more burials were uncovered, it became necessary to enlarge the trench again. The experiences from the trial excavation can be resuméd as follows: a unit find of habitation refuse of neolithic age, in between which was placed neolithic burials belonging to the same culture.



Fig. 2 Pong Sao, one of the mesolithic open-air sites in the Ban Kao plain.



Fig. 3 Excavation of Lue Site I in progress.

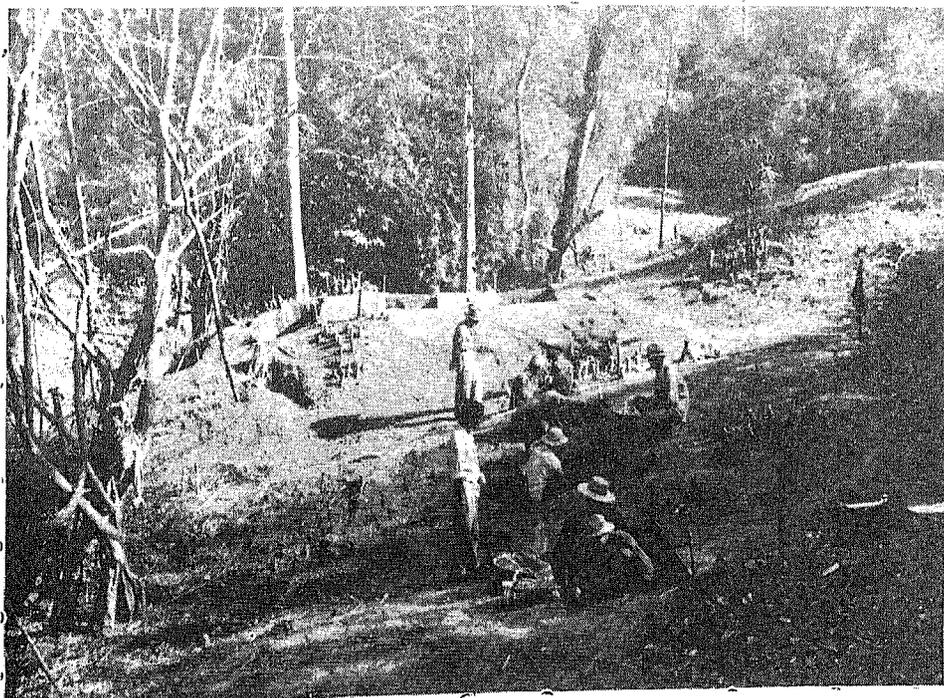
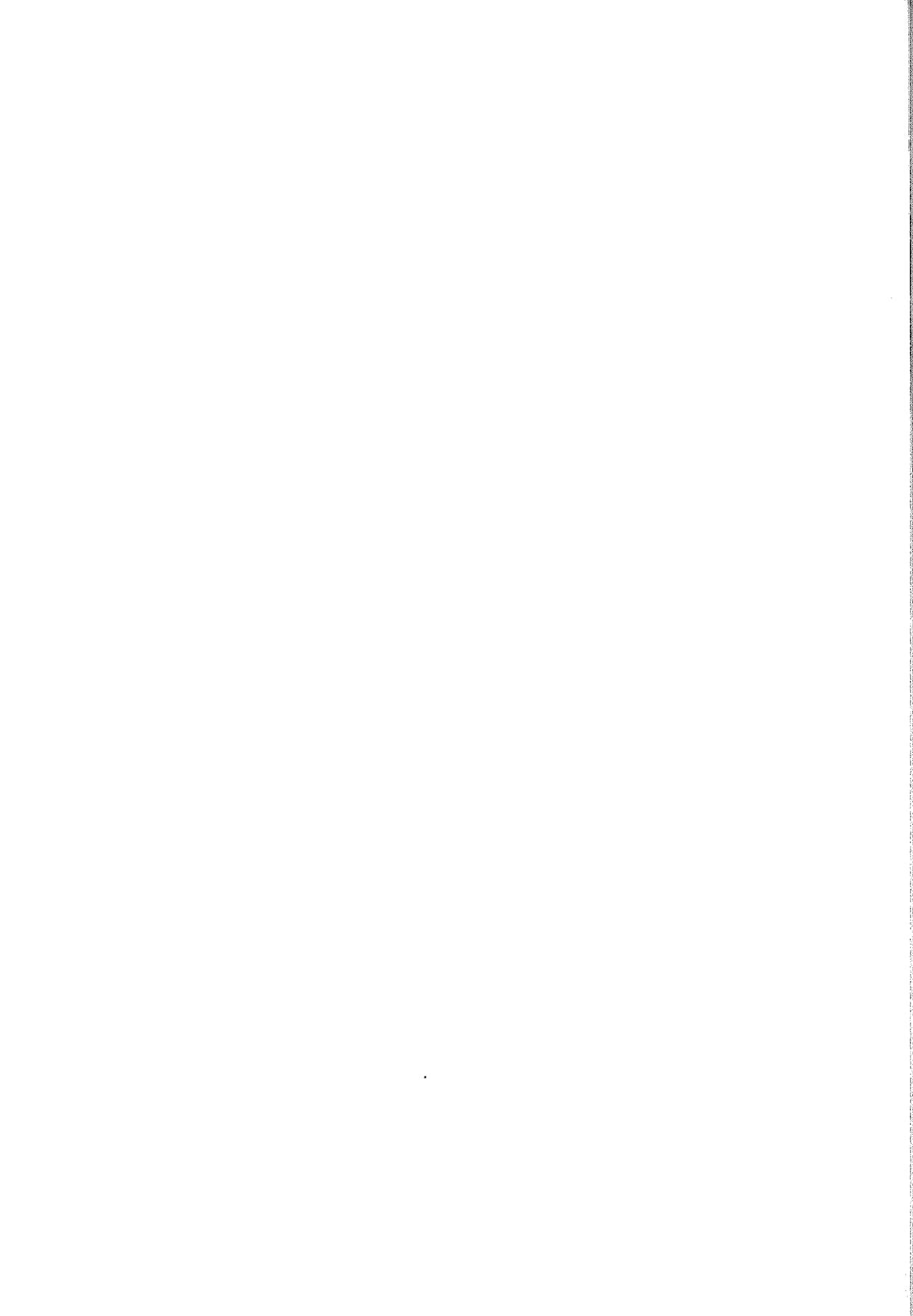


Fig. 4 Excavation of Lue Site II in progress.



On the basis of these promising results it was decided by the Committee of the Thai-Danish Expedition to continue and enlarge the excavations at Bang Site as well as carry out minor excavations at Lue Site I, to which our attention had been put by Nai Lue during the trial excavation.¹⁴⁾

Lue Site I is a small "island" in the bamboo forest. The excavation here was carried out in three trenches or sectors each three meter broad in which at first only every second meter was dug and so that if one had been excavated in the middle trench, the corresponding meter in the two other trenches would remain unexcavated. These were removed later on. The trenches were separated by half meter broad banks. Inside each trench meter finds were kept separated from every 20 cm; but no layers were removed horizontally, they were on the contrary following the surface of the unforested hill, which was thus peeled off layer by layer. Each meter was dug down to 40 cm below the lowest find except the top-hill meter in the middle trench, which was cut down to depth of 3 meters below the surface. Only about one fifth of Lue I was left unexcavated (fig. 3).

Lue Site II is situated at the slopes of a small "isthmus" close to Huai Hin. The method used here is almost the same as that applied to Lue I, except for the trenches being here only two meters wide and kept separated by two meter wide banks. Except for one place, every second cutting in the trenches was excavated, (fig. 4).

Lue III and IV situated behind Lue I and II respectively, were left unexcavated.

The Bang Site excavation was a real field excavation with a co-ordinate system inside in which the digging was carried out in squares. Each side was four meters, separated by one meter wide banks, designed in a way to best possibly absorb and include the trenches from the trial excavation, thus resulting in an amount of findings from a limited area. Here, where conditions were known beforehand, i.e. that the cultural strata was a unit from top to bottom, the digging followed the normal rules with horizontal

layers of 15 cm. thickness, after the surface had been cleared and levelled out. As big knives proved to be the best tool for excavating in this rather hard soil, most layers were excavated in two or three turns. As soon as a layer was finished it was carefully examined and the excavated findings were brought to a working shelter, where they were washed, separated into various groups, counted and, if necessary preconserved, and packed. Drawings and photos were made of anything of interest, (fig. 5).

In all these activities, which started in the beginning of November 1961 and were finished around the middle of April 1962, the following persons participated: Nai Prapat Yothapraserd, Nai Aporn na-Songkhla and Nai Pricha Kanchanakom as officials from the Fine Arts Department, Bangkok. Besides 7 students, Nai Virat, Nai Pitaya, Nai Nicom, Nai Viparg, Nai Damrong, Nai Verapong and Nai Somchai each stayed one month, except Nai Verapong, who stayed two months. Furthermore 44 second-third year students in archaeology were trained in two teams each staying a fortnight in February. From 15 to 60 local inhabitants were hired as workmen. Police officers Sanong and Suphart were responsible for our security. Professor Dr. Sood Sangvichien and some of his students should receive special mention as they voluntarily participated in the special subject of excavating and picking up the skeletons¹⁵⁾.

III. The findings. Habitation refuse, pottery, stone-bone-shell-clay and metal artifacts; the burials, orientation of the skeletons, burial gifts.

As the findings from the Luc Sites and Bang Site are closely related, they will be dealt with together. Only very limited parts of the findings have, however, so far been restored and conserved, as well as only minor parts have been reviewed after the excavation, for which reason many details must be excluded in this preliminary paper.

The habitation refuse consists of what was left from the daily life in the settlement, i.e. generally things of unorganic material and those organic pieces, which have resisted decaying, f.ex. animal

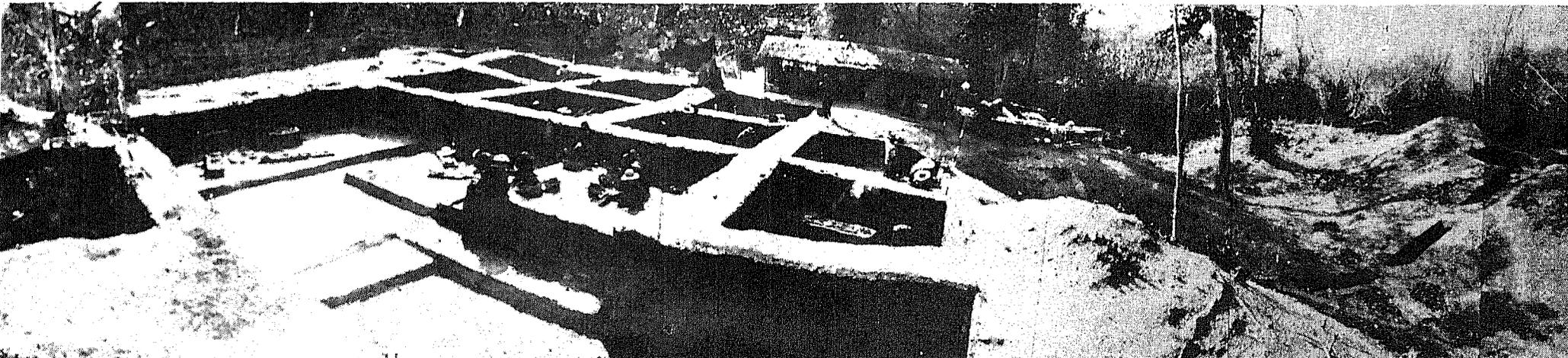


Fig. 5 Panoramic view of the Bang Site excavation.



bones, fishbones, shells of tortoise, fresh-water molluscs, stag antlers etc.

Of the total amount of findings of nearly one million pieces, the biggest single group consists of fragments of pottery, represented by nearly 700,000 pieces¹⁶⁾ being of any size from tiny to big, the latter often showing recognizable parts of the profile, thus giving an idea of the types represented. Two wares of different thickness can be separated out. The thinnest ware is by far the most numerous and as it corresponds to the pottery from the burials, and as only this so far has been restored, it will be most conveniently dealt with there. The thick ware is only represented by a few hundred sherds being around 1 cm thick and apparently from big containers. Some seem to have been decorated with horizontal applied lists¹⁷⁾. This group seems to be rather unimportant compared to the other.

Stones and implements made of stone amounted to nearly 48,000 pieces. Inside this figure fragments of and more or less complete polished stone adzes make about 1,000 pieces. This means, that together with those from the surface, the burial-ones and those from the trial excavation will about 1,200 pieces, measurable or at least determinable as to type, be on hand. It can however already be stated, that only 4 are shouldered ones, the remainder being of Heine-Gelderns "Firkantbeile"¹⁸⁾ or Roger Duffs Type 2, varieties A, C, D, F and G and type 2D, besides some varieties, which have not been elsewhere so far¹⁹⁾. A preliminary counting hints, that adzes having a lenticular section and rounded triangular shape are about as common as those of a more quadrangular/rectangular section and varying shapes, (fig. 6). To this should probably be added, 4,000 pieces of polished and unpolished stone chips, probably refuse from the manufacturing and resharpening of the polished adzes. Around one hundred fragments of stone "armrings" were found besides a limited number of broken half fabrics and plug-like discs from the refuse of the drilling out of the central hole. The only confusing point concerning the "armrings" is that it cannot be indisputably assured, whether they have at all been functioning as armrings! They are shaped like the Chinese pi (fig. 7), generally carefully made, mostly with an inner diameter too narrow to fit the wrist of a

Thai girl to-day, even if very slender. Furthermore they have not in one single case been found around the wrists of the skeletons, and in fact one was present in one burial, and in that case (fig. 8) lying at the head-end. Finally, the greater part of the fragments are often severely damaged along the outer brim. Consideration should be given as to whether these pieces are really or only partly armrings. In some cases the inner-diameter is so small, that it appears as if they were meant for putting on a bamoo-handle, as weights for digging-sticks or the like.

It has not yet been possible in all cases to distinguish between fragments of polishing and grinding stones. Anyway some two hundred pieces are represented. Quite a number of flat, more or less round but natural (unprepared) stones were collected. They may be put together with a number of clay discs, generally made from potsherds, and should perhaps be regarded as pieces for some kind of gambling. Different minor groups of stone tools have not yet been interpreted. Among these are probably tools used during fabrication of the pottery. The biggest part of the stones are, however, simple pebbles, collected, and as could be seen, in many cases used for one purpose or another.

Habitation refuse included about 85,000 pieces of bones of different kinds. While the excavation was still in progress, about 350 pieces were selected which, with some security could be classified as fragments of bone implements. Considering the amount of time, which could be spent on distinguishing different types and groups while the excavation was under way the above figures might be subject to slight changes. Furthermore many bones were heavily overgrown by some substance, which was extremely difficult to remove, except by means of rather strong acids, definitely harmful to the tools and bones.

Of the bone tools the most numerous are fragments of arrowheads and spearheads. These (fig. 9-10) are in many cases barbed and often like the plain ones, equipped with *side knobs* at the hind part of the stem, apparently meant for two purposes, partly for giving a better hafting, partly to avoid splitting the shaft (of bamoo?)



Scale 1 : 4

Fig. 6 Polished stone adzes.



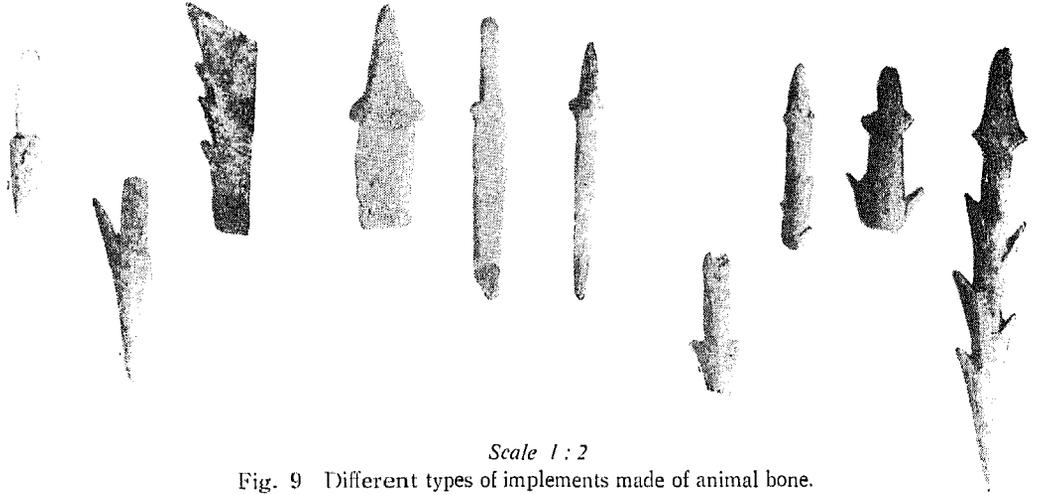
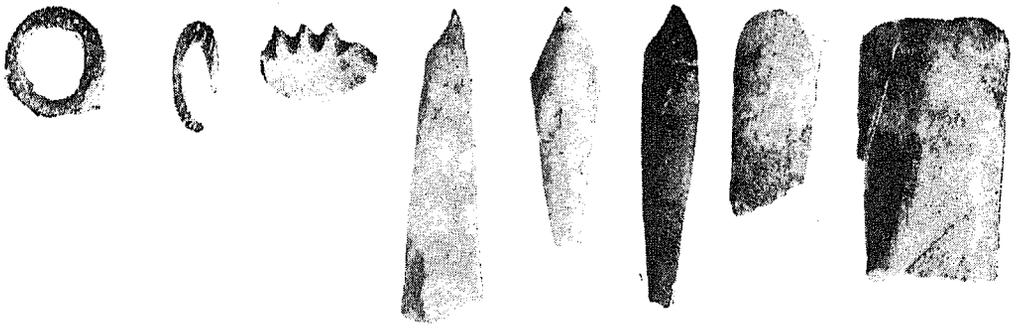
Scale 1 : 2

Fig. 7 Different types of polished stone armrings (?)





Fig. 8 Head-end of Bang Site burial, showing stone arming (?).



Scale 1 : 2

Fig. 9 Different types of implements made of animal bone.



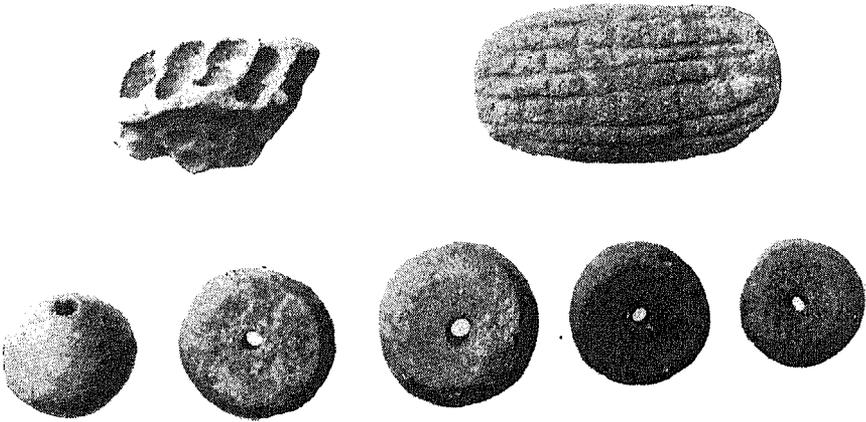
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Fig. 10 Spearheads and daggers, made of animal bone.



Scale 1 : 2

Fig. 11 Implements made of shells of bivalve freshwater molluscs.



Scale 1 : 2

Fig. 12 Top : left, bee's comb; right, bark cloth beater (?)
Bottom : spindle-wheels.

when hitting an object. Different sizes as well as divergent sections could be observed. Fishhooks of different sizes and types were found, as well as daggers made from elbow bones, rings both cylindrical and conical in shape and many other tools, some of which seem to be of unknown function.

About 8,500 fragments of shells of bivalve freshwater molluscs were counted. No efforts have so far been made to separate out those which should be classified as tools. It appears as if several different types of implements are present, but only those shown in fig. 11 are known by now.

The biggest figure except pottery, is that of burnt clay with more than 155,000 pieces, the greater part of which most certainly derives from incidental fires (or maybe slash-and-burn²⁰), but some of which indicate through curvature and decoration to be of another origin, having apparently been parts of stoves for cooking or perhaps remains of kilns for baking the pottery—or both. It is also impossible to say for sure whether a fragment of a bee's comb has come incidentally into the refuse or does it really indicate that honey was collected. (fig. 11) Of burnt clay there are further a few complete or fragmentary spindle-whorls, (fig. 12), most of which are of sexangular (double-conical) section.

To this inventory should be added a small number of iron tools—mostly weapons such as arrowheads, spearheads and celts—which were excavated in a few squares at a certain level²¹). They most certainly represent a later intrusion, deriving from some later habitation²²). Some very corroded, almost dissolved bronzes and some beads, both found in the same squares and layers as the iron tools should also be mentioned in this connection. Metal was found only at Bang Site.

The above mentioned groups, which make up the main bulk of the findings excavated, will most certainly when properly dealt with, give most interesting evidence concerning Heine-Gelders "Vierkantbeilkultur", even if they can only contribute to the daily life. Luckily we also found a representative number of burials to give an idea of not only the same culture's burial rites, but also about the

people who made the finds now excavated, their physical features and – it is hoped – relation.

No burials were uncovered at Lue Site I, but from Lue Site II two burials were removed, both having clear affinities to the Bang Site burials, of which thirtyseven were removed totally, while the presence of another eight could be ascertained, most of which were, however, left untouched for one reason or another.²³⁾ Of these, two appear to have connections with the iron implements, while the remainder most certainly should be considered as belonging to the same culture as that represented by the habitation refuse, indicated by the accompanying burial gifts, or to put in another way, it will be most difficult from an archaeological point of view to deny the unity of the main part of the remaining thirtyfive burials. How much physical anthropology can contribute to the solving of the questions raised from the burials, is still unknown, even if the work in this respect is in speedy progress²⁴⁾

The burials do only share one point in common: they are characterized by the greatest possible difference. No two burials are exactly alike. The state of preservation can thus be characterized as being anything from almost dissolved to very good, with not one bone missing. The orientation of the skeletons is as divergent as the preservation; no compass-direction can claim to be prevailing. Except for one skeleton being flexed the remainder are all extended. The head-end is divergent to the same degree as the orientation. It is in some cases raised a little or turned to one or the other side. The amount of burial gifts, mainly consisting of pottery and polished stone adzes, is from nothing at all to many, the average being two adzes and three to five vessels; besides this, but more seldom, implements of bone or shell, shells perforated for suspension as ornaments, a shield of a tortoise, shells of molluscs, necklace or bracelet of rows of beads cut of ivory? or shell? could be found. Even the accompanying vessels of pottery were not standard, as the combination of different types was divergent from one burial to the other. Generally the pottery-vessels are complete, even if crushed in the burials, but in several cases it could be proved,

that it was simply worn out old pots or uncomplete ones, which were used. No system could be observed in the way, in which the pottery was placed in the burial; but generally one small group was placed at the head-end another in the foot end or between the legs, but still without any clear system²⁵).

In spite of all this lack of regularity it was astonishing to observe, in how few cases burials overlapped each other (only two times), but even then they did not disturb each other. This may indicate that some kind of surface markings of the burials had been present; in some cases complete vessels were found above the burials at a higher level. Are they incidentally placed or do they represent grave offerings? Anyway, it was definitely impossible to find anything indicating the presence of burials in the levels above. Suddenly they appeared. In other cases complete vessels were found and a burial accordingly expected, but there were none.

Among the skeletons both sexes and all ages seem to be represented. It is, however, astonishing to observe the rather low death-age, further there seems to be some dental peculiarities, but otherwise no great differences in the physical features from present population have been observed so far, but of course these might develop when the entire material will be reviewed in detail.

Although by far not all the burial pottery has been restored yet it is rather evident that the most common types are at hand, and these may at the same time serve as illustration for the household wares from the habitation layer.

The pottery can be roughly divided into three distinct groups: A. a ware of greyish to bluish-black colour, B. a red ware and C. a ware of yellowish or grey-brown colour. These three wares generally have their own types. The fabric in all of them is characterized by medium to extreme thinness,²⁶ they are hardbaked and of fine or slightly grit tempered clay. In a few cases a thin outer slip has been added, but the surface is well burnished both outside and inside, the outside mostly left undecorated at the upper half of the vessel, the lower half being roughened by coarse cross-hatching, cord, mat or basketry impressions. The vessels are of very elegant

and sophisticated shape, although it must be emphasized, that many of them are somewhat irregular; this can in many cases be ascertained to have been caused by secondary fires or heating when used.

So far the following types have been compiled in group A: Dishes, (fig. 13), characterized by a rounded lower part or bottom, separated from the upper part (the neck and rim) by a marked carination. The upper part is much varied in shape and offers many possibilities for subdivisions of the group, the main points of which are rounded or transverse cut rim, cylindrical, conical or convex neck being high or low, generally plain burnished only in few cases decorated with finely incised oblique lines. Some dishes have an incised horizontal line above or below the carination.

Bowls, (fig. 14), characterized by a rounded lower part (bottom), separated from the upper part of the body by a pronounced carination or a marked shoulder, a convex or concave neck and out-turned rounded rim, the latter eventually placed upon a short collar.

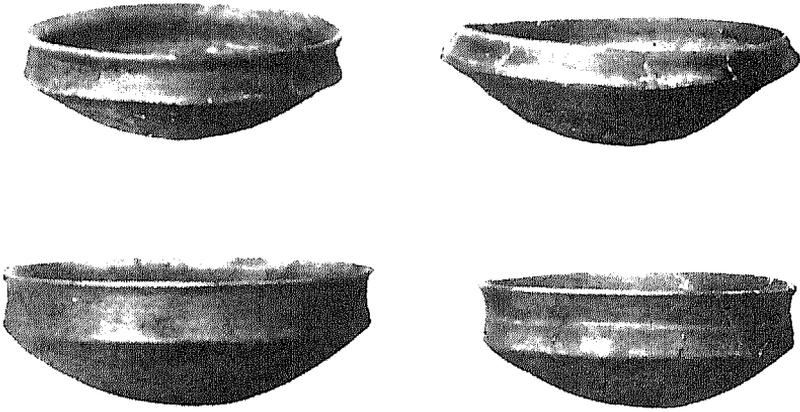
Jars, (fig. 15), with rather narrow opening, out-turned rounded or transverse cut rim, cylindrical neck, which in few cases is separated from the double conical bulging body by a thin applied list on incised line. The jar looks round-bottomed but is in some cases having a convex impressment²⁷⁾.

Container, (fig. 16), simple with S-profile.

Pedestalled bowls, (fig. 17), very divergent but extremely elegant pieces hourglass shaped (pedestalled) "fruit stands", (fig. 18), which in one case can be definitely proved to have served as support for a round-bottomed vessel of red ware of type like fig. 27

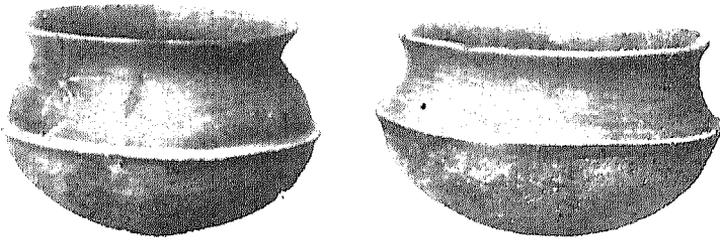
Different small vessels of divergent shapes both pedestalled plates, straight-sided or conical cups and double conical-shouldered ones (fig. 19).

The black ware is burnished and polished highly, in many cases giving the surface a glossy look. Crosshatching is rarely applied, cord matmarking being most commonly used, mainly at the lower part. They are all very thin, several being 2,5 to 4 mm thick.



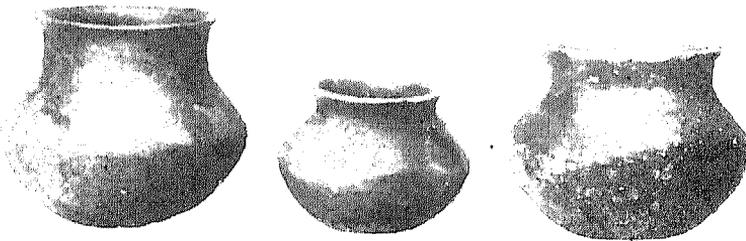
Scale (top 1:4, pot 1:5)

Fig. 13 Black ware, dishes.



Scale 2:9

Fig. 14 Black ware, bowls.



Scale 2:11

Fig. 15 Black ware, jars.



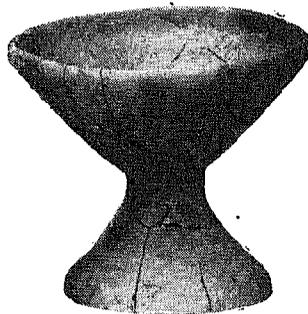
Scale 1 : 5

Fig. 16 Black ware, container.



Scale 1 : 5

Fig. 17 Black ware, pedestalled bowl.



Scale 1 : 5

Fig. 18 Black ware, "fruit stand".

Big Jars, (fig. 26) with rounded rim, funnel-necked, double conical body and rounded bottom. Densely decorated with impressed twisted cord. It is still uncertain, whether this is a specific type, or should be put in the same group as the big funnel necked jars with double conical bulging body on a permanent, medium sized straight sided ringfoot (fig. 27). These big pieces are fundamentally the same as the former, the difference mainly being their size and applied ringfoot. They are plain, burnished except in the lowest part of the body, where the ringfoot is attached.

While all the so-far mentioned types in group C have been mostly of the greyish-brown variety, almost all the vessels of the small types are of the yellowish variant, for which reason it may be more convenient to separate them out as a specific group, called D. It is, however, still too early and the material too limited for such a strict division. Several types can perhaps later on be proved to exist in the group, some of which are extremely interesting. Here, only fig. 28 is shown in order to give an impression of the delicacy of the shapes.

A specific note should be contributed to the hollow-legged vessels (fig 29) although only four such ones have been restored. More are known from the burials, and these together with the ones already reconstructed confirm, that hollow-legs have been applied to vessels mainly of group C colours, to shapes characterized by precisely executed vessels of great angularity. The body generally meets the neck in a carination; the neck as well as the collar have been given different forms; the hollow-legs, which are provided with holes at the upper and lower end for the expelling of air during firing, are either circular or oval in cross-section and with pointed or butt ends. They are, like the ringfoots, secondarily attached to the body, which for this purpose is roughened by means of decorating the lower part of the body. In this connection it is worth-while to raise the question whether all decorations on these roundbottomed wares, are simply meant as a way to make them less smooth thus reducing the risk of their slipping out of the hands when carried?

The red ware seems so far to be less differentiated in shape than the black wares, but generally of the same thin, elegant and sophisticated manufacturing. Crosshatching and criss-cross cord paddle carving is commonly used as the decorative element. The following types have by now been recognized :

Pedestalled stemmed dishes, (fig. 20), almost similarly shaped foot and dish, except for the former being only smoothed at the inner-surface. The stem is hollow, but the upper dish is " closed ". This type is so thin, that it cannot possibly have acted as support. A support of almost similar shape is known. This has an " open " upper plate. Undecorated.

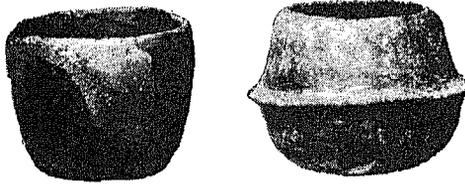
Bowls, (fig. 21), with rather wide opening, rounded overhanging rim and either cylindrical neck, bulging body and rounded bottom or conical convex-sided rather high neck, marked carination and rounded lower part and bottom. Several sizes of both variations are present. A variant of these two types has a broad overhanging collar and a low ringfoot, (fig. 22).

Small vessels of different types seem to be less common among the red wares; fig. 23 is flat-bottomed and ring-footed.

Group C is in fact the most doubtful, partly because some of the grey-spotted darkbrown wares may only represent unsuccessful black or red wares, partly because the types are less clear and homogenous than those from group A and B. Four distinguished main groups have however, so far been separated :

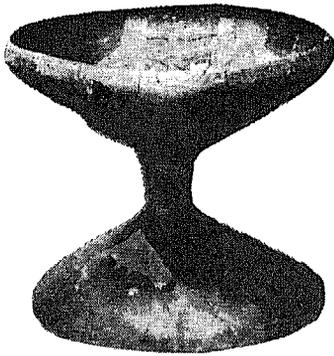
Containers, (fig. 24), two main types with several subtypes are at hand, the first characterized by a rather soft S-profile with an almost horizontal slightly overhanging rounded rim, and somewhat cylindrical body; the second has a short straight neck and rounded rim, very bulging body and rounded or nearly pointed bottom. These types are generally decorated by impressions of coarse twisted cord in vertical or oblique lines.

Beakers, (fig. 25), having rounded rim, concave collar, cylindrical convex-sided neck meeting the rounded lower part of the body in a very sharp carination. Also these types are decorated with vertical impressions of twisted cord of coarse and finer graduations.



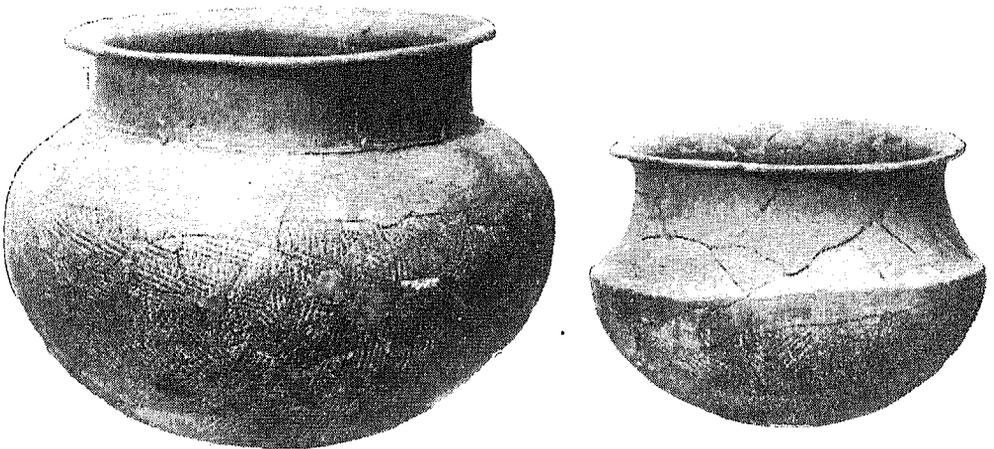
Scale 1:4

Fig. 19 Black ware, small types.



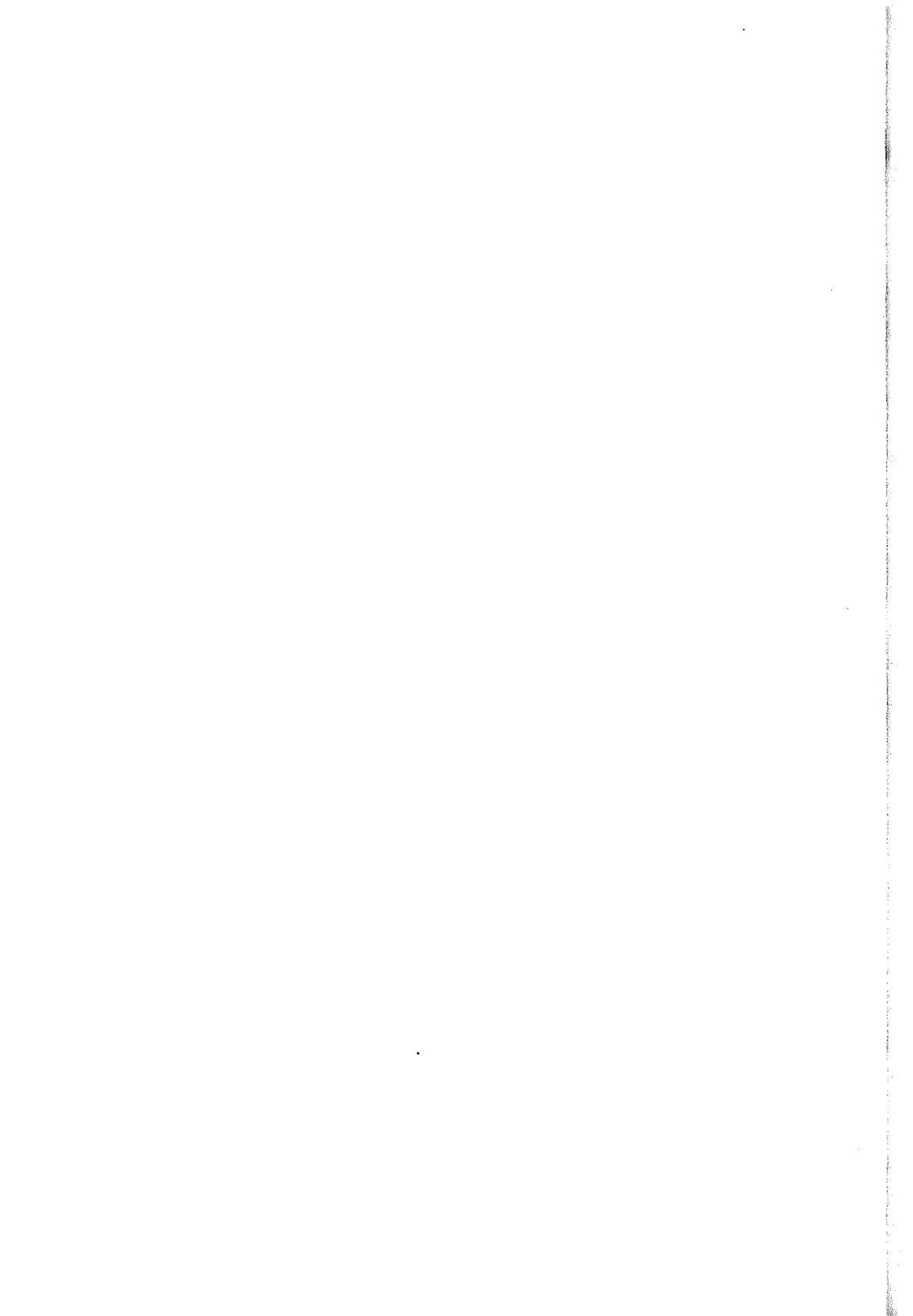
Scale 1:7

Fig. 20 Red ware, stemmed dish.



Scale 1:4

Fig. 21 Red ware, bowls.





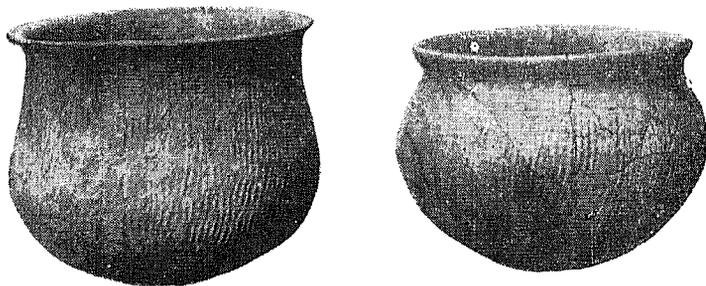
Scale 1 : 5

Fig. 22 Red ware, ringfooted bowl with overhanging rim.



Scale 1 : 4

Fig. 23 Red ware, small type.



Scale 1 : 5

Fig. 24 Brown ware, container.



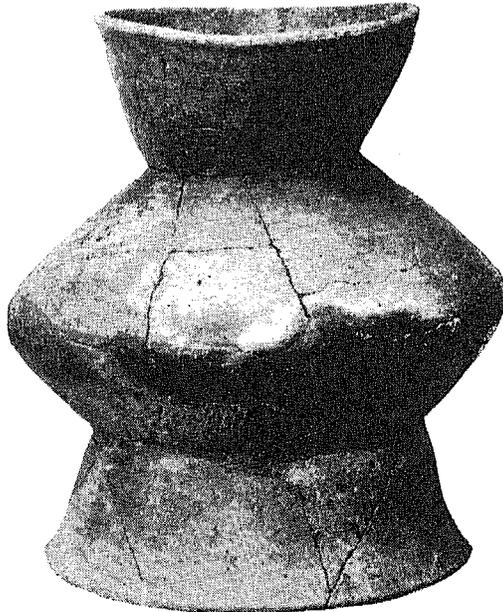
Scale 1 : 4

Fig. 25 Brown ware, beaker.



Scale 1 : 5

Fig. 26 Brown ware, big jar.



Scale 1 : 4

Fig. 27 Brown ware, big ringfooted jar.



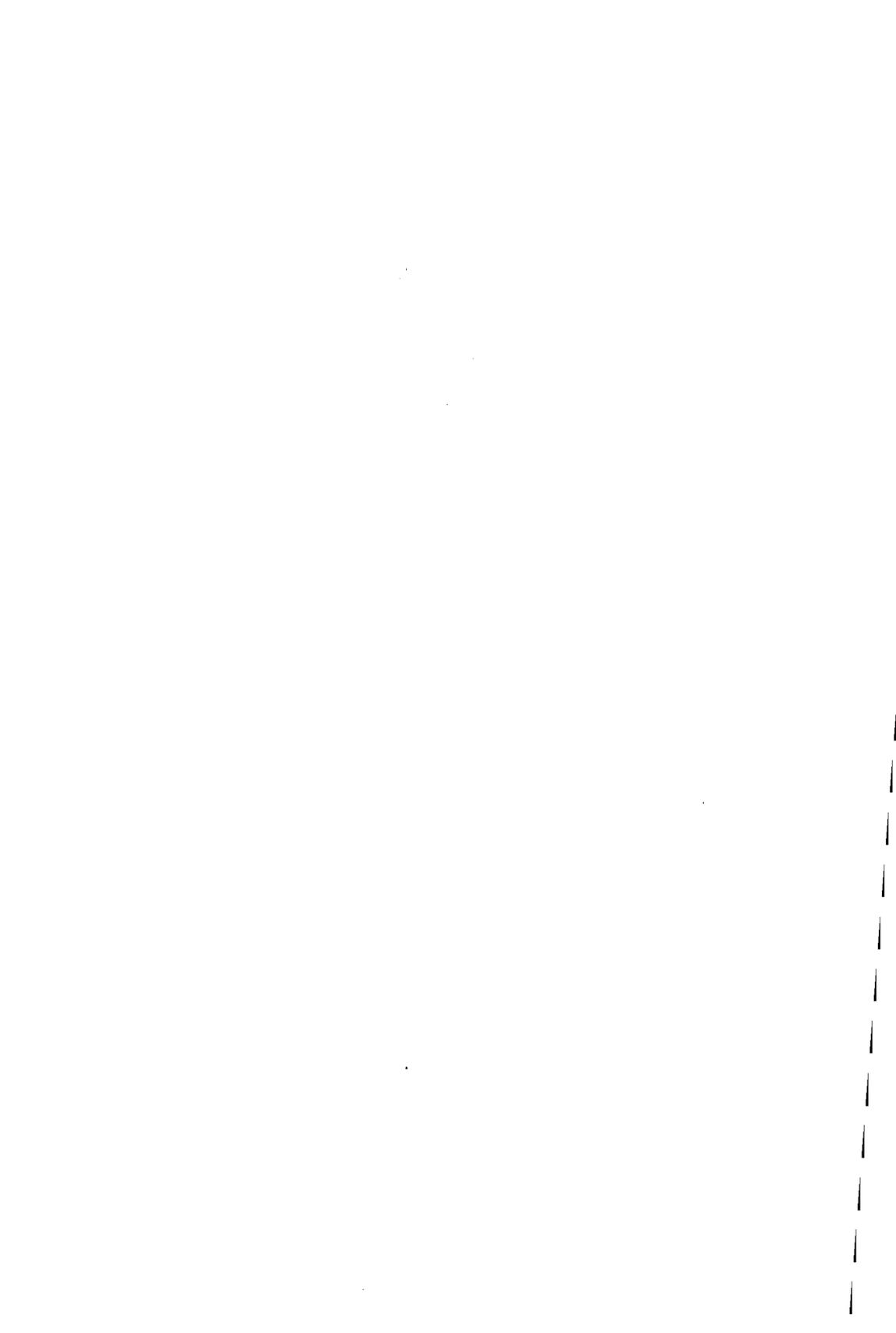
Scale 1 : 4

Fig. 28 Brown ware, small type.



Scale 1 : 5

Fig. 29 Hollow-legged tripod, brown ware.



The other burial gifts are hardly worth mentioning as they, as mentioned above, mostly consist of polished stone adzes. Only in very few cases were found implements of shell or animal bone. The adzes are generally placed in the head-end of the burial, and in several cases the adze was placed below the skull, fitting so tight to it, that it is extremely difficult to remove. Of more extraordinary burial gifts should be mentioned a necklace of tiny beads cut of shell from freshwater molluscs.

IV. Evidences from the excavations; foreign connections; dating.

It is obvious that the excavations in Ban Kao have greatly enlarged the knowledge about the neolithic period not only in Thailand, but in all Southeast Asia. Only very few and weak results are available at the present stage of publishing, the major aim of which is to give a preliminary impression of the material. Many questions concerning the neolithic period will of course be unanswered from this initial study, but it is hoped, that some important features can be illuminated, i.e. whether the community based its economy on agriculture with some kind of corn - or rice growing, whether they raised cattle, or the animal bones found only represent the remains of hunted species. It is evident, however, that the inhabitants did supply their dairy with gathering of freshwater molluscs, that they did fish and hunt, and probably also collected wild honey. It is further hoped, that the studies carried out by the physical anthropologists will elucidate—at least to some extent—the racial origin of neolithic man, and that the results will be proven, regardless of the pottery study—.

It should be clear already, from the above mentioned details on the excavated findings, that the material has two origins; one group has the character of refuse from a permanent habitation at the sites; the other group derives from burials found pell-mell among the former group. No great differences can, however, be found when analysing the two groups. They are clearly related and represent one and the same culture. Nothing was observed or has been found to prove a theory that the whole material should derive from a burial place only, the so-called habitation refuse being the

only remains from offerings or burial feasts. The evidences from typical household wares and of unfinished pieces or half-fabrics, of all kind of daily life refuse seems to be a too strong argument against this.

As mentioned above, it is clear that the community to some extent based its economy on hunting and fishing and perhaps gathering. It should, however, be emphasized that the prominent figure of around 160.000 pieces of burnt clay do not by far all derive from charcoal stoves, kilns for baking pottery etc, but that the greater part might originate either from incidental fires or the result of slashing and burning. In this case it could be used as indicator of some kind of primitive agriculture, the final proof of which it is hoped will come from the analyzing of soil samples both from the interior of the pottery, from the habitation layers and from the surroundings. Whether this will be possible cannot be told at this time.

The foreign connections of the complex seem to be of the greatest interest. For this purpose the pottery gives the best possibilities, as the quadrangular adzes, which are the most common at these sites are extremely widespread types used all over South and East Asia and the bone implements always to some extent are determined by the locally hunted fauna, although they do give some hints and are able to prove the connections given by the pottery. The same could be said about the shell implements.

The pottery has its force in its—nearly always—locally fabrication, its great fragility and tradition in shapes and decoration. From this point of view it is clear that the nearest possibilities for comparisons are found in northern Malaya, first and foremost in the material excavated by de Sieveking in the Gua Cha rockshelter in Kelantan²⁸). There is, however, no reason for believing, that the origin of the Ban Kao potteries should be found here. It will therefore be necessary either to think upon a common culture in mainland Southeast Asia or to think in terms of migration from some point outside this area.

The first hypothesis should of course have a great priority but is hard to follow, as long as so little only has been done inside

the field of prehistoric archaeology in Southeast Asia. It is however evident, that the Ban Kao/Gua Cha complexes have nothing in common with the stam-decorated potteries found further to the East or in South China. It is of course possible to find parallels in some of the simpler wares and decoration at other places in Southeast Asia, but for the more elaborate shapes it has so far proved completely unsuccessful. At the present time the second hypothesis, dealing with migration seems to be of greater relevance. The key word in this connection should be Lungshan culture, to which an astonishing amount of parallels can be pointed out²⁹). It is impossible here to point out all details of resemblance, but a few main points are,

- 1) The same way of burying the dead extended in the midst of the settlement,
- 2) Great similarities in the lithic industry,
- 3) At both places a flourishing bone industry with many corresponding types,
- 4) A distinctive industry of implements made from shells of bivalve fresh-water molluscs with an extremely big amount of common types,
- 5) An astonishing amount of parallels in pottery shapes and ornamentation, the same mixture of three different wares with the black ware as dominant feature,
- 6) And in case of agriculture in Ban Kao can be proven to have existed, this—and the further supply with hunting, fishing and gathering—will be another point of similarity.

Against this could be argued, that when it is difficult to find parallelities in other places in mainland Southeast Asia, how then trace Lungshan from its southernmost point in China, which is Szechwan and Chekiang provinces, down to Ban Kao and Western Thailand, at all? How to fill the intermediate gap? This is truly difficult, but need not be an invincible obstacle, as a migration not necessarily needs to have passed over land, but as well could have been a maritime affair! And a few, but important findings from Ban Kao might turn out—after closer examination—to prove, that the

population who settled here have had at least some kinds of connection with the sea. The final proof for this should be found among some shells, which have been perforated for suspension, and which generally are accepted as being sea shells rather than fresh-water species.

Thinking in terms of a maritime migration, this can have been a rather speedy one; the many and extremely close connections between Lungshan culture and the Ban Kao findings are in favour of this. As furthermore the similarities to Lungshan culture are stronger to the middle phase of this, as represented at the main settlement at Ch'eng-Tzū-Yai³⁰) than to the early or late phases, this might be used for dating purposes, as long as no Carbon 14 datings are available,³¹). According to Chêng Tê-Kín³²) the Lungshan culture should have come to an end at the Central Plain in China around 1500 B.C. It will therefore be reasonable to believe, that—because of the close parallels—the settling in Western Thailand had started before this date, but it is impossible so far to tell how much before this time. A much more difficult question to answer is the one, asking for the end of the settlement. It is however, most uncertain, that the few iron implements found at Bang Site should indicate, that settling lasted well into the Iron Age. In that case it is too easy to ask, why then no Bronze Age remains have been found also? It seems to be more reasonable to take the iron tools as representatives of a minor settling at the same place during later times. If this is true, there should be good reasons for believing, that the neolithic settlement had ceased before the Iron Age started. This is also more in touch with the potteries, as one burial contained an iron socketed axe and another was found immediately below one of the burials. In both cases the accompanying burial pottery is both much more limited in number, and of quite other fabrics and shapes. No striking similarities could be pointed out between these and the neolithic wares. These two burials and maybe one more, which apparently are of iron dating, do all have the same orientation, which is strictly north-south, the head-end being to the north.

If further studies of the whole material should prove the above suggestions, it means that the neolithic period should have

lasted from around or shortly before 1500 B.C. to before the Bronze/ Iron Age, which is supposed to have started around 500 B.C. This again gives an estimated total of around 1,000 years for the period. During this time at least some development inside the pottery complex should probably be observable. No such changes have so far been found at the Lue Site / Bang Site potteries, and a preliminary study does not offer any possibilities for this. Some slight differences can, however, be found when making a detailed comparison to the parallel findings from Northern Malaya. Accordingly future studies of the neolithic period ought to concentrate on Peninsular and Northern Thailand, in order to find respectively developments along the southern connections, and eventual earlier stages in the North, giving an idea of a possible overland migration route. This is so much the more necessary, as knowledge on the prehistory of Western Thailand for the time present seems to be reasonably great, as long as the greater part of Thailand is still unsurveyed for remains from the prehistoric periods.

References :

- 1) Preliminary reports have been published by the expedition leader, Dr. Eigil Nielsen in J.S.S. Vol. 49; 1, 1961, p. 47-55 and in vol. 50: 1, 1962, p. 7-14, by Dr. H.R. van Heekeren in vol. 49: 2, 1961, p. 99-108 and vol. 50: 1, 1962, p.15-18, and in Mededelingen van het Rijksmuseum voor Volkenkunde, Leyden, no. 15, 1962, p. 42-49, by Eigil Knuth, J.S.S. vol. 50: 1, 1962, p. 19-21, by this author in Folk, vol. 4, 1962 p. 28-45, and by Eigil Neilsen, *ibid.* p. 21-27.
- 2a.) Grosser Historischer Weltatlas, Bayerische Schulbuchverlag, 1954, has for Thailand only the site Ban Kao. Sarasins findings (l'Anthropologie 42; 1933) are not mentioned.
- 2b.) (See below)
- 3) Mechanical analysis of collected soil samples will probably give an answer to the question on the origin of the soil from the Ban Kao plain: whether it is a riverine or wind transported deposit or is due to local erosion of the moun-

ref. 2b) Coming from Kanchanaburi, the last station before Ban Kao will be Wang-Ta-Kian.

tains. The former theory seems most reasonable.

- 4) Proceedings of the Prehistoric Society of East Anglia, N.S. 14, 1948, p. 26 and p. 27, fig. 3, 7.
- 5) Proc. Prehist. Soc. 1948, p. 26 f.f.
- 6) Heider, J.S.S. vol. 45: 1, 1957, p. 61 and Asian Perspectives II, 2, 1958, p. 63.
- 7) In Folk, vol. 4, 1962, p. 36, is incorrectly mentioned, that the name of Bang Site already was in use during WW. II, whereas p. 44, ref. 29 has the correct origin of the name.
- 8) See Nielsen, J.S.S. 49:1, p. 48-51, van Heekeren, J.S.S. 49: 2, p. 101 and Folk, 4, p. 30-36.
- 9) Heider, Asian Perspectives II, 2, 1958, p. 65.
- 10) A possible explanation might be that everything was collected by Heider. During the first campaign of this expedition a surface collection was made from a site called Chande A. During the second campaign a team, working in the two Chande caves further inland every day passed and surveyed site A, but never succeeded in finding other pieces.
- 11) Heider, J.S.S. 45:1, 1957, p. 65.
- 12) The find shown in Folk, 4, p. 37 fig. 10, which was already doubted as being a unit find, later on proved not to be so, as the shoulder adze was found many years ago rather close to the camp put up by this expedition (fig. 1), while the vessels have been found at "Pottery site".
- 13) See J.S.S. 49:1, p. 53.
- 14) My best thank to the Committee for the Thai-Danish Prehistoric Expedition for the allowance to continue and enlarge the excavations in Ban Kao during the 1961-62 campaign.
- 15) My best thanks to everybody in Thailand, who in one way or the other contributed to the success of the excavations,

the workmen, without whom the results would never have amounted to the surprisingly high figures and who carefully excavated the findings under the burning sun, the police officers, who besides their primary task of protecting us rendered many facilities and helped tremendously, the students, the officials from the Fine Arts Department of whom Nai Arphorn and Nai Prapat should be specially mentioned, and last but not least professor, Dr. Sood Sangvichien, whose never failing friendship and enormously great and voluntary work cannot be overestimated, and finally to everybody else, who made our stay in Ban Kao completely unforgettable.

- 16) Even if more precise figures for the amounts of findings can be given they are without greater interest, as long as the whole material has not been finally studied.
- 17) Like Journ. Malayan Branch Royal Asiatic Soc. Vol. XVIII: 2, 1940, pl. VIII, 3.
- 18) R. Heine-Geldern, *Urheimat und früheste Wanderungen der Austronesier*, *Anthropos* XXVIII, 1932, p. 543-619. On "Vierkantbeilkultur" p. 573. ff.
- 19) Roger Duffs study of the square adzes has not yet been published. A preliminary paper on this was presented to the 10th Pac. Science Congress, Honolulu 1961.
- 20) The so-called baked clay walls, which Heider observed at Bang Site (J.S.S. 45: 1, p. 65) have definitely nothing to do with the settlement, but originate from incidental fires. Experiments proved this. A cut down tree put on fire will leave the surface red-burned, looking baked.
- 21) These iron tools, which first arrived here a short time ago, come according to the labelling from a certain level inside a limited area of the excavation. Except for one tool, found in a burial, the existence of the other were unknown to me, while the excavation was in progress. It is hoped, that the "clean" findings from the Lue Sites can contribute to solve problems concerning this mixing up of the remains from

two different periods, a problem which might have been solved in the field

- 22) The possibility of course exists that the iron tools do indicate the extension of the settling, but too many factors seems not to be in favour of this solution.
- 23) Some burials were found so lately that time did not allow excavation of them. Others were situated in such a way, that excavation of them would be unremunerative compared to efforts spent on them. Two were found in so-called test holes, put out after coordinates to the excavation in all directions in order to find the extension of the settlement, which can simply be characterized as huge.
- 24) Dr. Sood Sangvichien has continued work in Copenhagen for three months on the skeletons, which he himself excavated, in order to help solve the most interesting questions concerning the origin of the settlers at Bang Site. Dr. Sood is a leading authority and should have the best possible background for the physical comparisons to present day Thais.
- 25) It has not been possible here to deal with all differences observed on the burials, as this cannot be done before all the burial pottery has been restored and physical anthropological examination been brought to an end.
- 26) As "thin" pottery is understood thicknesses less than 4.5 mm., as "medium" thicknesses from 4.5-6.5 mm., thick is above 6.5 mm..
- 27) Like Asian Perspectives III, 2, p. 133, fig. 5a.
- 28) G. de G. Sieveking, Excavations at Gua Cha, Kelantan 1954, Federation Museums Journ. Kuala Lumpur 1954-55, p. 75-138; B.A.V. Peacock, A short description of Malayan Prehistoric Pottery, Asian Perspectives III:2, 1959, 121-156.
- 29) van. Heekeren, A tentative investigation of the Sai-Yok neolithic pottery in Thailand, Med. Rijksmus. Volkenkunde, 15, 1962, p. 48; etc. Folk 4, p. 42; further Cheng

- Tê-K'un, *Archaeology in China*, Vol. I, Cambridge 1959, p. 87-92 and W. Watson, *China before the Han dynasty*, London 1961, p. 48-54, concerning Chinese Lungshan culture.
- 30) Li Chi a.o., Ch'êng-Tzû-Yai: The black pottery culture site at Lung-Shan-Chên, Yale University Publ. in Anthropology Vol. 56, 1956.
- 31) No carbon dates have so far been returned from the laboratory. Sufficient samples are, however, on hand for dating the different excavation layers at Bang Site, as well as from below the bottom layer at Lue I. Especially datings concerning the beginning of the settlement should have good possibilities.
- 32) Chêng Tê-K'un, lit. cit., p. 93-95.

