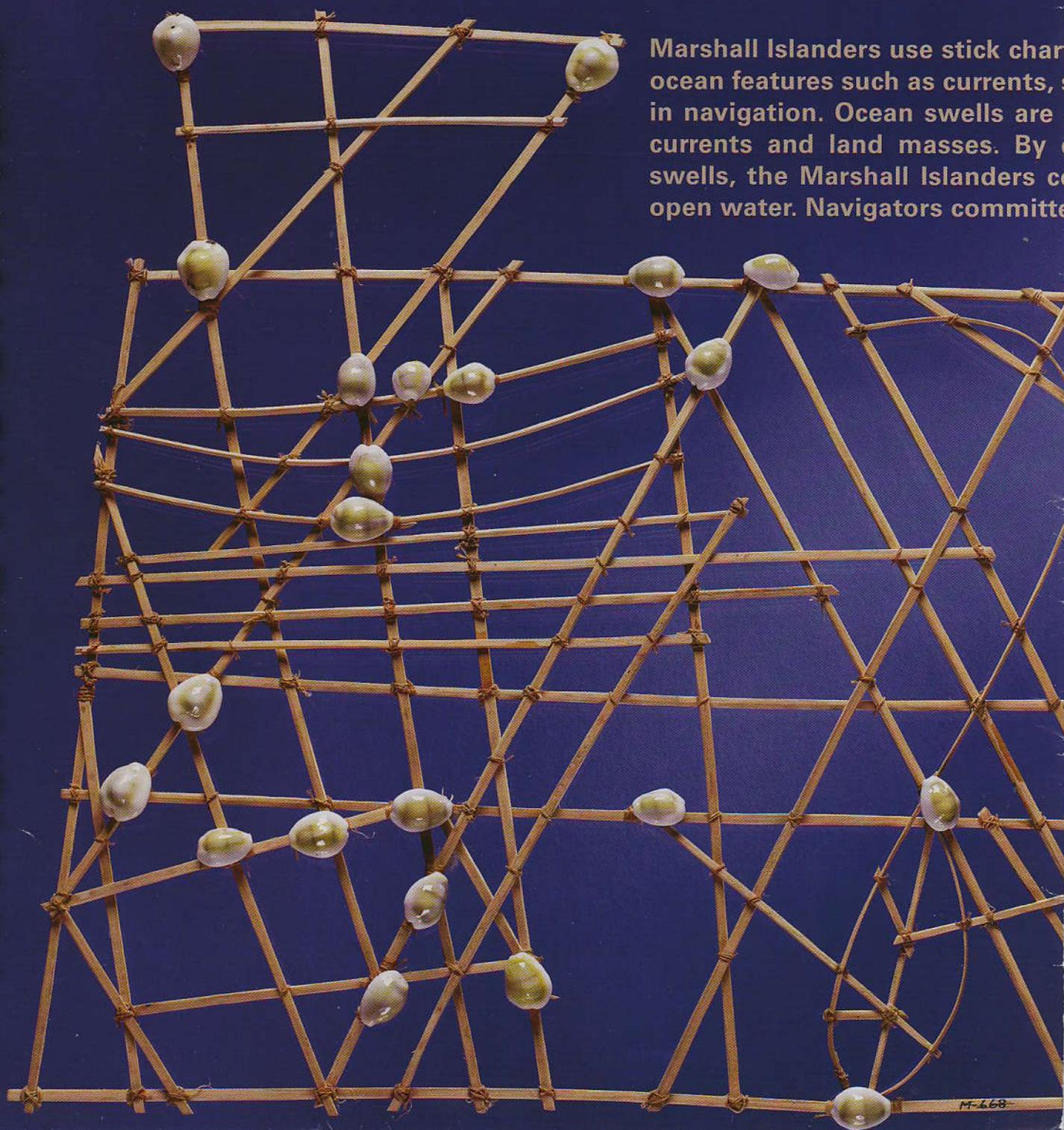


# ETHNOMAT

EXPLORING THE ROLE OF MATHEMATICAL THOUGHT

NAVIGATING THE OPEN SEAS



Marshall Islanders use stick charts to represent ocean features such as currents, swells, and land masses. Ocean swells are represented by the spacing and orientation of the sticks. By observing the patterns of swells, the Marshall Islanders can navigate the open water. Navigators committed

# THEMATICS

HT IN TRADITIONAL AND INDIGENOUS SOCIETIES

s to map the interaction of  
wells and islands as an aid  
affected by depth of water,  
charting changes in ocean  
ould accurately navigate in  
d these charts to memory.

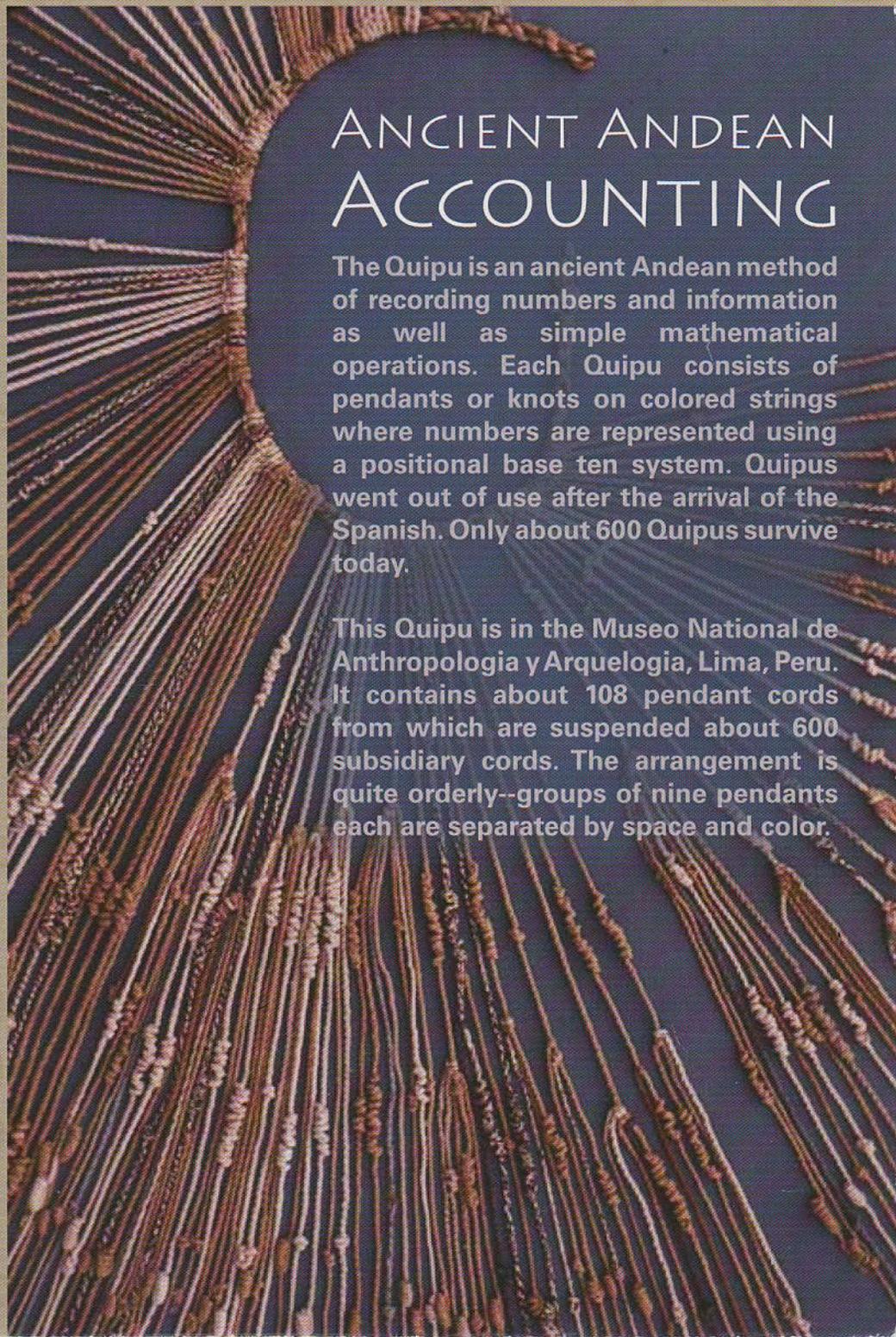
Meddos and other forms of stick charts became known beyond the Marshall Islands in the late 1800s with the arrival of Europeans. Stick charts went out of use when canoe travel between the islands ended during World War II.

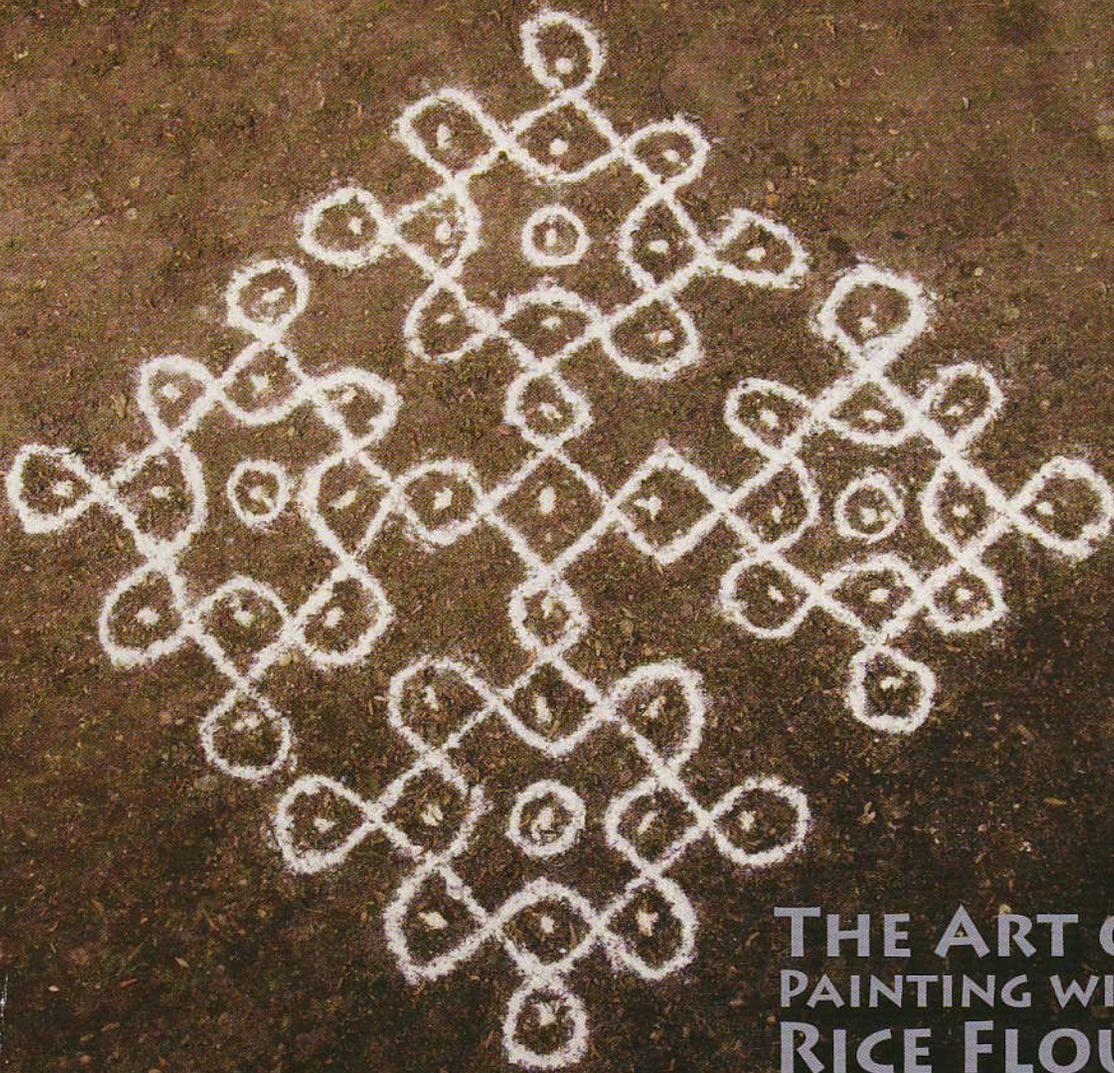


## ANCIENT ANDEAN ACCOUNTING

The Quipu is an ancient Andean method of recording numbers and information as well as simple mathematical operations. Each Quipu consists of pendants or knots on colored strings where numbers are represented using a positional base ten system. Quipus went out of use after the arrival of the Spanish. Only about 600 Quipus survive today.

This Quipu is in the Museo Nacional de Antropología y Arqueología, Lima, Peru. It contains about 108 pendant cords from which are suspended about 600 subsidiary cords. The arrangement is quite orderly--groups of nine pendants each are separated by space and color.





## THE ART OF PAINTING WITH RICE FLOUR

Background Kolam design computer generated by Darrah Chavey. Traditional design constructed by Rhiannon Roselle. For more information: <http://www.homsigmaa.org>. Photo Beloit College/Jeff Woods.

**The Kolam, also known as Rangoli, is a transient art form throughout the Indian subcontinent. It dates, perhaps, as far back as 2500 B.C.E. Traditionally, colored rice flour is used by girls and women to create designs on the floors of prayer rooms, courtyards and thresholds. A symmetric grid of dots is created and the flour is poured, either connecting the dots or woven between the dots, to create various designs. The designs incorporate ideas that are comparable with those found in tilings and graph theory. This Kolam is a variation on the Anklets of Krishna design. The background Kolam is known as the Vine Creeper.**

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STORY  
IN THE

Traditional design  
Photo Beloit Col

**The Sona of t  
is passed on  
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cubs." The lo  
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awareness of  
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## Presented by the Mathemati

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For additional material visit the HOM SIGMAA web site at [www.homsigmaa.org](http://www.homsigmaa.org). MAA Study Te

# ONA

TELLING  
SAND

Constructed by Darrah Chavey and Rhiannon Roselle. For more information: <http://www.homsigmaa.org>.  
Image by Jeff Woods.

The Angola and Congo regions of Africa are drawn in the sand while a story is being told. The practice is passed from story-teller to story-teller. A grid of dots is used to "weave" the drawing as a single line made by tracing up the finger from the sand, or redrawing any part. This lusona is called the "Lioness with two cubs." The central rectangle is the mother lion (head on the left); the parts above and below the mother are two cubs (heads on opposite sides). The rectangle is of relatively prime dimensions, indicating an awareness of the theorem that those are the rectangles which give single line drawings. The addition of squares in this case  $2 \times 2$  squares, indicates an awareness of the theorem that any square can be added to a rectangle along one side and maintain the one-line property.

Mathematical Association of America 

Poster created by Amy Shell-Gellasch. Special thanks to Marcia Ascher and Darrah Chavey.

For more information can be found at [www.maa.org](http://www.maa.org). Poster design by Elizabeth Holmes Clark, 2008.