

Timbrel Vaulting on Mfangano Island, Kenya

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My proposal for the RAMSA Travel Fellowship is centered around an investigation of timbrel (Catalan) tile vaulting, a centuries-old Mediterranean construction technique that has renewed interest due to its formal flexibility and ability to construct geometrically complex surfaces and structures. The main body of research will be carried out on Mfangano Island, Kenya between June and August, 2013 and culminate in a collaborative construction with a team of local craftsmen of a small structure that employs the tile vaulting technique. This structure will be a demonstration of a traditional construction method being used through an informal design process. Upon completion, the structure will serve as Africa's first entirely wind/solar-powered radio station.

Last summer I had the opportunity to travel to Mfangano, a Kenyan island in Lake Victoria, to participate in the construction of an Aquaponics system (*see page 10 of the attached portfolio*). I not only learned many hands-on construction skills, but also gained an understanding of ***informal design in developing countries***. Throughout the course of my stay I began to see the potential for future design projects that could be carried out in partnership with the community and the *Organic Health Response* an NGO that has been operating the Ekialo Kiona Community Center on the island for over 5 years.

For this travel experience I propose the following project that seeks to test a traditional building method in a place that most of the world has no idea exists. Both structurally efficient and environmentally sustainable, recent construction projects such as the *Mapungubwe National Park Interpretive Center* in South Africa by Peter Rich and *The Sustainable Dwelling Unit* in Ethiopia by John Ochsendorf (MIT) and Philippe Block have shown that tile vaulting is a favorable method of construction in developing areas that are dealing with deforestation and cannot (or should not) rely on wood as a primary building material. By adapting the clay tile, which is traditionally used in timbrel vaulting to a soil-cement-based tile, there is an opportunity to construct structures out of locally-made materials without the need for extensive amounts of wood scaffolding or centering.

The first phase of the research project will involve precedent studies and learning the timbrel vaulting technique. In-depth studies of historical examples by Rafael Guastavino and Eladio Dieste as well as contemporary experiments by John Ochsendorf and Philippe Block will help contextualize this project and inform physical experiments that are to be carried out at the University of Pennsylvania in Spring 2013. These experiments will produce a series of tile vault prototypes constructed under the supervision of Professor Lindsay Falck and Lecturers Fernando Vegas and Camilla Mileta (*funding acquired from other sources*).

In the beginning of June, I will travel to Kenya with the knowledge acquired through this preliminary research. I will first gather all necessary tools, supplies and building materials in Nairobi and Kisumu. Next, I will travel to Mfangano Island to begin more vaulting experiments with the local craftsmen called the *Ekialo Kiona Sustainable Design Guild*. We will fabricate stabilized soil tiles and construct prototypes to gain an intimate understanding of the ancient building method. ***The goal is to make a comprehensive technology transfer aimed at empowering the craftsmen with new skills they can continue to use and innovate.*** Beginning no later than July 1st we will construct the *Ekialo Kiona Radio Studio* using the tile vaulting technique. This structure will serve not only as a demonstration of this building method, but the larger community being reached through radio broadcast. The data collected during the experiments and construction will contribute to a larger body of studies on timbrel vaulting in developing communities and inform the subsequent phases of this project.

This proposed trip would last approximately 9 weeks starting in the beginning of June. The fellowship would primarily fund the travel to and from Mfangano Island as well as the tools, supplies and building materials needed to carry out the research and construct the final prototype. The travel sequence to the island will be as follows:

Flight - New York City through Amsterdam to Nairobi
Flight - Nairobi to Kisumu
Hired Car - Kisumu to Lwanda
Ferry - Lwanda to Mbita
Public Boat (50' Canoe) - Mbita to Mfangano