

"ROMANCING THE SHARD"

An interview with Don Hein



Don Hein is an Australian archaeologist who has worked for more than 20 years at Ban Ko Noi (since he excavated his first kiln there in 1980). Kho Noi is the site of the main Thai ceramics production of the export era, commonly known as Sawankhalok, which was at its peak in the 15th century AD. During the 1980s, he was the field director of a joint Thai-Australian ceramics project that made significant discoveries about the nature of this production, particularly that kilns and much of the technology were of indigenous development. Hein has recently completed his PhD, titled "The Sawankhalok Ceramics Industry" (Deakin University, Australia 2001). **Ray Hearn** interviews the field-smart and scholarly 'adventurer' archaeologist.

It has been twenty years since the joint Thai-Australian work, *The Thai Ceramics Archaeology Project* (TCAP), which began in 1981 at the kiln site Ban Ko Noi, or Sawankhalok as it is generically known, in central northern Thailand. The project was formed as a direct result of Don Hein's 1980 discovery of a kiln, KN 36, of a type known to exist in the north but not previously found at Ko Noi, where only later brick built kilns had been documented. The kiln was an in-ground kiln slab built one with transitional modification, including a brick chimney (Figure 1). The find suggested that contrary to the prevailing opinion at that time, the production here was of much longer term with beginnings before the Sukothai era, and that rather than based on imported knowledge and technology the stoneware ceramics

production was mostly of localised Thai based development.

Although Hein and the team were to make many significant pioneering discoveries, little apart from scientific papers on progress results or reports have been published. There has been no overview of the work of Hein and TCAP members, or acknowledgment of the joint nature of the project. This interview, with the on-site director of TCAP, seeks to explore the personal side of often quite exciting finds in which the painstaking work of a dig, a sense of serendipity, intuition and adventure mixed with forensic deduction are revealed:

Following only a crude, outdated map, Don Hein journeyed to the ancient Thai City of Sisatchanalai, covering the final stages along the Yom River by canoe when tracks ran out.

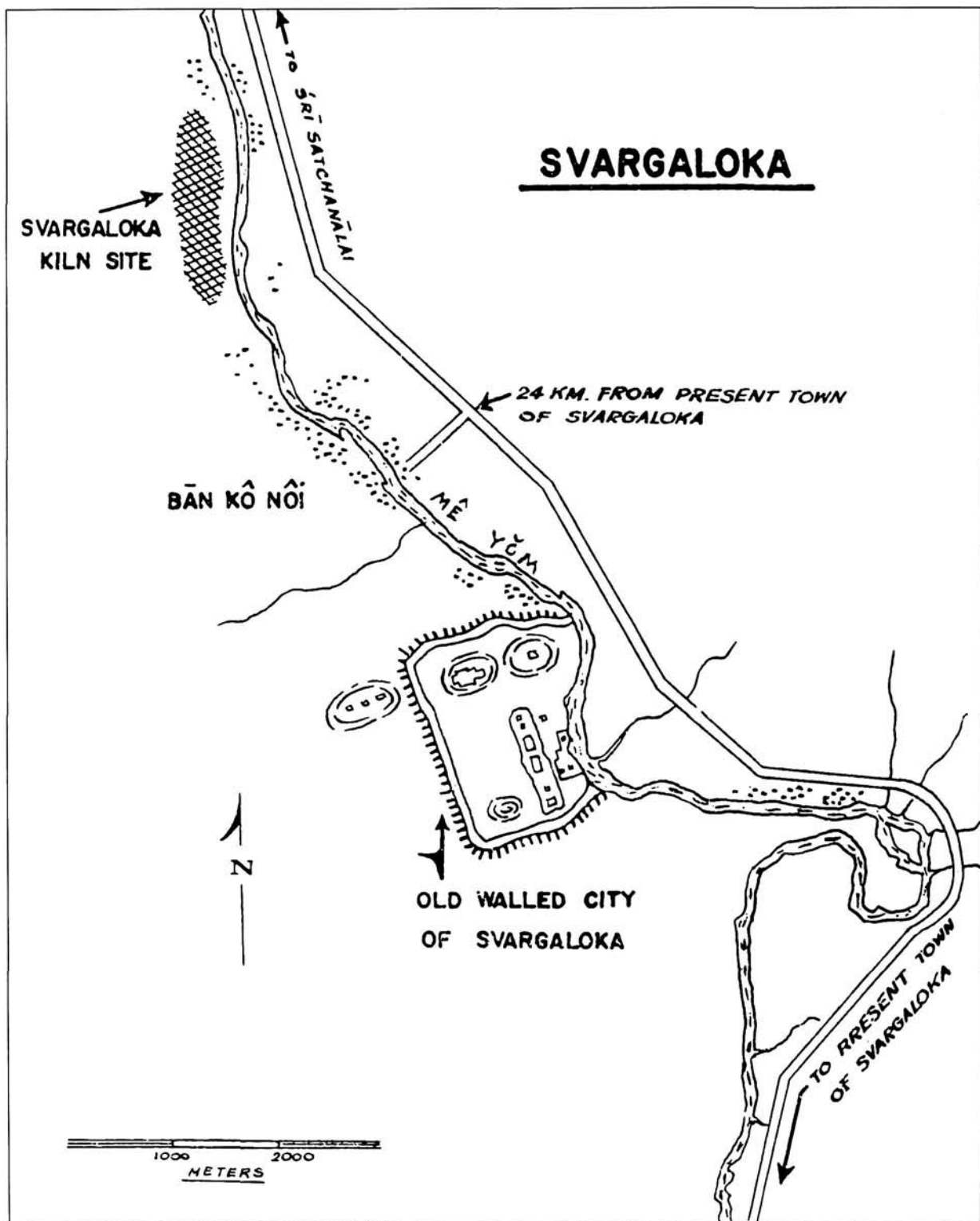


Figure 2: Sketch map of 'Svargaloka' kiln.
"The Ceramic wares of Siam" by Charles Spinks, 1965 p.36.
 The 'mud map' that Hein used to locate the Ban Ko Noi Kiln Site

The balding archaeologist was searching for buried treasure. A treasury of ancient pottery. He found it too. "Yes", grinned the 47-year-old Mr Hein back in his cozy Adelaide office. "It all seems like something from *Raiders of the Lost Ark*." (interview in *The South Australian Magazine*, Mann 1984: 4-5).

Ray: *Can I begin by asking you first of all about how you became interested in the Ko Noi site and the old kilns?*

Don: In 1970, we decided to travel overland to Europe and back, and by misadventure we got locked into Southeast Asia for a little while. We travelled - by ship in those days - up to Singapore from Adelaide, and the ship took our luggage by mistake onto Hong Kong or somewhere, and we had to wait some time for them to come back. In the meantime, we bought a vehicle and decided to go up into Thailand, which was one of those romantic, exotic places that we'd only heard about, and we loved it. We loved the climate, we loved the people, and we loved the country. Even though the Vietnam War was still in full flood, and there was lots of evidence of the war, we did visit many historic places, some of the Khmer sites and the old cities Sukothai and Si Satchanali. On our return to Australia, I was offered a job at the Art Gallery of South Australia (AGSA). What I was to discover was that the gallery did have a marvellous collection of Southeast Asian ceramics. The collection was under the curatorship of Dick Richards who had only recently (1969) been able to purchase a major Singapore private collection, including many Thai wares, and having a ceramic background since art school days I took some interest in this.

I started to ask questions, and as I learnt what little was known about Thai ceramics, I began to suspect that there was more to the story. Well, in fact there was absolutely a lack of information, a dearth of good knowledge about them, and therefore some looking into that was required.

Ray: *How did your first visit to the Ko Noi kilns come to pass?*

Don: In 1975, on a return trip from China, I went to Sukothai and then up to the kilns for the first time. All I had was the map in Charles Nelson Spink's 1965 book, *The ceramic wares of Siam* (Figure 2) which was really only a thumbnail sketch of the area showing approximately where the kilns were. Following the map I went on the main road close to the River Yom as indicated, to the spot where the kilns were shown to be located on the opposite bank. The main road was very much smaller then, though now a highway, and there was no road at all behind Ko Noi, which now runs back behind the monuments. That didn't exist then, and indeed you couldn't go to Si Satchanali by road because there was no bridge across the river. There were no bridges anywhere then except for one 50 km away at Sukothai. Before the bridge at the modern town of Si Satchanali was built, the only way to get across the river was by canoe or boat. Therefore, there were no vehicles because there were no roads on the opposite side - on the west of the river there were no vehicles. The only vehicles I saw were *kwai lek*, little motorised farm carts.

I walked in to the river and got a canoe, as there were lots of canoes on the river then, across the river. I walked along

till I found the kilns, or some evidence of kilns. It was clear that big mounds in the undergrowth were kiln mounds. You could see one or two that would have been exposed back in the '60s by the Fine Arts Department; in particular, work had been done to preserve the last remaining arched roof section on what we now call kiln KN7.

I suppose there were a dozen very obvious mounds, and a slightly greater number of kilns clearly observable, so that was my first contact with the actual site. Also, there are the ruins of the marvellous ancient city quite near the kiln site, the walled city of Si Satchanali which itself is an exotic and poetic representation of history. The old city had been cited for restoration and redevelopment by the Thai Department of Fine Arts at this time, so there was some growing Thai interest in the culture of that era.

After my return to the AGSA, I took an even greater interest in Thai ceramics, and in the ceramics story. There was a growing awareness of Thai ceramics and some exhibitions were now beginning to include Thai wares, but it was not so long ago that these were as nearly always wrongly identified as Chinese ceramics. It was only at the turn of the century that people realised that there was such a thing called Thai ceramics.

I was determined to research Thai ceramics further, using actual on-site evidence.

Ray: *How did your official interest come about?*

Don: Having one's appetite whetted after the first visit in 1975 by the potential of the site to provide information on the gallery's

collection, I applied for and was granted a UNESCO Fellowship to Silpakorn University Post-graduate School of Archaeology for a twelve-month period in 1977.

We (my wife Toni and I) were based in Bangkok but spent a great deal of time at Si Satchanali/Ko Noi investigating the kilns, and we very quickly established that there were many of them. I was particularly interested in kiln production and construction, and I thought the site itself would provide very valuable information. Until then, most information about Thai ceramics didn't come from the production sites at all, but came from shipwrecks and secondary sites, export location sites in The Philippines and Indonesia. The large kiln site at Ko Noi, then relatively unknown, was particularly of much interest to me.

Ray: *What on site documentation had there been of the kilns?*

Don: Statements in various Thai sources talked about an entrenched and accepted 'magic number' of 47 kilns being located at Si Satchanali. The number came, I think, from Lucien Fournereau's work back at the turn of the century. At first, he thought there were hundreds of kilns but later amended it to a very small number, I think it was 47, just from recall. We were not able to find out which kiln was meant to be which, so we adopted our own numbering system. Kiln number one at Ko Noi was KN 01, chosen as a central point right beside what was then watchman's hut. We basically started to number at first in sequence as we found each kiln. KN was Ko Noi; PY was Pa Yang and PK Pitsanalok and so on

Our first maps of the kiln site, and the first assumptions raised, were made in 1977

during that study year. We quickly realised that there were hundreds of kilns at Ko Noi alone, and more at other sites. The kilns at Pa Yang just outside the city walls were well known, and there are kilns at Sukothai and Pitsanalok too.

There was a tremendous amount of looting going on - hundreds of diggers every day. I have photographs and field notes of this phenomenon. 'Diggers' came from various villages to the Ko Noi kiln site looking for artefacts to sell to the tourists, and in the process doing tremendous damage to the integrity of the site; but at the same time, looters' holes revealed to me important things. There were varying depths that this cultural material came from, a range of shards showing a variety of productions. The intense nature of the diggings revealed other ruins below the surface, and led one to suspect that the site was extremely complex and not a simple arrangement of a few kilns on mounds.

Ray: *In 1977, you documented the site, but had not yet carried out any official excavation?*

Don: After the research year in 1977, the next trip for me was in 1980. I planned to look further into the nature of the kilns, and to follow up on the importance of the site. I did some more survey work on locating kilns, and this led to the discovery of the first in ground kiln, but we had had a long involvement with the site by then.

I was fiercely determined to make some significant new discovery. When you are funded to work, you do then feel driven by the need to be able to achieve something specific. It was soon near the end of the trip, but that was the length of time remaining in Thailand, and it was down to the last few days.

I hadn't really made any major progress, just details, bits and pieces to add on to what I'd already known earlier, but I was quite determined to come up with something.

It was so hot at that time during the early dry season, December/January. We didn't do too much walking around by this stage; we knew the site pretty well in terms of its typology and knew where various mounds, shards, and kilns were. I decided to look where there were surface kilns in a small group behind Sun's (a villager) house. These had been discovered by or shown to Dick Richards and already checked earlier in 1980.

While poking around in that general area, I noted that the clay pans and dry paddies had cracked in an overall turtleback pattern. I noticed one clay pan in a slight depression, and amongst the dry grey bushes there was one single green bush growing. As this was the kind of bush that needs water, as I stared at it, I realised that it must have a source of water to be so green. On closer inspection, among the general turtle back sort of cracks in the claypan there was a circle of crazing around the bush indicating to me something was under the surface causing that pattern.

I dug down a few centimetres and discovered a circle of bricks which to me could only be the top of a chimney of a kiln, and the explanation was that the kiln was acting like a sort of giant pot plant to hold moisture. More importantly, the top of the chimney being present meant that the rest of the kiln was almost certainly still there. The chimneys are the first things that break and fall away.

So I came home, and made a request for funding to go straight back to excavate this in-ground kiln. We set up a joint project

with the Department of Fine Arts, completed the dig, and in the same year published something on our excavation in the *Art Gallery of South Australia Journal* (AGSA journal) of 1980 - December of 1980.

For the first few seasons, an annual dry season field trip was undertaken but from 1984, a continuous field presence was maintained for several years until the end of the project. I was the on-site director of TCAP.

Ray: *What was so significant about this kiln, KN36?*

Don: KN36 was intact; the first intact kiln found at Ko Noi. It was also the first in ground kiln found outside the north; these were not previously known at Ko Noi. KN 36 was an in-ground kiln of transitional type built of slab and brick, not an excavated hole like the earlier bank kilns. This opened up a whole prospect of the earlier excavated kilns dug into the ground evolving on the one site to later constructed surface and brick. The single green bush had led to an extremely significant find.

Ray: *TCAP (Thai Ceramics Archaeological Project) was formed in 1980, and this was an extremely significant year for you, wasn't it?*

Don: TCAP was formed in 1980 when this find was reported in the AGSA journal, and the Gallery together with the University of Adelaide were successful in a very substantial series of ARC grants over seven years, together with other funding. Because of the gallery's collection we were able to argue that fieldwork would extend our knowledge, and the collection could reinforce the research.

Ray: *TCAP was very much a joint venture?*

Don: Yes, very much so. Although the discovery of KN 36 was mine alone, right from that first excavation we were working together with the Thais, and over the years I have made some very good friends. Initially there were six members, three each from Australia and Thailand. The Australians were myself and Dick Richards from the AGSA and Dr Peter Burns from the University of Adelaide. The Thais, Pisit Charoenwongsa, Prachot Sanghanukit and Seehawat Maenna



Don Hein

were from the Department of Fine Arts, Archaeology Division.

Later, the membership was widened to include a range of scientists and other specialists, most notably Dr Mike Barbetti, from the Mackintosh Quaternary Dating Centre at the University of Sydney, who did some dating work for TCAP.

Anyway in 1981, we did our first TCAP dig looking at the kilns in the KN 36 area and discovered KN 60, the updraft kiln. There were updraft kilns there as well as stoneware cross drafts (and metal furnaces) but there is still some question about their role, because of the fact that most earthenware pottery was produced elsewhere. There was some thought that they may have been used in a process of double firing, bisque firing for stoneware, but in fact that is not true because all that stoneware was fired with a single fire.

Ray: *There are no bisque shards of stoneware form whatsoever?*

Don: Yes that is correct, there are none. All the updraft kilns were associated with terra-cotta wares or earthenware, and no glazed wares. That is in Si Satchanalai, it may not be true for Sukothai, but that is another story.

Ray: *Have you looked at the Sukothai kilns at this point?*

Don: Yes I had, we were aware of other kilns in the region, and I spent a fair bit of time in 1977 at Sukothai, and mapped the kilns. Some basic maps also appeared in publications during that time, so there was some information available. The Sukothai site was difficult at that time because it was a no-go area. The police warned us about going there because as well as 'digging', crime in general was a serious problem, robbery and so on.

I knew a local family, and I became familiar with people living there. There's nobody living there now, but in those days there were houses there. These people would

be out digging away, and I would be looking at what they were finding. There were people with guns on guard on the perimeter in case the police came and it was all very difficult.

Ray: *What was the next major project for TCAP?*

Don: Now I guess the next major discovery occurred in 1983, which was our third season under TCAP, and we were doing two digs. One was at Pa Yang, being done by Dick Richards on kilns that are part of the mound and quay system - large mounds associated with canals that was fairly sophisticated. The only evidence that I am aware of in Asia where kilns have been so arranged and clearly associated with canals. Our research suggested that the later export wares were transported directly from the kiln site to Sukothai by canal, rather than river.

Ray: *Dick Richards was at this dig Pa Yang, at the same time you had another dig?*

Don: While that was going on I was doing a dig at what is now the kiln KN 61 museum site. The reason I was doing a dig there is that the year before Dr John Stanley - using a caesium magnetometer - had located signals of an anomaly under the ground in that area. We put down our standard 2 x 2 square metre pit, went down about five metres and found nothing. There were vertical differences between two different types of soil matrix with some ash present, so that is probably what the signal revealed, perhaps from a kiln firing pit, but more likely canal or flood action.

I still thought that there was a kiln nearby, and I had an idea where it ought to be. Now the area was scattered with looters' holes, and all the locals said - we were in the

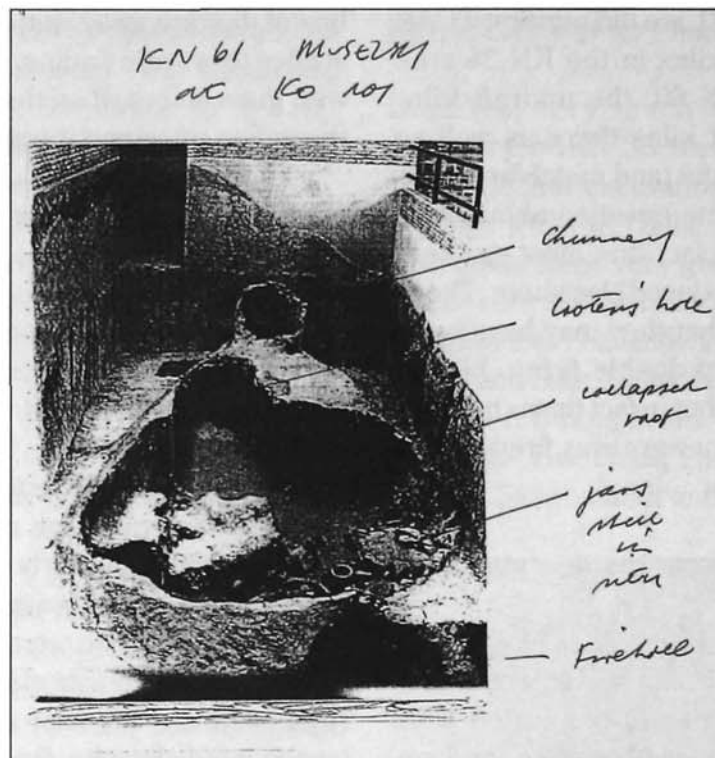


Figure 3: Photograph of kiln KN 61 in the museum as Ban Ko Noi, showing collapsed roof and jars still in situ

middle of a village, remember - "You are wasting time; we have dug everywhere and yet there is no kiln."

Ray: *Acting on a hunch, you still felt that the kiln was nearby, and therefore continued to check out the looters' holes?*

Don: There were many of these holes around the area, some of them several metres deep. Because they were partly filled with rubbish, I kept digging them out in the evening after we had finished site work. This was a very painful exercise because any disturbed ground has *mot dang*, a little red ant that bites and brings up big welts on your skin when you go down. I remember there was one time I suffered about 120 bites, a bit like a small bee sting, so you need to be quite determined if you are going to take up this sort of work.

As I dug down the bottom of one of these, quite close to our pit, within 3-4 metres of our excavation, I found shards of a jar rim the right way up, and immediately below it found other shards in the opposite direction - the bottom of the pot. I realised that this was extremely significant.

It was one of those marvellous feelings you get when you know you have made a major discovery. As wasters are normally thrown down the shards, scatter horizontally, and are mixed with other shards. This small jar, however, was still preserved upright on the one spot; it could only have been a crushed pot still in situ caused by the collapse of the kiln.

I realised that I must be standing on the floor of the very kiln we were looking for, and not only that, there were wares still in situ from its roof falling in, and subsequent abandonment. Exciting stuff worth every *mot dang* sting!

So we extended the excavation, and found kiln KN 61 now on display in the museum (Figure 3). This is a large in-ground kiln, about five and a half metres long and nearly four metres wide, used for making large metre diameter metre-high jars and smaller jars. Some of these wares were still in position but potters did not know this at the time and abandoned the kiln.

Ray: *The looters didn't know this either?*

Don: No. They must have noticed the broken jar on what was the kiln floor, but lacked the experience or intuition to know what the shards might reveal.

Ray: *The looters' hole is quite clearly visible in the subsequent excavation and museum. There are the crushed pots, particularly by the firebox, but there is a large area of the kiln empty.*

Don: That's the top end of the kiln. When I say the kiln collapsed, you have to imagine a space the size of half an egg and two portions of it have collapsed. What we think happened is that the potters got down when it was cold, got down the chimney and salvaged whatever pots they could, and then came upon the crushed collapsed area and went back. The firebox area was also caved in and they could not do anything from that end either. They probably thought that all the rest was damaged and not worth digging out.

An example of serendipity at work with some jars left for 500 years for posterity.

So this was a discovery that became a museum. It was quite a wonderful thing to be personally involved with because you are driven by the demons to keep on looking; because you suspect you know something



Figure 4: Photograph: Kiln KN 42 museum general view of excavation



Figure 5: Photograph: looking into KN 42 pit

Looking down into pit
 KN 42 at left, floors of excavated kilns
 KN 110 is shown at bottom of
 excavation pit in the centre of the
 photograph

must be near to cause that bit of ash you found, some reason for all the looters' holes ...

Ray: *What led you to the KN42 discoveries?*

Don: In the following year, January 1984, I began full-time work as the on-site director of operations, and stayed for several years. I began to plan the excavation on 42 for a number of reasons: firstly, to begin with a major project to look at the range of production; and, secondly, I believed from the evidence, mainly from looting operations, that mounds were built-up debris of previous kilns being demolished, and were not deliberately made.

We chose kiln 42 as one of the mounds in which we could test this hypothesis. We chose the most damaged mound with looters holes all over and it was a rather damaged site. We felt quite responsible about that, that we did not choose the best of the mounds that perhaps could give the best information. We were not sure what we were doing but chose the site that had been most disturbed.

We started to dig down but had to open a second pit as there were more kilns that we found in succession: nine kilns one on top of the other, and two more close by, making eleven kilns (Figures 4 and 5). The bottom one only had been built on the original ground surface but each subsequent kiln was built up on the thrown-down ruins of the one before (Figure 6).

Excavating those kilns was a major revelation and proved the hypothesis that the mounds built up over time as kilns were rebuilt. We also estimated the working life of the mound to be about 300 years; 11 kilns,

the life of the kiln about 20-30 years. That was the figure we came up with, and I still maintain was the life of the kilns (in that sequence).

Radio carbon dating by Mike Barbetti later does seem to confirm a production of around three hundred years for the export industry, that is from the fourteenth to sixteenth century AD (In *World Archaeology*, Barbetti and Hein 1989).

We did find shards of another sort of ware lower down in the sequence which we called "Mon", this being the name we gave to the earliest wares. The villagers knew the wares by that name.

Ray: *What does "Mon" signify?*

Don: We believe now that the Mon people, who controlled the region before Sukothai emerged, did operate those kilns, and that's

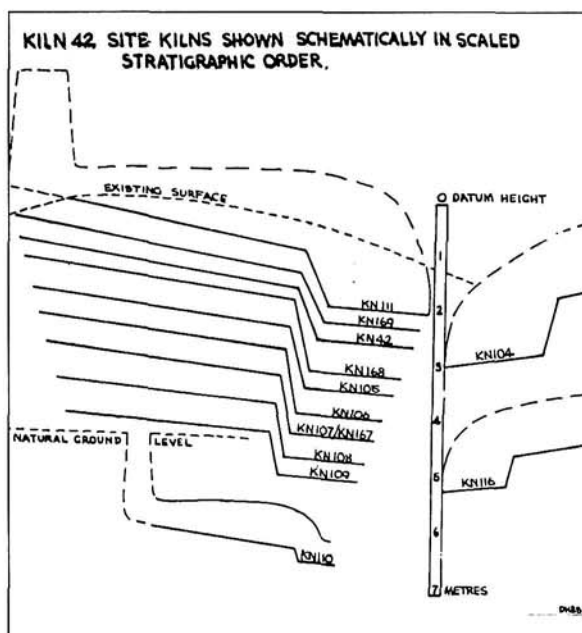


Figure 6: Sketch: stratigraphy of sequence of kilns
"Field Report on the Excavation of Kiln 42 Ban Ko Noi Si
Satchanalai, Thailand"
by Don Hein, September 1985 (unpublished)

borne out by research done by Dr Michael Vickery. The Mon presence is supported linguistically by the interpretation of names like *Chaliang* and *dau turiang* (kiln / bowl) which do have a Mon translation but make no sense in Thai (Vickery 1987).

Ray: *At the Kiln KN42 Site, you knew that you had excavated to the original ground level, and KN 109 was first in the sequence of kilns?*

Don: Normally the archaeologist stops digging when sterile ground is identified, because natural sediments show that the cultural level limit has been reached - below that, nature; above that, culture; so there's no point in digging any further. But I knew...

Ray: *But you knew about in-ground kilns from KN36, and northern Thai kilns?*

Don: Clearly I knew about in-ground kilns. At the site there were ceramic shards about that didn't belong to the surface kiln production. Acting 'on spec', I instructed the team to keep on digging, digging down through the natural ground for a further metre and a half until we came to a change in the soil; a discolouration from natural ochre of the river terrace sediment to a red/orange colour.

Even before we reached the body of the kiln itself, I knew we had reached heat-affected soil, and that we had located an in-ground kiln.

That's the kind of thrill the archaeologist gets: it's like Christmas.

Ray: *You would have known that you would need to dig down a couple of metres or so?*

Don: That's correct; that's the depth the kiln would have been at if there were one. If the chimney is to have sufficient draft, that's how deep the kiln needs to be. The top of the chimney must come out at ground level like a rabbit burrow.

Ray: *Unlike kiln KN61 where you had indicators (a magnetometer anomaly*

and a trench with ash), the discovery of this kiln (KN110) must have been an extra thrill because there was no real reason for that in-ground kiln to be there at all.

Don: No, it was just a hunch; you get hunches like detectives get a certain hunch, and keep following it when everything else says quit.

Ray: *You also had a hunch about Wat Don Lan?*

Don: Yes, there was no surface evidence at all to suggest kilns, but from aerial survey photographs I could see a depression indicated as overlapping circles. John Stanley subsequently found an anomaly, and we dug and found kilns just where I suspected. This was all done by deduction. There was no surface evidence whatsoever, but we found kilns there.

Ray: *If an in-ground kiln hadn't been found there (at the KN42 pit), would you have kept digging elsewhere on that mound?*

Don: No, not on that site, but I would have continued to look for in-ground kilns because I knew they existed. I wanted to prove the relationship between them and surface kilns, and to show that the progression from in- to on-ground was continuous.

Ray: *What is it that was so important about the discovery of 110?*

Don: KN110 was terribly important, because we could see a development of the technology needed to fire to higher temperatures. KN110 was an early kind of kiln built initially without a firewall. There were various stages of this kiln's use to show how a firewall developed during its working life.

The kiln floor started off as just a gentle slope, and then material fused onto the floor, became too difficult to remove without damaging the kiln, and so was tolerated and left. Gradually the kiln floor level in KN110, where the ware is loaded, became elevated above the firing chamber floor, and formed a step: and so a firewall had come to be developed.

The potters probably then began to realise burning wood for the firing could be contained in front of this wall. When stoking you didn't knock your pots; and the natural draft begins to work better with the hottest flame being drawn directly into the ware chamber, and of course this was necessary to be able to high-fire glazed ware.

We could see the stages of development, and we could see the reasons why that development took place. The firewall developed because of the use of the kiln, where you push it to a higher temperature when you have glaze wares in it. Over time in later kilns, a wall was deliberately

constructed, but we see the actual invention and development of the firewall in KN110.

That's how good discovery comes about - the development was really recognition of the actual events. The evidence of this firewall evolution showed the stages of an indigenous sequence of development; there was no external intervention.

Ray: *With your insights and intuition, you are like the potter of old. One of the things I think is useful to your work is your experience in the technical side of ceramics production acquired from your art school background. When you look at the kiln site you do so as a potter, not just an archaeologist. To me this is exciting because if you perceive that there's a perfectly logical production development to help with the business of making pots. Many others without ceramics experience may miss the evidence.*

Don: Exactly. That really summed up the situation; the potters were not introduced to new ways of potting from external ideas. I see a local evolution of kiln technology; see the reasons for the changes and developments. I recognised that there are logical reasons, reasons related to production, the consequences of temperature, consequences of the materials being used.

Ray: *It's much easier to model the negative space of an in-ground kiln than it is to construct a surface kiln?*

Don: The potters made surface kilns by creating an in-ground kiln on the surface, but you can't dig a kiln out of the air, so you have to construct it out of something. The later kilns were made out of brick, perhaps because the Thais used brick in architecture

a great deal. You wouldn't invent a surface kiln like the type at Ko Noi to be built with brick; you wouldn't design it, and you couldn't. Nobody would begin with brick to make a kiln like that. The potters had to invent a most complicated way of

end of their working life. For example, all show a large build-up of slag in firebox and chimney, worn bricks, and repairs.

Ray: *This indicates that the industry faded away; rather than suddenly being abandoned, the kilns were fired out to the end of their working life and just not rebuilt.*



*Figure 7. complicated brick pattern
to allow dome of pile
to be constructed using
an arch (figure 8)*

Figure 7: Photograph of brick work showing complex pattern to construct domed ovoid shape (kiln 13 Ban Ko Noi)

Don: The disaster theory came about when the huge piles of broken ceramics that surrounded the now fallen kilns were explained by violent breakage, perhaps by war-mongering invaders, but we know that quality-control over centuries led to the large piles of wasters that surround the kilns. However, the Burmese invasion of the late C16 AD is used by many writers as a terminal date for the industry. There is a general consensus that the export phase of Ko Noi ceramics production did finish around that time, coincidentally or not.

Ray: *You continued to research at Ko Noi after 1987?*

constructing the surface kilns because the rectilinear brick didn't suit itself to making ovoid forms (Figure 7).

The Thai potters invented, or re-invented the arch (Figure 8).

Ray: *Rather than a sudden end to the industry, there seems to have been a gradual decline?*

Don: All the evidence at the kiln site is that the last kilns, those upper most on the mound, were old kilns; they were fired to the

Don: I've researched at Ko Noi for more than 25 years now. I expect to complete a major project on the technology of the kilns and wares later this year. We have also worked extensively throughout the mainland Southeast Asian region – in Laos, in Cambodia, and this year again in Myanmar. Burma I expect will reveal much more of the ceramics story in the next little while.

Ray: *There is also a similar stoneware technology found throughout mainland Southeast Asia?*



Figure 8: Arch bricks clearly showing in collapsed roof of kiln KN 03 at Ban Ko Noi

Don: Another dimension: Myanmar. Ceramic production in Myanmar began quite early as well, and we are finding in-ground kilns and surface kilns there now, which are obviously part of the same chronology and part of the same history. According to old records, Burmese kilns in the eighth and ninth century AD were producing glazed ceramics. The cross draft kilns used in Myanmar are like those found in northern Thailand and so must have a common origin in a similar technological tradition.

I have no doubt Cambodia, Vietnam, and China have a different trend of a distinctly different type of cross draft kiln, without going into detail now.

Satisfaction: Don says: "It's all about establishing, I suppose, some order to the questions about the history of the ceramics in the area. I guess life's about little satisfactions and, for us, this is one of them" (*The Bulletin*, March 31, 1992).



Ray Hearn is a Research Associate of the Museums and Art Galleries of the Northern Territory, Darwin Australia, and is currently completing his PhD on the contemporary and historical stoneware production of the kilns at Ban Ko Noi.