gayagama kiln build

by Shana Angela Salaff

Gyan Daniel Wall is a ceramic artist who builds wood-fired kilns using an ancient Middle Eastern bricklaying technique developed for creating vaults and domes on houses and mosques. Shana Salaff documented the process this July at the Gaya Ceramic Arts Center in Bali, Indonesia.

The Australia- and New Zealand-based Gyan Daniel Wall heard of the Gaya Ceramic Arts Center in Bali, Indonesia when he met its director, Hillary Kane, at a wood fire conference in Tasmania last year. Already planning to visit Bali, Wall ended up spending much of that trip at the Gaya studio, making pots and helping to fire their first wood kiln. This year, he was invited back as interim director and to facilitate the building of two more wood-fired kilns at the center's new studio location. The first of these was an anagama and took form during a one-week kiln-building workshop followed by a two-week pottery making and firing workshop.

During the first week of July, Wall and participants in the workshop built the Gayagama. For this kiln, Wall used a Middle-Eastern bricklaying technique where arch bricks are laid diagonally against each other, causing each brick to be supported by the one underneath it. Thus, aside from two temporary forms used to support the front and back arches, no internal support was needed. The Gayagama was primarily constructed from raw handmade bricks made from local materials. The combination of the use of raw bricks and the self-supporting arch technique enabled the build to be closer to the kind of fluid and intuitive process that one associates more with making ceramic vessels than with kiln building. Though Wall's basic plan called for the general dimensions of the kiln, many decisions were made on site. The result is a beautiful, organic-looking, and well-functioning kiln.

Origins of the Technique

When asked about the origins of the technique, and how he came to use it, Wall explained, "As far as I am aware, Australian wood-fire potter/kiln builder Daniel Lafferty was the first to use this technique for


1


2


3


4


5

1 Loo Jia Wen (l) and Tok Yu Xiang (r) learning how to form bricks using wooden molds, then refining them.
2 Subfloor, firebox, and base of wall.
3 First four courses of raw bricks built up on the subfloor.
4 Laying in the floor using hard brick placed on a thin layer of silica sand.
5 Creating the back arch using a bucket for support.
6 Setting up the first 45°-angle course off of the back arch.
7 Laying in the first courses off the back arch.
8 View of completed back arch, beginning of the roof, and walls with built-in side stoke holes.
9 Loo Jia Wen (l) and Bruce McWhinney (r) building the front arch.

building kilns in modern times. The building technique is originally from the Middle East and is used for building brick domes and vaults without the aid of a form-work structure. Daniel came across this technique in a book called *Ceramic Houses*, written by Nader Kalili, and decided to translate it into kiln building. However, recently while researching kilns on the Internet, I came across an image of an ancient kiln in Thailand that also used this building method.

"Daniel is a close friend and mentor. I first met him and experienced his kiln-building techniques at the Hyperclay Gulgong event in 1998. I helped on a raw adobe brick anagama build that he facilitated at the Tanja wood-fire event in 2002, hosted by Yuri Wiedenhofer who had also built his kilns using this technique. I loved this simple free-form style of building using raw, handmade bricks, so that when it came time to build my own kiln that was the way to go."

The building method appeals to Wall on many levels, and fits with his clay working methods and philosophy. "In my work in general, I love the feeling of freedom and the sense of self-reliance and connectedness I get from using minimal technology and sourcing materials from nature," he explains. "I love engaging in the creative process in a very earthy and holistic way. I love the free-form style of building that this method allows; it is like making a big pot. The form evolves and unfolds during the building process. To me, working with raw materials, making work, designing, building, and firing kilns are all part of an integrated holistic co-creative process."

The Building Process

Before the build began, a typical Balinese–style tile roof was built over the kiln area. The dirt under the kiln, well compressed ahead of time, was graded at a slope of about 15 degrees. Staff at the Gaya CAC made over 900 bricks that were set out to dry—as much as the Balinese humidity would allow. During the workshop, participants learned how to make bricks, and added these to the stockpile (1).

Wall used kiln shelves and a center string line to map out the floor plan of the kiln and then created a sketch with the measurements. Once the workshop started, the kiln building began with digging in the footings for the walls and the steps for the floor, making the base of the kiln lower than the earth around it, creating natural insulation


10


11


12


13


14

and support. The front and side-stoke firebox areas were dug out even lower to create under-floor air grates, with a duct running under the floor from the firebox to the side-stoke that provided pre-heated air.

Local soft red bricks were used for the foundations and air grates of the fireboxes. These were laid with mortar made from the earth excavated out of the floor (2). In keeping with his philosophy of continual experimentation, and because there was a surplus of red brick available, Wall decided to use these extra bricks as an external support wall that was completed after the main walls were built. The chimney and walls were started using the raw brick and brick mortar, and the kiln grew in many directions at once.

When the walls were a few courses high (3), the hard firebrick floor was laid out on a thin bed of silica sand (4). Wall wanted the floor to be made from durable hard brick, and for the floor to be separate from the walls so that it could be replaced in the future if needed. Next, the red brick outer wall was built up, along with the base of the chimney.

Once the area between the chimney and the back of the kiln was high enough, the back arch was created, using a bucket as a temporary arch support (5). Raw bricks were shaved down on two sides to create tapered arch bricks. Spaces between the bricks were filled with mortar and then well compressed. The front arch was formed in the same way later in the process. After the key brick for each arch was hammered into place, the supports were removed. Once an arch was in place, the first arch course was laid diagonally over it at a 45-degree angle, with small chunks of brick filling in any large gaps (6). The second course of the back arch was laid in, supported by the first course and the side walls (7). Each successive course was staggered over the one before it. Side stoke holes were created (8) and blow holes were placed along the spine of the kiln. The front arch was built next. (9). The plastic bucket supported the structure until the key brick was inserted (10). The chimney was built using raw bricks laid in a circular pattern (12), with a slot created for a kiln-shelf damper. The brick above the slot was keyed in place so that it would never sag or bulge outward.

The staggered, self-supporting courses built off of the front and back arches met in the middle with one final key brick (13). This created a strong barrel vault with a beautiful herringbone-like pattern

10 Gyan Wall and Bruce McWhinney finishing front arch.
11 The roof is formed by laying in angled rows against the front and back arches.
12 The chimney is made of the same bricks, laid in a circular pattern. The damper is a kiln shelf.
13 Gyan Wall closes up the central arch from the inside.
14 The top view of the kiln after closing central arch.
15 The interior of the finished kiln, coated with a thin layer of clay and alumina hydrate.
16 Plaster is mixed by foot, then coated over the raw bricks above the courses of red bricks that lined the lower portion of the wall.
17 Here Loo Jia Wen (l), Bruce McWhinney (c), and Gyan Wall (r) apply a layer of plaster.
18 The finished kiln showing the stonework outer wall. The pizza oven can be seen between the chimney and the back of the kiln.

(14). Final details that were added to the kiln included a pizza oven built between the back of the kiln and the chimney (over the back arch and first courses). The mortar around all bricks, both inside and out, was compressed as much as possible, and the interior of the kiln was washed with a thin mixture of clay and alumina hydrate (15). Once the kiln was essentially complete, insulating plaster was mixed by foot. Three layers of plaster were spread over the kiln (16–17), for a total thickness of about 6 inches (15 cm). Wall added stonework around the kiln that is both functional—providing steps to climb on to see through the air holes and further buttressing for the walls of the kiln—and aesthetically pleasing (18).

Kiln Blessing

Because the kiln is in Bali, local custom must be followed. The Balinese, mainly Hindu, believe the gods must be given the correct offerings and prayers for any project to succeed. From rice fields to houses, vehicles to tools, marriages to cremations, the proper ceremonies are necessary. The Gayagama blessing took place on a drizzly day, with the local village priest and an assistant presiding. Blessings include fruit, flowers, food, baskets, and other forms woven from banana and palm leaves.

Following the kiln-building workshop was the making and firing workshop. Wall kept a small fire going inside the kiln to dry out the bricks and plaster during the first week. After a week of making, pots were loaded green into the kiln; both kiln and contents were fired together. The firing took three days and culminated in a pizza party on the last night. At the end of the firing, the firebox was filled with fuel and the dampers were closed for an intense reduction. After about six hours, (at about 1050°C), Wall re-stoked the kiln and then introduced a small amount of water and a little more air to re-oxidize the iron and to coax a rich red color out of the pots. Most of these pots were made with a red clay/ball clay blend that Wall has christened "Bali Bagus" (bagus means "good" in Bahasa Indonesian).

the author *Shana Angela Salaff is an artist and instructor living in Fort Collins, Colorado. In addition to contributing to CM, she has written for* Pottery Making Illustrated.