



Digging up a modern way of tracking ancient text

Hopkins scientists to use Web to catalog cuneiform

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PUBLISHED ON FEBRUARY 16, 2003

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Imagine the difficulties of studying cuneiform. First, you have to learn to read the ancient Middle Eastern characters, a feat only a few hundred people worldwide have mastered.

Once you've learned to decipher cuneiform, which takes at least three or four years, tracking down reading material can be just as hard. The clay tablets are often discovered in pieces. "One fragment could go to a museum in Britain, the other could be in Philadelphia and maybe the third is in Britain. You can spend a third of your time just doing footwork to try and track everything down," said Piotr Michalowski, a professor of ancient Near Eastern languages at the University of Michigan.

But a team of professors and scientists is working at the Johns Hopkins Applied Physics Laboratory in Howard County and on the Homewood campus in Baltimore to change that by creating an Internet library of scanned cuneiform tablets.

Since the rise of the Internet, several other universities, including the University of California at Los Angeles and the University of Pennsylvania, have begun digitally cataloging cuneiform.

The Hopkins project, funded through a \$1.55 million grant from the National Science Foundation, is the only one that will attempt to replicate cuneiform in three dimensions, which many say could be more useful to scholars than traditional pictures.

"It's a very noble goal. We have to be able to see different shadings to identify poorly preserved cuneiform," said Robert Englund, a professor of Assyriology at UCLA and the director of the Cuneiform Digital Library Initiative, which is cataloging tablets in two-dimensions.

But because cuneiform tablets generally have writing on all six surfaces, bringing the ancient writing into the 21st century won't be easy.

"We have to invent machines to do this because working in 3-D is much harder than 2-D," said Dean Snyder, a scholarly technology specialist at the Johns Hopkins University who is a part of the project, dubbed the Digital Hammurabi Team after an ancient legal text.

Written history

Cuneiform first appeared about 3200 B.C. and the last texts were published about A.D. 75, scholars say. Most deal with everyday transactions such as taxes and business deals, but others have religious themes and one contains the Epic of Gilgamesh, one of the first known epic poems.

As a form of writing, cuneiform is similar to Chinese -- a mixture of picture words and words formed from a syllabic alphabet comprised of hooks and wedges. Documents were usually written on wet clay tablets with long reeds. When the clay dried, the records became permanent.

Because it's difficult to ship the tablets and because transporting them, when that is possible, is expensive, most cuneiformists who don't have access to them rely on photographs or drawings sketched by hand. That has serious drawbacks, scholars say.

"You don't know how accurate a drawing is, and a photo has to be properly lit to be any good," Snyder said.

Reaching in the dark

Furthermore, many cuneiform tablets have never been published in

books or magazines, "so it sometimes feels like you're reaching around in the dark," Michalowski said.

"You can come up with this wonderful idea based on [published] tablets, but it's frustrating because you can't prove it unless you get a travel grant to go view the actual tablet," he said.

Cuneiformists have long dreamed of a way to cut through the tedium of digging through old tablets and writing to curators of museums and private collections with requests to view cuneiform collections.

"But technology has never really caught up until now," Snyder said.

Rendering objects in three dimensions is much harder than in two, scientists say. Part of the problem is there is relatively little demand for 3-D camera equipment.

And most of the existing equipment either can take grainy, large-size photos, which wouldn't have enough detail for cuneiformists or are microscopes that give too much detail, scientists say.

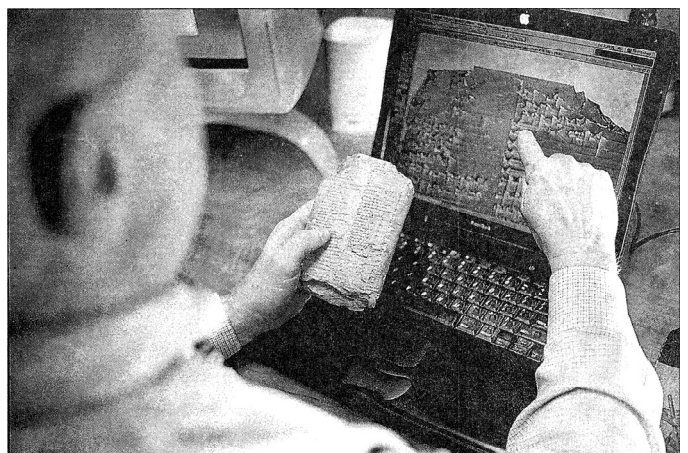
"Right now, most of the machines are either too much or not enough," said Donald D. Duncan, an engineer at the Applied Physics Laboratory, who is doing most of the technical designs on machine.

Duncan and others have found a Canadian firm that produces a scanner that they believe can be adapted to scan cuneiform.

But the machine will have to be significantly modified to handle delicate clay tablets and to scan six-sided objects.

The thought of having an easy-to-use 3-D catalog at his fingertips makes sense, Michalowski said, although he acknowledges being a "traditional" person who enjoys the romance of hunting through musty collections to try to prove his theories.

"It's kind of like being Indiana Jones, without the beautiful women and explosions," he said. "But I guess we're organizing. I'm sure that in five or 10 years, the Internet will be the only way we study," he added with a sigh. Dean Snyder, a technology specialist at the Johns Hopkins University, compares a symbol taken from an ancient tablet with its matching cuneiform symbol on a 3-D computer program.



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