

# LEARNING BY DOING

by Y-Jean Mun-Delsalle



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Supplementing studies carried out in a typical classroom setting, some educators of vernacular architectural traditions have opted for a hands-on experiential approach to teaching and learning to pass on age-old knowledge of design and construction that is sustainable and sensitive to the local context, using natural materials like earth.



Having lived on three different continents, **Y-Jean** is no stranger to change. A peripatetic lifestyle such as hers allows her to move easily among cultures, and she quickly adapts and adjusts to new environments, rising to meet the challenges and opportunities that necessarily emerge from the school of life. She finds joy and solace in writing and has been contributing to various regional and international titles, shining a spotlight in particular on art, design and horology. When she's not writing, you'll find her dancing, practising yoga or dreaming up scenarios for a murder-mystery novel she hopes to write in the future.

In some educational environments, gone is the strict setting of learning by rote from heavy textbooks, replaced by an informal, on-site learning-by-doing approach. Students are asked to get their hands dirty, literally, by drying mud bricks to understand the use of indigenous materials. In places as diverse as New Mexico and Burkina Faso, we discover the teaching of traditional building practices that are ecological, cost-effective and aesthetic. It's about getting back to basics and focusing on architectural education that is not only taught through classic academic methodology, but that one learns in a traditional way through a hands-on experiential approach.

It is learning by doing: training builders and artisans that didn't go to design or architecture school, teaching them sustainable building practices that respect local cultures, peoples and their lands, and contribute to local communities and the environment, and reinventing traditional building materials for modern-day use to produce extraordinary examples of Green architecture. Despite their historical importance, there is limited interest in using these natural materials today, but an effort to promulgate the transmission of ancient skills through traditional training methods is attempting to halt the disappearance of such knowledge. We thus find millennia-old sustainable design principles meeting contemporary architecture.

## THE MUD HEN PROJECT

Take the case of The Mud Hen Project ([ahousemadeofmud.blogspot.com](http://ahousemadeofmud.blogspot.com)), a 40-acre earthen building and sustainable demonstration site in the foothills of the Ortiz Mountains in New Mexico started by John Corcoran and Liza Macrae. Constructed out of natural building materials like adobe, straw clay, and reclaimed and locally-harvested wood, matched with high-tech solutions like photovoltaic solar power, Mud Hen reveals how a less impactful lifestyle goes hand-in-hand with beautiful design, looking towards the human ingenuity of the past and its indigenous architecture to propel oneself into the modernity of today. As artists and homebuilders, Corcoran and Macrae made the move from New York to New Mexico to learn to build with adobe. In the process, they discovered "what an incredible and viable material earth is, one that may be utilised in response to all sorts of building construction. John has been a builder since the early '70s, and all that experience and history learning what one could do with earth really stirred his imagination," says Macrae.

Thus, the couple launched The Mud Hen Project last year to share what they had learnt. They will be building a small addition to their home once spring arrives, and have invited friends and members of the community to come help build in exchange for learning, as a sort

1 Simone Swan's vault building workshop held last October 2 Nubian vault mason Saidou inside his house in Boromo, Burkina Faso

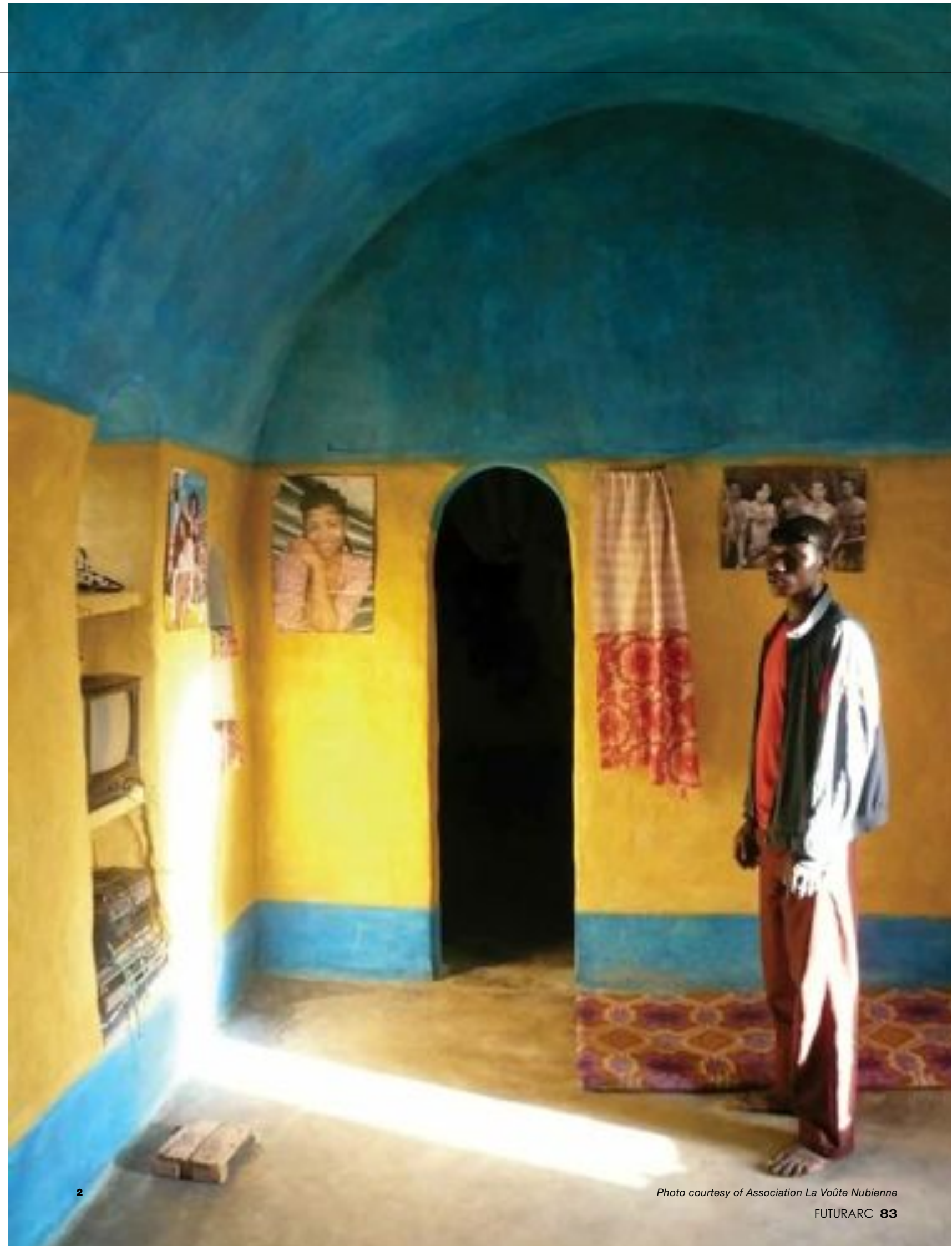


Photo courtesy of Association La Voûte Nubienne

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of no-fee casual workshop or informal mentor programme, being primarily focused on educating the owner-builder. Macrae reveals, "We hope to teach experienced builders that a home should not be valued by how many square feet and/or how many bathrooms it has. We also wish to impart that earth is not only a 'green' material, but an incredibly beautiful material to build with, be it for earthen floors, as a plaster or to paint with. We also hope to get people to realise that a smaller home is extremely liberating for several reasons: they are less expensive to build, can be built quickly and slowly added to if need be, use less embodied energy to build and are easier to maintain. We also wish to teach the mechanics of how to build with earth, how to lay adobe, plaster with earth and make paint from earth. As simple as this knowledge is to learn, it is not well known or understood as a viable alternative."

Additionally, each Sunday, weather permitting, they hold an open house where they fire up their adobe bread oven and share pizza, wisdom on sustainable building and fun. In fact, people are able to learn directly from their home as it is a showcase of sustainable architecture. Macrae explains, "I am continually surprised by how our small home touches people you least expect it to. The quiet of the location and the care and love of a handmade house is quite powerful. I believe people learn a great deal through experience. Inviting people to our home and sharing a meal often opens individuals to new possibilities as to how they can live. For our more well-heeled friends The Mud Hen Project speaks of living a simpler, less stressful life."

**ADOBE ALLIANCE**

Corcoran and Macrae's friend, Simone Swan of Adobe Alliance ([www.adobealliance.org](http://www.adobealliance.org)), which promotes the innovative use of earthen materials to establish a new building standard for sustainable homes and communities, is equally passionate about the wonders of earth architecture in terms of comfort, durability and beauty, having studied in Cairo with Egyptian environmental architect Hassan Fathy.

Near-extinct North African domed, arched and vaulted architecture based on timberless earth brick domes and vaults, a centuries-old approach found in many parts of the world, was revived through the pioneering work of Fathy, in response to the loss of traditional building methods in Egypt brought about by decades of indenture and changes caused by Western

economic and industrial influences. Committed to helping poor communities suffering from inadequate housing, he taught them indigenous architectural methods that had been perfected by their ancestors, and used a widely-available, low-cost material to show that poverty should not stop one from erecting one's own house. He designed affordable and beautiful habitats using bricks made of mud and straw or grasses after noticing the survival of remarkable examples of Egyptian mud vaults and domes dating back to Pharaonic times.

Today, Swan hosts hands-on workshops on designing and building adobe vaults and domes that apply traditional North African earth building practices to the desert climes of the southwestern United States, while incorporating knowledge learnt from local masons in the Chihuahuan Desert. They attract a very high calibre of people, who practise building foundations, mixing mortar, hefting adobe bricks to the site, placing them properly, taking measurements, handling the adze, etc. Swan proposes adobe architecture to create "shapes that have echoed throughout human history in all parts of the world where earth is useful. I teach contemporary design by keeping it simple and essential, devoid of decoration. The very plaster of earth and water in the interiors yields an ineffably pleasing and atavistic feeling of the immediate moment."

She advocates a hands-on approach to teaching and learning, and feels that students learn authenticity through this method rather than from a traditional classroom setting. Participants are transformed by the experience of coming into contact with the earth, which is a "beautiful, inexpensive, magical element to work with (it is a strong, spiritual experience to handle mud up to the armpits). It is a pleasure to fashion mud bricks by hand; it is forgiving: a mistake is swiftly corrected. There is little cost in transport from the source and mud is non-toxic since it is not industrially produced. I consider the salubriousness of handling this material of utmost importance; also dwelling in it is health-giving," discloses Swan.

Boston-based architect Eugenia Magann, who attended Swan's weeklong workshop on vault construction last October, describes the experience: "What I can apply to my practice is a renewed appreciation for a reductive way of building. It seems as though my practice so far

has been an additive way of working, transporting most goods to the site, and an exhaustive layering of industrial materials in order to make state-of-the-art facilities. Adobe, however, starts with local resources. The structure is then built by hand with very little money needed. I found Simone's teaching method to be the most appropriate to this topic—we built a portion of the vault ourselves under the tutelage of the instructors. We were covered in mud, balancing on scaffolding, trimming adobes with a machete, preparing the position with mortar and hoisting and tapping adobes into place. This is the best way to teach and learn the art of adobe. It is because of this teaching method that I was able to fully realise the simplicity of assembly, the labour of the construction and appreciate the beauty of a home made entirely by hand."

Stevan de la Rosa Tames, who was an intern with Adobe Alliance, notes, "About her teaching method, it's mostly all hands-on. I learned more than just about building vaults at Simone's three years ago. Earthen architecture is something one keeps learning with every project one is a part of, and that I apply to my career as a natural builder/facilitator all the time." Nepalese architect Nripal Adhikary, who participated in Swan's weeklong practical plastering workshop in 2005, divulges, "My appreciation of earthen structure and inspiration to pursue this field came after working and staying at her house in Presidio, Texas, and after taking the workshop. Nepal is not dry like New Mexico or Texas. Our climatic condition is wet and we have lots of earthquakes, so flat roofs or exposed vaults would not work in our context. We have to improvise. I have been using bamboo with adobe in all my construction; they work wonderfully well."

**NUBIAN VAULT TECHNIQUE**

In the Sahel, many are trapped in a vicious circle of poverty, building homes out of increasingly rare timber and expensive, imported and fragile sheet metal that are not only outside of their budgets but also pollute the environment by their production and transportation, putting these families into debt and continuing a cycle

**3, 4 & 7** Simone Swan's adobe house in Presidio, Texas, is a showcase of the possibilities of sustainable building **5** A dome building workshop held by Simone Swan's Adobe Alliance in 2007 **6** A 2005 workshop on plastering, vault building and dome initiation taught by the Adobe Alliance **8** Simone Swan's vault building workshop held last October



Photos 3–7 courtesy of Yasmina Rossi



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**Because this is the most effective way of learning the necessary skills, this is traditionally the way new things are learnt in rural societies in West Africa and apprentices learn in context, in their own environment and, at the same time, contribute to the construction of an actual building.**

**9** A Nubian vault building in N'Golofala, Mali **10** A Nubian vault building in Pelengana, Mali **11** The first Nubian vault mosque in Mali, in the village of Dendjola **12** Thomas Granier, founder of Association La Voûte Nubienne, and villagers from Zamo Village, Burkina Faso, on a Nubian vault work site in 2003 **13** A Nubian vault construction site in Tiodié Village, Burkina Faso, in 2006 **14** Fabrication of small mud bricks for the construction of a Nubian vault by laying them out to bake in the sun

of dependence and weakening family, local and national economic systems. For the past 30 years, deforestation, drought and rising population numbers have led to the disappearance of the wood used in traditional Sahelian constructions (flat roof terraces). The Nubian vault, an ancient African technique originating from the Nubian region of Egypt for the construction of buildings covered by earthen roofs, is an economic, durable, aesthetic, comfortable and safe alternative that uses readily-available local materials. Traditionally used in Sudan and Central Asia, but until now unknown in West Africa, it does not overlook the Sahelian architectural aesthetic, as a traditional flat roof terrace may be constructed on top of the vault, and mud replaces the use of fast-vanishing wood.

Through the Association La Voûte Nubienne's (AVN) "Earth Roofs in the Sahel" programme ([www.lavoutenubienne.org](http://www.lavoutenubienne.org)), the populations of sub-Saharan Africa have been able to sustainably

improve their quality of life through access to this ancestral architectural technique that has been adapted to local climate conditions, standardised and radically simplified to facilitate learning, which includes the use of a guide cable to delineate the vault radius and incorporation of plastic waterproof sheeting in the roof for added protection during the rainy season.

AVN was founded in 2000 by French artisan, Thomas Granier, and Burkinian cultivator, Séri Youlou, to assist with building Sahelian homes, as over 70 percent of a population of 150 million inhabitants in the Sahel don't have access to sustainable and decent housing. The Nubian vault technique provides long-lasting buildings using basic tools, 100 percent local materials (mainly mud bricks dried in the sun) and simple technical skills, so it's easier on the pocket, preserves the environment and restores local usage and the aesthetic of roof terraces. Manpower represents 95 percent of the cost, allowing Sahelians to



Photos 9–14 courtesy of Association La Voûte Nubienne

exchange building work for products or services instead of cash, or to self-build if they lack money. While it creates jobs locally and limits the exodus of the workforce, it also provides more solid and better-insulated habitats than sheet metal housing, with improved thermic and acoustic comfort. Thus, housing has been adapted to the socio-economic, environmental and cultural context of Sahelians, leading to the appropriation of a new architecture that responds to their needs.

The focus of AVN is actually not to build but to teach how to build. Consequently, builders and their apprentices work directly for clients. AVN ensures the training of local apprentices in the technique, giving them a new job and source of income, encouraging them to become independent entrepreneurs who then go on to build a network of clients, train other local artisan-builders from A to Z and run their own businesses. Apprentices are trained directly on the worksites themselves by builders that are already operational, and taught a technique that's rather easy to learn through practice. On average, it takes two building seasons before a builder is ready to train someone else. The idea is that one builder will learn from another, acting as instructors and transmitting their savoir-faire.

The Nubian vault technique has been adapted

to match local time-honoured ways of imparting skills, particularly in rural communities, so that it is easy to put into practice and teach by example. Tony Kaye, a member of the AVN Management Committee who's responsible for international relations, denotes the advantages: "Because this is the most effective way of learning the necessary skills, this is traditionally the way new things are learnt in rural societies in West Africa and apprentices learn in context, in their own environment and, at the same time, contribute to the construction of an actual building."

Apprentices receive on-the-job training for free, and entrepreneur-builders are able to undergo advanced training to further hone their skills. To ensure that the builders adopt the technique as their own and become autonomous entrepreneurs, AVN helps them get in touch with potential clients, develop abilities as trainers and learn skills such as quantity estimating, costing and site management until they can stand on their own two feet. It also works to create demand and supply until the establishment of a self-sustaining local market, and then withdraws.

While the AVN programme is not the first in recent times to try to revitalise the use of Nubian vaults for domestic architecture in the Sahel, one of the factors that differentiates it is that the education of builders is carried out

on real construction sites that become training environments, and not in formal training centres removed from the local community, as practice is often far from what theory dictates. With building based on empirical knowledge, each worksite then becomes a training site, and builders familiar with earth brick construction can learn vault construction fairly rapidly, in two to six months of apprenticeship, depending on prior experience. They acquire the knowledge to build simple one- or two-storey houses comprising one or more Nubian vaults, or community-use buildings like mosques, churches, schools and dispensaries. As of last August, there were an estimated 150 Sahelian builders trained, €360,000 of local salaries generated and 900 Nubian vaults constructed in Burkina Faso, Senegal and Mali.

As many forms of traditional architecture have been threatened with obsolescence, why revive and preserve this Egyptian architectural heritage that would otherwise have been lost? Kaye replies, "Because it is absolutely appropriate for the conditions now in the Sahel, where traditional roofing techniques based on the use of large quantities of timber can no longer be used, and the only alternative—corrugated iron sheets on sawn timber supports—is expensive, non-sustainable, uncomfortable and unhealthy (the average lifespan in the Sahel of a corrugated iron roof is five years)."