The Secrets of the Incan Khipu

By Dan Vergano

Hidden atop the Andes, the mysteries of the lost Inca Empire are yielding to today's technology. Archaeologists are gaining a new appreciation for the elaborate Stone Age skills that allowed the Inca and their predecessors to rule Andean South America. A young empire snuffed out by the Spanish conquest in 1532, the Inca left behind monumental buildings and enigmatic knotted strings, thought to represent numbers and an undeciphered writing.

In August 2005, a Harvard team using an innovative computer database showed how *khipu* (KEY-poo), the elaborate knotted strings used by the Inca, served as ledger books for their empire.

Archaeologists have long known that the Inca tallied numbers using *khipu* knot sequences, but they cannot interpret knot clusters that may be words. A computerized comparison of *khipu* hidden in the remains of a high-ranking Inca's home suggests those knotted cords held a tally of the empire's demands for tribute labor from a town called Puruchuco.

And the analysis may have identified the first definitive *khipu* "word," a separate knotted string pattern atop several *khipu*. The word may identify a place or official involved in the tally.

The cache of *khipu* from the Puruchuco site was uncovered in 1956 but was meaningless before the computer analysis, the research team reported in the journal *Science*.

Anthropologist Gary Urton of Harvard University and his colleague Carrie Brezine now have about 300 of the 700 catalogued *khipu* in a computer database. They hope that database will one day reveal a *khipu* whose numbers correspond to one of the Spanish conquistadors' documents known to have been taken from a *khipu* census.

Unraveling the meaning *of khipu* from such a translation would tell scholars what meaning - whether it be alpacas, labors or other tributes - is attached to the numbers on many other strings.

And it would provide a powerful new understanding of how the Inca ruled their mountainous empire, Urton says. From the capital, Cuzco, the 15th-century empire ruled from Colombia to Argentina at the height of its powers. Using *khipu* tallies, Inca rulers relied on a vast road system and bureaucracy to move food, people and materials over the Andes to various vassal cities.

By Gary Urton via Reuters
Ancient purse strings? *Khipu,* a system of knotted cords, helped the Inca keep track of an empire.

History made in knots, numbers

Scientists know from records left by conquistadors that khipu were more than mere record-keepers. They also stored the legends and history of the Inca empire.   ^

"But all we really know from" them are the numbers," Harvard's Gary Urton says.

Scholars do know those numbers were organized in a decimal system like our own, with separate columns holding multiples of tens, hundreds and so on, all represented by knots on cords.

Each *khipu* started with a primary cord, usually spun from alpaca wool. Pendant cords with knots tied from them hung from the primary.

Researchers suspect that the color and position of the pendants, as well as how they were tied to the primary cord, all had meaning to Inca bureaucrats, who were trained from childhood in how to read *khipu.*

Knots representing numbers generally came in three kinds, Urton says:

»• Figure-eight-shaped knots represented a 1.

^ Long knots represented numbers 2 to 9, depending on the number of turns.

> Single knots represented units of tens and hundreds.

Zero's knot was simple. It was no knot at all, Urton says, "just a blank space on the string."