Signs of Life

Over thousands of years, the ancient Mesopotamians developed a written script out of an ingenious counting system

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Just 50 years ago, no one knew the origins of perhaps the greatest human invention of all time: writing.

The clues lay in thousands of artifacts accumulating dust in the storerooms of the world's great museums. For 25 years, I visited museums in the Near East, Europe and North America, systematically examining clay objects from the Neolithic period (8000-6000 B.C.). Among figurines, spindle whorls, pots and mud-bricks, I found lots of minuscule clay tokens in many shapes. What were they? No one had any idea. I finally came to understand that these humble clay tokens were counters—and that they were the precursors of the earliest writing.

It all began about 7,500 B.C., when early farmers became concerned with keeping track of goods. They made counters out of clay in a dozen shapes, including cones, spheres, disks, cylinders, tetrahedrons and ovoids. Each shape was assigned a meaning. A cone, for example, stood for a small measure of grain, a sphere stood for a large measure of grain and a cylinder stood for an animal. The invention was simple but of the greatest importance: It was the first visual code, the first symbol system ever created for the sole purpose of communicating.

There are about 8,000 of these tokens, from Palestine, Anatolia, Syria, Mesopotamia and Iran. Clearly such accounting practices were common throughout the Near East.

Four millennia later, when cities first appeared, tokens rather suddenly evolved into a complex accounting system with a repertory of 300 shapes, some with incised or punched markings used to record multiple types of goods. There were tokens for keeping track of raw materials like wool and metal; processed foods like bread, honey and trussed ducks; and manufactured goods like textiles, mats and vessels.

This token system, while a brilliant initial step, was cumbersome. Tokens were used to represent goods in a one-to-one correspondence—one cone for one small measure of grain, ten

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Over 5,000 years, from the mid-eighth millennium B.C. to the late third millennium B.C., writing evolved from simple signs denoting objects to a complex symbol-system capable of encoding human language. In the earliest stages, tokens of different shapes (above) represented various goods in a one-to-one correspondence; one cone-shaped token, for example, represented one animal. In the middle of the fourth millennium B.C., tokens began to be placed in hollow clay envelopes, sometimes with the contents of the envelope impressed on its surface. The spherical envelope opposite, from ancient Susa in present-day Iran, is impressed with seven markings representing the seven tokens it contained. A still later development involved dispensing with the actual tokens and creating a numeral system; now inventories were incised on clay tablets, and objects were recorded with the use of numbers along with a sign denoting the object. The sign for a large measure of grain, the sphere, was used to refer to "10" and the sign for a small measure of grain, the cone, was used to refer to "1." The 3100 B.C. tablet opposite, from Godin Tepe in Iran, is inscribed with signs for 44 objects (four spheres and four cones, which in two dimensions appear as circles and triangles).

ovoids for ten jars of oil. This meant, in effect, that only small amounts of goods could be kept track of—and, indeed, most of the envelopes that have been found contained fewer than 20 tokens.

Around 3,500 B.C. administrators of city-states in Mesopotamia, Syria and Iran began placing tokens in envelopes to keep accounting records orderly and tamper-proof. We have 150 such envelopes in the form of hollow clay balls filled with tokens.

Some of these envelopes' surfaces bear impressions of the tokens they contained. Impressions were made by stamping tokens onto the wet clay of the envelope. The markings allowed officials to know the type and number of tokens in an envelope without opening it. This was the first real step toward writing, for now three-dimensional symbols (tokens) were represented by two-dimensional signs (envelope markings).

A dramatic simplification of this system occurred around 3300-3200 B.C., as we know from 200 tablets in collections from Mesopotamia, Iran and Syria. Instead of filling envelopes with tokens, recordkeepers began to make impressions of the tokens on flattened clay balls. Thus were created the world's first tablets, or texts written on flattened clay—dispensing entirely with the actual counters. Consequently, the markings no longer merely represented tokens; they were independent signs standing for grain, sheep, oil or woven rugs.

Thus it took no fewer than four inventions—tokens, envelopes, markings and tablets—and about 4,000 years to fully reduce three-dimensional tokens to written signs. The system itself, however, had remained largely unchanged. Like the tokens, the impressed signs represented goods in one-to-one correspondence. Three small measures of grain were still represented by three cone impressions.

Around 3100 B.C., accountants began using a pointed stylus to draw the tokens—relieving them of the task of actually pressing tokens onto the tablet. Moreover, 4,000 tablets from Sumerian Uruk illustrate that incised signs were not used to stand for objects in one-to-one correspondence. Ten jars of oil were no longer represented by ten ovoids. Instead, the sign for a jar of oil (the ovoid) was preceded by numerals—that is, signs for abstract numbers ("abstract" in the sense that a certain sign—for example, "3"—can be used without regard to what is counted: three goats, three cities or three ideas).

No new signs were created to express abstract numbers. Instead, the old impressed signs for grain measures took on new meanings. The cone sign that formerly represented a small measure of grain came to mean "1," and the

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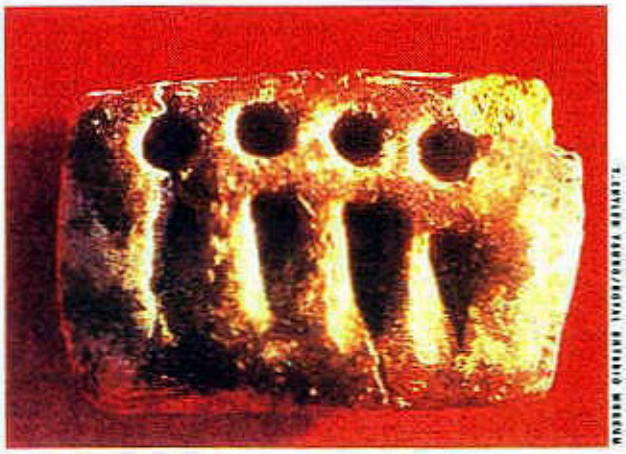

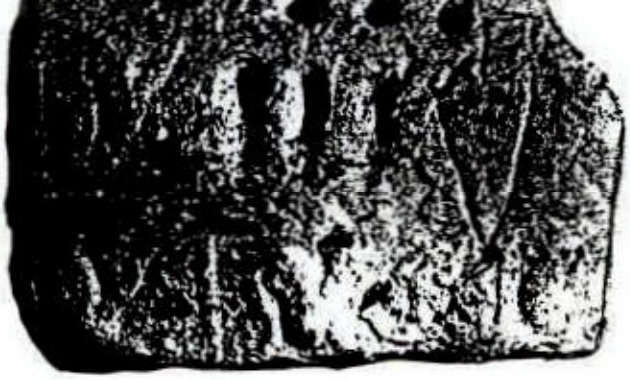

Incised tablet showing an account of thirty-three jars of oil(?). Godin Tepe (Gd 73-295), Iran. Courtesy T. Cuyler Young, Jr.

Origins

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sphere sign that formerly represented a large measure of grain came to mean "10." Here was a marvelous economy of signs: 33 jars of oil were expressed by seven signs (10+10+10+1+1+1 and "oil")—rather than 33 signs.*

Equally important, as a result of the creation of numerals, the signs for goods and the signs for numbers could evolve in separate ways. Writing and counting generated different sign systems.

Those 4,000 tablets from Uruk show that toward the end of the fourth millennium B.C. the names of people who gave or received goods began to be listed in inventories. This means that signs were invented that stood for sounds—that is, the name of the person as spoken in the Sumerian language. These new signs, or phonograms, were sketches of easily drawn things that stood for the sound of the word they evoked. A drawing of a man stood for the sound "lu" and a drawing of a mouth stood for the sound "ka," which were the words for "man" and "mouth" in Sumerian. The syllables or words composing an individual's name were written like a rebus. For example, the name Lucas could have been written with the two signs mentioned above, man-mouth or "lu-ka." With the invention of phonograms, writing became connected with the sounds of speech.

*The base-10 system, however, was not the only number system used in ancient Mesopotamia. Grain and bread, among other things, tended to be counted in groups of 60 (in a sexagesimal number system). Other groupings were also used.

In 2800 B.C. writing still dealt exclusively with accounting. Texts listed merchandise received or dispensed by a state administration, stipulated land donations or compiled signs (in a kind of dictionary) for the benefit of scribes. But then an extraordinary development occurred about 2700-2600 B.C. at the court of the Sumerian kings of Ur. Royal scribes began writing on objects of gold, silver and lapis lazuli that were to be deposited in tombs. The inscriptions consisted of a personal name—"Meskalamdug"—wrought on a gold bowl, or a name plus a title—"Puabi, Queen"—on a lapis lazuli seal.

For the first time in history, the Ur scribes put writing to work for a function other than accounting. That new purpose was funerary. The Sumerians believed that the name of a deceased individual was to be spoken aloud at regular intervals to sustain him or her in the underworld. The writing of Meskalamdug's name on a gold bowl to be buried with him suggests that writing the sounds of a name was deemed equivalent to speaking the name aloud. So after 5,000 years of dreary accounting work, writing began to be put to the more dignified task of guaranteeing the survival of the dead.

This concern for the afterlife led to another development in the history of writing. About 2600 or 2500 B.C. statues of men in the attitude of prayer were inscribed with the name of a deceased individual followed by a plea for a long afterlife. These prayers addressed to gods used sentences with subjects, verbs and complements—so that the earliest writing modeled itself on speech by adopting the syntax of spoken language.

Now we have mature writing, the gateway to literature. About 2400 B.C., the Sumerian ruler Eanatum, king of the city-state of Lugash, was able to describe his victories in a lengthy text. By 2000 B.C., writing was used for historical, religious, legal, scholarly and literary texts.

The origin of writing is no longer a mystery. The objects long ignored in museum storage—8,000 tokens, 150 envelopes, 20 inscribed envelopes, 200 impressed tablets, 4,000 incised tablets, a dozen funerary gifts, 80 worshiper statues—snap together like pieces of a puzzle. Contrary to all expectations, writing has its roots deep in prehistory—going back to the ninth millennium B.C. Nor would anyone have guessed that writing derived from counting. In the end, it seems proper that the invention of our most powerful form of self-expression was connected to our mortality.

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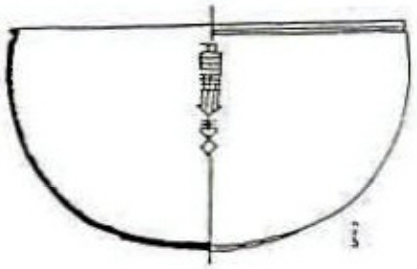

Name of Meskalamdug