

Recent discoveries in the Near East and Pakistan are forcing scholars to reconsider traditional ideas about writing's evolution. But a lack of fresh data is making their task difficult

# Writing Gets a Rewrite

**BAGHDAD**—The inventor of writing, according to Mesopotamian legend, was a high priest from the great city of Uruk who one day began making marks on wet clay. Five thousand years later, German archaeologists triumphantly discovered the oldest examples of writing—called cuneiform—200 kilometers south of here in a long-buried Uruk temple, providing what seemed to be scientific confirmation of the ancient myth.

But that heroic story is quietly being shelved by scholars as new finds in Egypt and Pakistan over the past decade, and a radical reinterpretation of clay objects found in Mesopotamia's heartland and its periphery—today's Iraq, Syria, and Iran—have

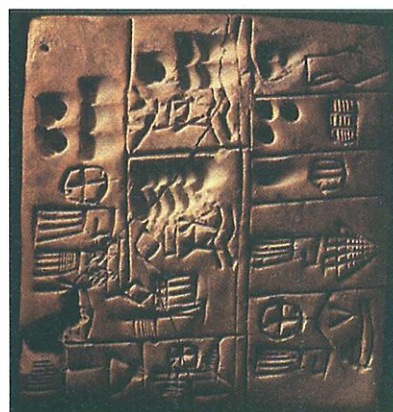
bridge, U.K., who spoke at a recent conference here.\* “In a sense, writing appears as the last step in the long line of evolution of communication systems.”

The revised text on writing's history, however, is far from complete. Scholars say they are hampered by a lack of fresh data from Near Eastern sites, the reluctance of museum curators to allow potentially destructive testing of critical artifacts, and the limitations of radiocarbon dating. Moreover, the 1989 discovery in Egypt of an ancient and sophisticated writing system has fueled a new debate: Did Mesopotamia's literacy trigger that of Egypt, as is traditionally supposed, or was it the other way around—or neither? More recent finds showing that the Indus script likely was evolving around 3300 B.C.—at about the same time as its Near

But tracing the predecessors of cuneiform, hieroglyphics, and Indus River valley script becomes increasingly tricky the farther back in prehistory researchers probe. “We really have very little information prior to 3500 B.C.,” says Piotr Michalowski, a cuneiform scholar at the University of Michigan, Ann Arbor. “It comes down to a matter of faith.”

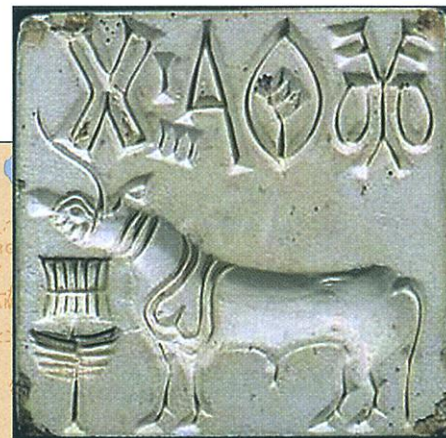
## Token theory

For decades, archaeologists in Iraq, Syria, and Iran dug up curious ceramic pieces—numerous small tokens in diverse geometric



### Uruk

An example of protocuneiform, which developed before 3000 B.C. in Uruk. Accurately dating these early tablets has proved problematic.



### Harappa

Indus River script developed far earlier than once believed; this sample found in Pakistan dates to before 3000 B.C.

### Abydos

Early writing found in Egypt. Scholars agree that the findings led to hieroglyphs but disagree over this system's sophistication.



necessitated a different account.

Most researchers now agree that writing is less the invention of a single talented individual than the result of a complex evolutionary process stretching back thousands of years before the first hard evidence of writing surfaced in Mesopotamia, Egypt, and the Indus River valley about 3300 B.C. “The prehistoric communication revolution began some 9000 years ago,” says Joan Oates, an archaeologist at the University of Cam-

East counterparts began to coalesce—have deepened the mystery. Some researchers, pondering the near-simultaneous appearance of seemingly separate protowriting systems in three distinct civilizations, suggest that they may have developed independently in response to similar circumstances.

\* International Conference of the Fifth Millennium of Writing, Baghdad, 20–26 March.

shapes. They also found hollow clay spheres with markings on the outside from later periods and with these same small ceramic pieces inside. Those ranged in age from about 9000 to 4000 years old but were dismissed by most researchers as ancient games and relegated to museum storage bins.

But Pierre Amiet, an archaeologist at the Louvre in Paris, suspected as early as the 1960s that the mysterious objects were actually used to count goods. Since then, his



student Denise Schmandt-Besserat, now at the University of Texas, Austin, has elaborated on that theory. After studying thousands of tokens, she proposed in the 1980s that different shapes signified different commercial objects—a cone shape, for example, represented a measure of grain; a cylinder connoted an animal. The number of tokens indicated quantity. “It was the first visual code, the first system of artifacts created for the sole purpose of communicating information,” she says.

Despite her colleagues’ skepticism, Schmandt-Besserat went on to theorize that the system grew and evolved over thousands of years. By the end of the fourth millennium B.C., tokens represented different animals; processed foods such as oil, trussed ducks, or bread; and manufactured and imported goods such as textiles and metal, she says. By about 3500 B.C., concurrent with the growth of major cities like Uruk, the tokens were often found in hollow clay spheres, like envelopes; markings on the outside indicated the sorts and quantities of tokens within.

Ultimately, the tokens were dispensed with altogether, and the clay spheres became clay tablets with impressed marks representing objects—marks that evolved into early cuneiform, according to Schmandt-Besserat. By 3100 B.C., someone—perhaps indeed an Uruk priest—began to use a reed stylus on wet clay to make the more precise markings that comprise cuneiform. This form of writing continued at Uruk and other Mesopotamian sites until the latter days of the Roman Empire, much as Latin survived as an elite and holy language in Europe for more than 1000 years after Rome’s fall.

The token theory, according to some scholars, helps solve a nagging puzzle. “The great mystery until now was how a full-fledged system emerged so suddenly,” says William Hallo, an Assyriologist at Yale University. “Now we can see a progression of successive steps [over] a fairly extended time.”

But many Assyriologists say Schmandt-Besserat goes too far in postulating a sophisticated representational system before 3500 B.C. Oates prefers to call the tokens “a means of remembering rather than a genuine recording device.” Eleanor Robson, an Assyriologist at Oxford University, U.K., says the later arrangements of tokens in spheres

clearly are “a coherent system”; even so, she says, it is hard to identify the inside objects definitively from before 3500 B.C. “Most are little blobby lumps,” she says, “and it’s hard to know which are tokens and which are beads or weights.”

Skeptics also insist that there is little evidence that cuneiform grew directly out of this system, as Schmandt-Besserat maintains. Token shapes and the impres-



**Old times.** Gunther Dreyer found ancient writing in Egypt that may predate cuneiform.

sions made on the spheres, she says, inspired cuneiform’s representations for objects such as sheep and oil. But others are not so sure. “I accept the tokens as the earliest form of writing, but I see no good evidence that incised tokens are precursors” to cuneiform, says Robert Englund, a Sumerian scholar at the University of California, Los Angeles. Paul Zimansky, a Boston University archaeologist, agrees. “There’s no indication of linkage,” he says.

A few scholars take a harder line. Michaelowski holds to the idea that cuneiform is a separate development that may have been influenced by tokens and cylinder seals—also widely used in ancient Mesopotamia—but that is unique and distinct. “I joke that cuneiform had to be invented by one person because it was too good to be invented by a committee,” he says, arguing that the system is the result of a “quantum leap” that drew on many traditions.

More data would clearly be welcome. Englund and Robson assert that more research should be done on the sealed hollow spheres, more than 100 of which are in museums around the world. Englund and his colleagues have already done x-rays and computerized tomography scans on these objects at the University of Heidelberg in Germany, but, they say, the time, expense, and low resolution of these procedures make them a poor substitute for splitting open the spheres and studying them directly. Curators, however, are reluctant to see their artifacts tampered with and possibly destroyed. “It’s an unpleasant situation,” Englund says.

#### Dating troubles

Egypt is only 1000 kilometers west of Mesopotamia, and there is a long history of trade between the two great civilizations. So scholars have long accepted the idea that hieroglyphics—which were thought to have

appeared a century or so after cuneiform—were inspired by the Uruk concept of storing information.

But a 1989 discovery by Gunther Dreyer of Cairo’s German Archeological Institute and his subsequent findings at Abydos in upper Egypt have threatened Mesopotamia’s ancient claim as the source of the first writing system. Opening a royal tomb dubbed U-j in 1989, Dreyer’s team found a large trove of objects bearing inscriptions that are more than a century older than the oldest written materials previously discovered in Egypt. The finds, which include nearly 200 small bone and ivory objects, are from roughly the same era as Uruk’s earliest tablets—around 3200 B.C. A rougher set of similar inscriptions was found on nearby vessels. About 50 signs seem to represent humans, animals, and a palace façade. Later findings nearby included pot marks dating to about 3500 B.C.

Dreyer argues that the symbols represent a single well-developed system that led to hieroglyphics. But other researchers are skeptical of this claim. “The pot marks can’t be interpreted,” and so the data “are insufficient” to draw wide-ranging conclusions, says John Baines, an Egyptologist at Oxford University, although he agrees that the inscriptions on bone and ivory clearly are writing.

Meanwhile, attempts to accurately date materials from both Egypt and Mesopotamia have proven inconclusive. Recent radiocarbon dating in Heidelberg of charcoal from both an Uruk temple, where early cuneiform tablets were found, and the Abydos tomb showed a date of approxi-



**Code breaker?** Denise Schmandt-Besserat maintains that clay tokens and spheres led to cuneiform.

mately 3450 B.C. for Uruk and 3320 B.C. for Abydos—pushing back the previous dates, based on well-known Egyptian chronologies, about 150 years.

Margarete van Ess of Berlin’s German Archeological Institute, for one, accepts those dates, which push the origin of cuneiform back by a century or so, giving Mesopotamia the edge. But other scholars say such precision is not possible in radiocarbon dating.

Researchers are looking for additional clues, both in situ and on the tablets and vessels that record the early writing; Van Ess, for example, recently began digging at Uruk after the decade-long hiatus resulting from international sanctions against Iraq.

Those clues are hard to come by, however. Because builders at Uruk often used old tablets as fill, pinpointing their date and context is difficult. "Uruk is such a mess," says Englund. "The stratigraphic record is really quite horrible." And Dreyer—who continues his excavations—has yet to find significant material at Abydos that may shed more light on hieroglyphic evolution.

### Three at once?

Archaeologists in Pakistan have had more luck in recent years. A team of U.S. researchers discovered compelling evidence in the late 1990s that the script from the Indus River valley also has a long and complex history. The Harappan civilization flourished there from 2800 B.C. to 1700 B.C. before collapsing; its script ceased to be used afterward, and the meanings of the signs remain a mystery. But although it never attained the complexity of the Mesopotamian or Egyptian writing systems, the Indus script nevertheless developed into a formidable grouping of signs.

The recent finds suggest that the script arose more than half a millennium earlier than previously believed. Pottery discovered at the site of Harappa includes markings that date from 3500 B.C. to 3300 B.C. and that appear to be precursors to that script. "I wouldn't call these signs writing," says Richard Meadow, a Harvard archaeologist who works at the site. "But these could be seen as part of an evolution of signs that continue to the Harappan period."

The Harappan and Abydos finds pose a major challenge to the traditional theory that writing diffused gradually from Mesopotamia to Egypt and perhaps to the Indus. All three areas were linked by trade in prehistory—Egypt to Mesopotamia through the Levant, and Mesopotamia to the Indus through modern-day Iran and the Persian Gulf coast. But the dominance of Mesopotamia is now in question.

"That the idea [of writing] passed from Egypt to Mesopotamia is quite a possibility now," maintains Dreyer. Others are not so quick to make that leap. "I'm undecided," says Baines, "but I don't think that's likely." Still other Mesopotamian scholars largely adhere to the old school of east-to-west influence, given what they say is the long evolution apparent from cylinder seals and the clay spheres.

Baines, however, posits a third possibility: that the two systems developed independently at about the same time. And if Harappa is included, then the evidence suggests that

three separate systems with their own evolutionary paths began to mature nearly simultaneously. That would appear a stunning coincidence, but some researchers say contact with other groups, combined with an indigenous need to convey more complex information, might have been the not-so-coincidental common ingredients that made the Near East and the Indus advance so quickly.

"Writing develops in areas where people are interacting," says Jonathan Kenoyer, an archaeologist at the University of Wisconsin, Madison, who has dug along the Indus. "Yet these regions also developed their own unique forms of expression." This is true not only for the scripts, which are unrelated, but

also for their function. In Egypt, for example, writing typically was focused on ceremonial uses, while accounting dominated Mesopotamian tablets.

However writing matured, scholars are left with the more daunting mystery of who laid the foundation for the artisans at Abydos, priests at Uruk, and the unknown makers of Indus script. "No one expected writing had such deep roots in prehistory," says Schmandt-Besserat. Deciphering that long and complex story is proving a formidable and controversial task, with no Rosetta Stone in sight.

—ANDREW LAWLER

*Next week: A special News Focus on the state of archaeology in Iraq.*

### PROFILE

## Dollars and Cents vs. the AIDS Epidemic

An atypical economist is a driving force behind the new global health fund being debated this week at a special session of the United Nations

**BOSTON**—Jeffrey Sachs is in his office for the first time in 3 weeks—and he is here today only because a trip was canceled at the last minute. He will be here for 2 days before taking off again for meetings in Asia. Hundreds of e-mails are crying out for his attention, the accumulation of just a few

tragedy inflicted by HIV/AIDS on the developing world, especially sub-Saharan Africa. He's become one of the most vocal advocates for a multibillion-dollar international program to tackle not only AIDS but the intolerable disease burden that, he argues, is holding back the developing world. He's constantly cajoling rich governments to open up their

coffers and drug companies to loosen their intellectual property claims on drugs desperately needed in poorer countries.

But it's not just his cause that has made him visible. It's also his style. He recently teamed up with an international crew including Pope John Paul II and rock star Bono, U2's lead singer, to campaign for debt forgiveness in poor countries. The money, he says, could be better spent on health. A great fan of U2, Sachs spends about as much time on the road as the band does, some 25

days a month if he isn't teaching. And like Bono, Sachs can bring crowds to their feet—in his case with impassioned sermons on the rich world's obligation to drastically increase spending on public health in poor countries. "Jeff shakes up the world," says Harvard colleague Barry Bloom, dean of the School of Public Health. "He's not known for his inter-



**Tryin' to throw his arms around the world.** Jeffrey Sachs has teamed up with U2's Bono and the Pope in a crusade to reduce disease rates in poor countries.

days, and his telephones—including his ever-present cell phone—never seem to stop ringing. This Harvard economist is clearly no run-of-the-mill academic.

Sachs is in demand—and constantly in the public spotlight—because he has jumped into one of the biggest and most visible international public health issues of the day: the