

## A KHMER KILN SITE—SURIN PROVINCE

by

Roxanna Brown,  
Vance Childress,  
&  
Michael Gluckman\*

For some years, Bangkok has been one of the few places in Asia where Khmer pottery can be purchased on the open market, and according to museum officials and art-dealers, the source of the wares is lower Northeast Thailand—primarily Srisakhet, Surin and Buriram provinces. Moreover, the number of kiln-wasters amongst the finds make it virtually certain that some former Khmer kiln sites co-exist with former Khmer habitation sites in the area. However, no kilns have actually been found by anyone in authority.

The illisiveness of villagers protecting their monetary gains and the silence of Bangkok dealers shielding their sources, in fact, make it difficult to pinpoint even the district provenance of the wares or wasters. Through the offices of a sympathetic inhabitant of Ban Sawai village, Surin province, however, the authors of this paper were able to make a direct examination of one area where there were recent finds, and wish to propose the distinct possibility of the area being a kiln-site, and worthy of careful excavation.

Finds from Ban Sawai, located about 15 kilometers southwest of the provincial capital of Surin (see Fig. 1), began appearing on the market in about March of 1973—among them were some statues, numerous pieces of pottery and some kiln wasters. When the authors visited the village in December of 1973 they were led to seven sites where the villagers had been digging in the rice-paddies, three kilometers west of the village. The local people said that there were other sites nearby but that it would take another complete day to see them all. Content for the moment with the seven disturbed areas, the authors collected surface sherds which they washed and attempted to reconstruct, and made

---

\* Roxanna Brown has recently completed a Master's thesis on Southeast Asian ceramics at the University of Singapore.

Vance Childress, an architect who is directing the restoration of Prasat Ban Phluang, Surin province.

Michael Gluckman is beginning studies at Oxford University on Chinese export wares.

measurements of the area in order to draft the accompanying map (Fig. 2). As a result a definition of the types of ware peculiar to the area, plus a case for the existence of former kilns, can be made.

Judging by the number of Khmer edifices along the present Thai-Khmer border and northwards to the Mun river, lower Northeast Thailand once supported a sizeable Khmer population that was linked to the Angkor metropolis by two main arteries.<sup>1</sup> Visible in aerial photographs on the Cambodian side of the border, the roads led from Angkor in fairly direct lines towards the Mun River. Portions of the primary road to Pimay are still extant in dense jungle on the Thai side of the border just to the west of Prasat Ta Muang in Surin province; from there it ran to Phanom Rung, Phanom Van and on to Pimay. A second road, the closest to Ban Sawai, extended from Angkor to Prah Vihear, and then north past Ban Phluang and on to Surin.

Heavy temple construction in the provinces adjacent to the old roads (e.g. Prasat Ta Muang, Phnom Rung, Prasat Ban Phluang, Prasat Bing etc.) during the 11th and 12th centuries, together with numerous man-made lakes, indicates a stable and undoubtedly agrarian-based population. Geographically, Ban Sawai occupies a central position within the area.

Any population, of course, requires storage vessels, and a sedentary population often initiates their local production; in the case of Ban Sawai, local production of pottery vessels of the Khmer type is hypothesized. Pottery vessels could have met the requirements of both home and ceremonial usage.

Khmer pottery has been fairly well-defined by the excavations at Angkor by Bernard Ph. Groslier.<sup>2</sup> It is wholly distinctive, uniquely Khmer, highly traditional, and only found within the confines of present or former Khmer possessions, except in rare instances. As far as former kilns in Cambodia proper are concerned, however, only one likely site has been documented: that on the plateau of Phnom Kulen, which Etienne Aymonier found in 1883.<sup>3</sup> The only types of wares

- 1) For a more complete description of the roads see Louis Finot, "Dharmâçâlas au Cambodge" *Bulletin de L'École Française d'Extrême Orient*, Vol. XXV (1925), 417-422.
- 2) For an outline of the types and their approximate dating see Roxanna M. Brown, "Khmer Ceramics" *Arts of Asia* (May-June 1973).
- 3) see Etienne Aymonier, *Le Cambodge*, Vol. II (Paris, 1901), 412; and Victor Goloubew, *Le Phnom Kulen*, (Hanoi, 1924), 14.

reportedly represented there are pale and yellowish-green bowls, covers, heavy tiles and architectural ornaments.

The reasons for proposing Ban Sawai as an additional kiln site are, first, the great number of sherds and pottery specimens; secondly, the fact that kiln wasters have been found; and thirdly, the fact that most of the sites of digging investigated were characterized by numerous chunks of fired laterite-bearing clay that could have been wall sections of kilns. Simple firing pits covered with laterite clay domes, something akin to the present charcoal kilns of the area (see Fig. 2), could have attained sufficient temperatures (probably 1000° to 1200° C.) to fire Khmer pottery.

The sherds gathered from the Ban Sawai sites represent brown, blackish, pale green, olive, 2-glaze (brown plus pale green), and unglazed wares. The shapes include small, medium and large-sized water or wine jars; lime pots, many of them zoomorphic; footed vessels; covered urns; bowls; depressed globular jars; basins; and small bottles (see illustrations). The finds, listed site by site, are set out in the appendix to this article. Brown and blackish-glazed wares are the most abundantly represented, followed by the unglazed wares. The least common ware is the olive-glazed, of which there were the sherds of only one very large water jar. Pale green-glazed sherds, primarily of bowls, were found at most of the disturbed sites but in small numbers. The glaze of the majority of sherds is badly worn or chipped.

The clay of the specimens is pale to blackish-gray on the brown, blackish and olive-glazed wares, and often marked with specks of black impurities. Its rough, granular quality suggests that it is sandstone-based clay. The unglazed earthenwares are reddish in color. The clay of the pale green-glazed pieces, on the other hand, is fine and whitish in color suggesting that either those pieces or their clay were imported from elsewhere. Many more sherds and wasters of pale green-glazed bowls, in fact, have been found in Ban Kruat district of Buriram province which is another possible kiln site that the Fine Arts Department has plans to excavate.

The ornamentation is simple, incising under the glaze being the most common kind. Bands of incised concentric waves, or the "comb" pattern, tiny rectangles, and vertical striations are diagnostic. Other decorative methods are the moulding of ridges and mouth flanges, and appliqué zoomorphic features or rows of tiny knobs.

Most of the shapes appear to have been built by the coil method and then turned on a wheel. The bases are usually flat or slightly concave, and on the footed vessels thickly potted. The foot of the small jars and bottles often displays a thumb-print-like pattern of concentric lines, which results from the pieces being cord-cut from the turning table.

By comparison with wares of similar shapes and glazes found at Angkor in dated excavations by Groslier, the Ban Sawai material can be assumed generally to belong to the second half of the 11th, the 12th and perhaps 13th centuries. In support of that general dating it is notable that sherds of Ban Sawai-type pottery are found at most of the Khmer edifices of the Northeast, the majority of which were built between A.D. 1000 and 1150. The authors, indeed, personally found sherds of the Ban Sawai type at Phnom Rung, Phnom Van, Prasat Ban Phluang and Prasat Nikom—all of which are temples of Hindu inspiration that undoubtedly fell into disuse by the end of the 13th century, following the widespread introduction of Hinayana Buddhism.

As a further aid to dating it is significant that no sherds of Chinese blue-and-white ceramics have been recovered from the Ban Sawai area, nor from at least the nearby temple of Ban Phluang, while earlier Chinese white wares are occasionally found. It is generally accepted that Chinese blue-and-white was not developed or exported before the 14th century. The remains of three *Ch'ing pai* covered boxes of probable late Sung date, in fact, were found by the authors at their Site I of Ban Sawai. Similar white wares are found at many of the temples of the Northeast.

In conclusion, then, the authors of this paper feel that the number of Khmer pottery specimens, sherds and wasters found in Northeast Thailand make it virtually certain that former kiln sites do exist somewhere around Ban Sawai, which being a source of some of these finds, is one likely location. The chunks of fired laterite-bearing clay found at the sites are probably the remains of the kilns themselves. For the reasons outlined in the paragraphs above, the most likely dating of the kilns would be between A.D. 1050 and 1300.<sup>4</sup>

4) After this article was submitted, another one of interest was published on the Khmer kilns of Ban Kruat district, Buriram province, by Mr. Srisakra Vallibhotama: "The Khmer Ceramic Kilns of Ban Kruat and Their Preservation" in *Our Future* (Journal of the Society for Conservation of National Treasures and Environment, (Bangkok), Vol. II, 7 (Jan-Feb 1974), 30-33.

## APPENDIX

**Site 1.**

*Circumference :* approximately 30 meters

*Sherds found :*

- pale green glazed bowls
- brown-glazed large water jar, squat bulbous jar, zoomorphic lime pot (owl), footed water vessels, and covered urn
- blackish-glazed footed water vessels, large water jar, and basins
- brownish olive-glazed large water jar
- unglazed large water jar

*Related finds :* presence of fired laterite-bearing clay, and sherds of 3 different *Ch'ing pai* covered boxes

**Site 2.**

*Circumference :* approximately 40 meters

*Sherds found :*

- pale green-glazed bowls
- brown-glazed footed water vessels
- blackish-glazed footed water vessels

*Related finds :* abundant presence of fired laterite-bearing clay and large rocks of sandstone

**Site 3.**

*Circumference :* approximately 5 meters

*Sherds found :* — brown, blackish and unglazed large water jars

*Related finds :* presence of fired laterite-bearing clay

**Site 4.**

*Circumference :* approximately 10 meters

*Sherds found :*

- pale green-glazed bowls
- brown-glazed covered urn
- blackish-glazed footed water vessels
- large olive-brown glazed water jar

*Related finds :* — presence of fired laterite-bearing clay plus large sandstone rocks

**Site 5.**

*Circumference* : approximately 30 meters

*Sherds found* : — unglazed earthenware

*Related finds* : presence of fired laterite-bearing clay plus some chunks of fire-blackened sandstone

**Site 6.**

*Circumference* : approximately 8 meters

*Sherds found* : — pale green-glazed bowls  
— brown-glazed footed water vessels, covered urn,  
and bowl  
— blackish-glazed footed water vessels

*Related finds* : none

**Site 7.**

*Circumference* : approximately 30 meters

*Sherds found* : — pale green-glazed bowls  
— brown-glazed bowls, footed water vessels, and  
footed bottles

*Related finds* : the villagers claimed to have found in this spot 7 intact brown-glazed water jars and 2 small bronze figures; they also led the authors to a nearby paddy where they say they uncovered and then re-covered a laterite block platform; chunks of fired laterite bearing clay were in evidence, and also a worked piece of stone that appeared to be a grinding pestle

## Report on Analysis of Pot Sherds

*Specimens :* 15 specimens of various thicknesses and colours, some with greenish, white, or dark glaze and others with black coating apparently the remnants of a glaze.

*Submitted by :* Brick Corporation of South Africa Limited per laboratory order no. 10896 on April 3rd, 1974.

*Client :* Dr. J. Gluckman, P.O. Box 455, Johannesburg (Instructions received from Mrs. Steele.

*Laboratory Nos :* 406226-406241

Separate analysis of the coating ("glaze") on the sherds and the body of the sherds was required. The analysis comprised the determination of ferrous iron, ferric iron, and copper.

### Preparation of specimens for analysis

The coating ("glaze") was removed by careful scraping with a sharp knife. In almost all instances clean glaze could be removed without undue difficulty. The exception was the specimen marked No. 2 (Site 1) which was a thin sherd strongly glazed in white on both surfaces. It was quite different from any of the other specimens. A very small portion of the glaze was removed with a diamond-tipped glass-cutter. The area of the sherds which had been scraped was divested of all residual traces of glaze by grinding with a grindstone and the cleaned portion then crushed in a mortar for analysis.

### Analysis

Weighed-out portions of "glaze" and "body" were dissolved by digestion with sulphuric and hydrofluoric acids in plastic volumetric flasks in a neutral atmosphere protected from ingress air. After diluting to volume aliquots were removed for the three determinations :

- Ferrous iron* : Colorimetric method with orthophenanthroline.  
*Total iron* : By atomic absorption spectrophotometry.  
*Ferric iron* : By calculation (by difference between total iron and ferrous iron)  
*Copper* : By atomic absorption spectrophotometry.

**Results**

The results of the analysis are set out in the attached schedules.

**Report on Analysis of Pot Sherds****List of Sherds****Site 1**

- 1) brown-glazed water-jar
- 2) ch'ing pai bowl
- 3) thick brown-black-glazed jar
- 4) thick pale green-glazed bowl

**Site 2**

- 5) thick pale green-glazed bowl

**Site 3**

- 6) thickly-black-glazed jar

**Site 4**

- 7) thin yellowish-glazed footed urn

**Site 6**

- 8) black-glazed funerary urn
- 9) thick black-glazed jar
- 10) yellowish-glazed footed urn

**Site 7**

- 11) thin pale green-glazed bowl
- 12) thin black-glazed footed urn
- 13) thick yellowish-green bowl, pale colour
- 14) reddish unglazed earthenware, vessel shape unknown
- 15) yellowish unglazed earthenware, shape unknown

### Analysis of Pot Sherds

Specimen	Component	Ferric iron as Fe %	Ferrous iron as Fe %	Copper as Cu %
<i>No. 1. Site 1.</i>				
Ridges with black glaze & patches of brown glaze	Glaze	2,39	1,30	0,085
	Body	1,60	0,32	<0,01
<i>No. 2. Site 1.</i>				
Hard white glaze almost impossible to detach	Glaze	0,06	1,94	1,84
	Body	0,12	0,048	<0,01
<i>No. 3. Site 1.</i>				
Black Glaze	Glaze	4,86	0,11	0,035
	Body	2,64	0,17	<0,01
<i>No. 4. Site 1.</i>				
Green Glaze	Glaze	1,18	0,020	0,11
	Body	0,27	0,42	<0,01
<i>No. 5. Site 2.</i>				
Cracked green glaze	Glaze	0,71	0,097	0,040
	Body	0,14	0,49	<0,01
<i>No. 6. Site 3.</i>				
Black Glaze	Glaze	2,59	1,69	0,040
	Body	1,71	0,80	<0,01
<i>No. 7. Site 4.</i>				
Brown Glaze	Glaze	4,22	0,24	0,18
	Body	0,81	0,095	<0,01
<i>No. 8. Site 6.</i>				
Black Glaze	Glaze	4,28	0,67	0,081
	Body	1,61	0,35	<0,01
<i>No. 9. Site 6.</i>				
Black Glaze	Glaze	4,83	0,45	0,020
	Body	0,82	1,48	<0,01
<i>No. 10. Site 6.</i>				
Black & brown Glaze	Glaze	3,16	0,80	0,056
	Body	1,55	0,31	<0,01
<i>No. 11. Site 7.</i>				
Cracked green glaze	Glaze	0,38	0,44	0,055
	Body	0,10	0,49	<0,01
<i>No. 12. Site 7.</i>				
Black Glaze	Glaze	5,34	0,53	0,055
	Body	1,50	0,33	<0,01
<i>No. 13. Site 7.</i>				
Cracked green glaze	Glaze	0,81	0,037	1,43
	Body	0,53	0,15	<0,01
<i>No. 14. Site 7.</i>				
Trace of grey coating only.	Body	3,36	<0,001	<0,01
<i>No. 15. Site 7.</i>				
No glaze present	Body	2,37	<0,001	<0,01

**McLACHLAN & LAZAR (PTY) LTD**  
**Consulting Industrial Chemists, Analysts & Samplers**  
*Incorporating* DR. L. HEYMANN'S LABORATORIES

URANIUM HOUSE, 6 SIMMONDS STREET EXTENSION  
 Postal address: P.O. Box 3344, Johannesburg.

Our Ref: 741080  
 16th May, 1974

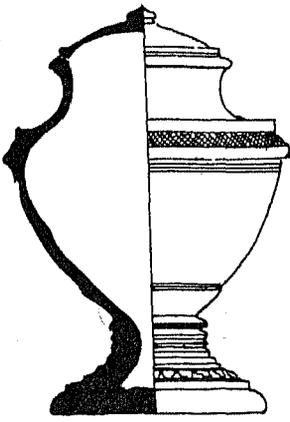


figure: 1  
19cm.H

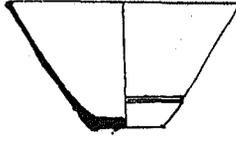


figure: 2  
18cm.H, Dia.12.7cm.

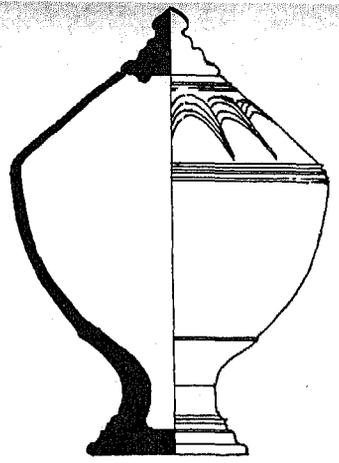


figure: 3  
17cm. H.

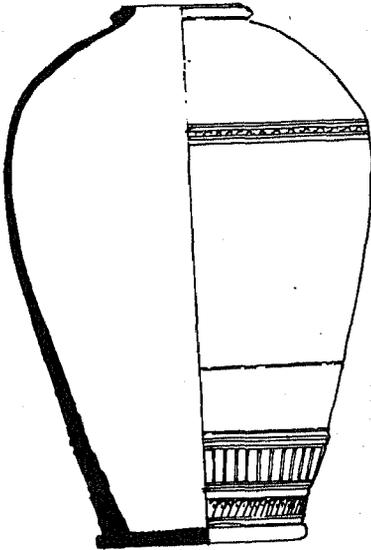


figure: 4  
75cm.H.

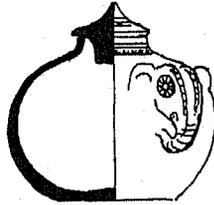


figure: 5  
5.2cm.H



figure: 6  
8cm. High

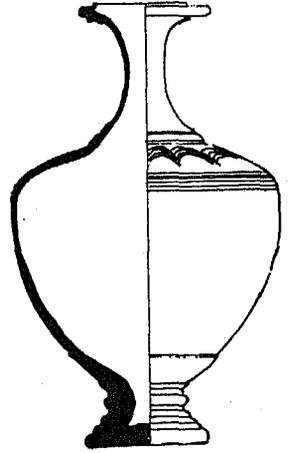


figure: 7  
40cm.H.

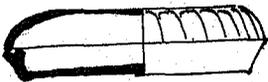


figure 8  
3cm.H.

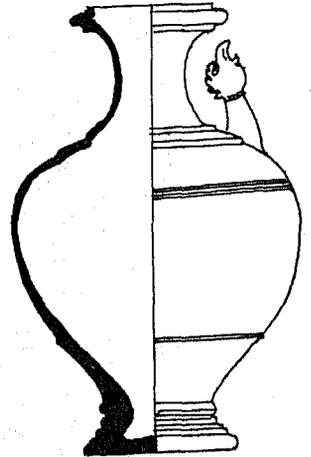


figure 9  
45 cm. H. (approx)  
(reconstruction)

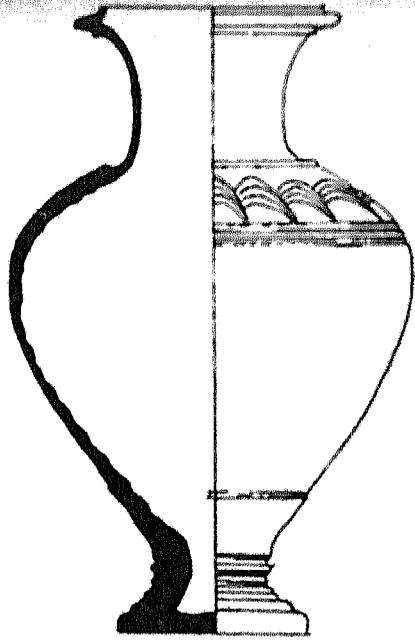


Figure: 10  
Sherds. no dimension

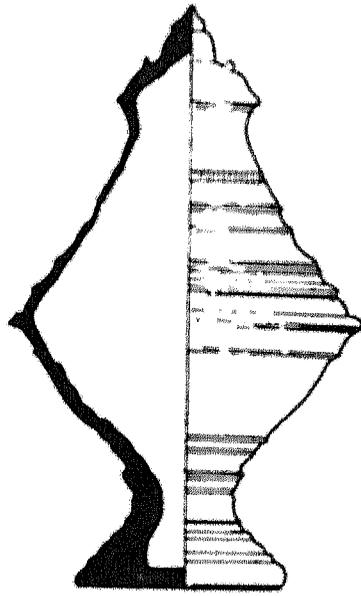


Figure 11  
30 cm H

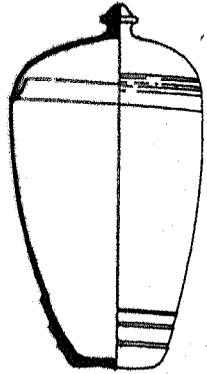


Figure: 12  
16.5 cm.H.

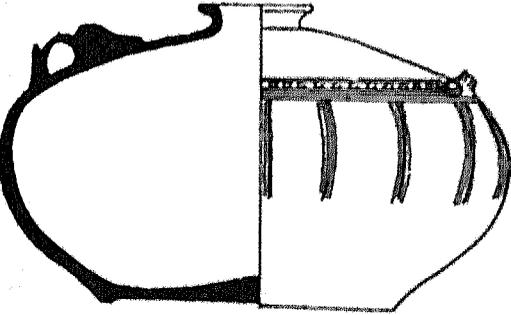


Figure: 13  
12.5 cm.H

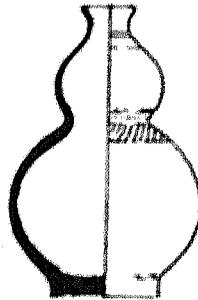


Figure 14  
9 cm H.

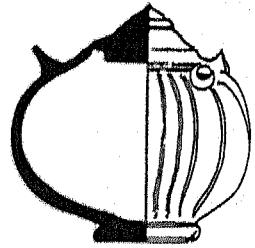


Figure: 15  
6 cm.H.

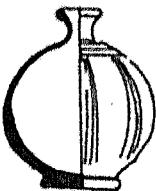


Figure: 16  
5 cm.H.

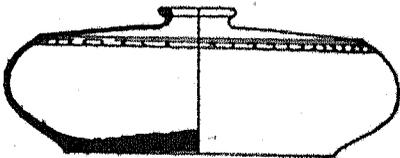


Figure: 17  
10.5 cm.H.

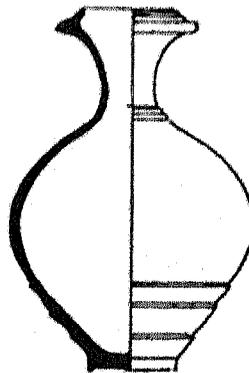


Figure: 18  
18 cm.H.

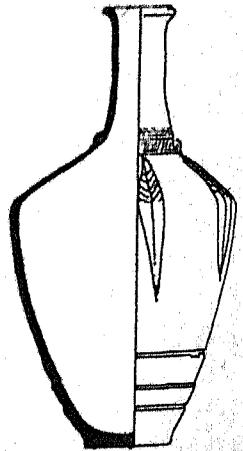


Figure: 19  
20-24 cm.H.

BURIRAM

15° 0'

SURIN

SATEL-7

BAN SAMRI

KM. 11



568'

14° 45'

ANPOE PRANG

PRANG BAN PHANG

PRANGKHA



601'

103° 15'

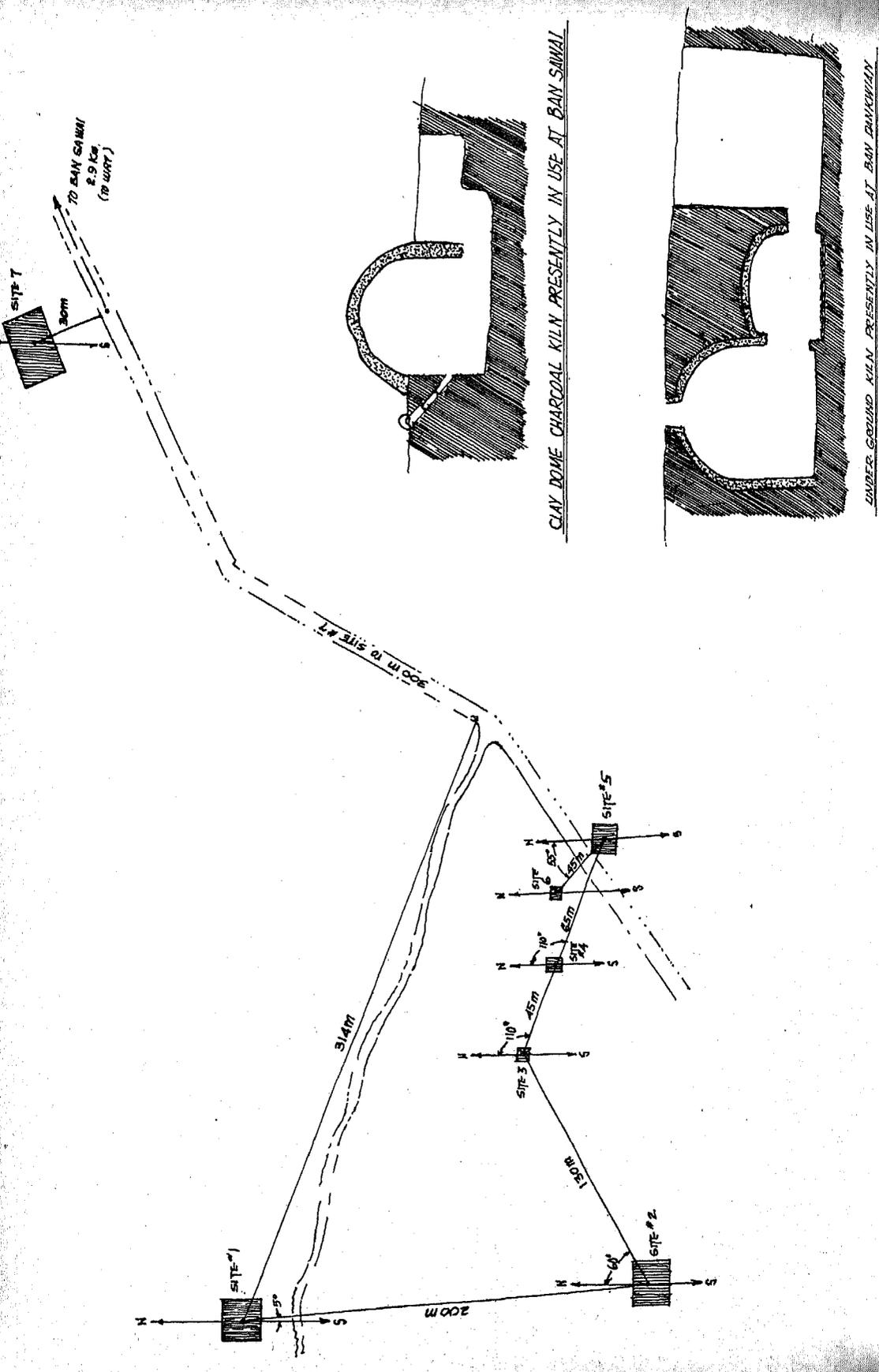
14° 30'

BAN TA MING

BAN KRUT

PRANG TO NIMIN

CHANGUAT SURIN  
KANT SIMKRAP



CLAY DOME CHARCOAL KILN PRESENTLY IN USE AT BAN SAHAI

UNDER-GROUND KILN PRESENTLY IN USE AT BAN DANKEWAI