OXFORD, U.K.—The biblical God punished humanity for its arrogance by creating innumerable languages—nearly 7000 at last count. Writing systems, however, escaped the curse. During the 5 millennia since writing first emerged on the same Mesopotamian plain as the legendary Tower of Babel, fewer than 100 major scripts have appeared. But once born, they can be surprisingly durable. A handful of researchers are now taking a closer look at how scripts vanish to glean insight into how and why cultures disintegrate. They have found that writing systems show an amazing tenacity, even in the face of invasions, language changes, and religious upheavals. Ironically, the more cumbersome systems often prove the hardiest. “There is so much intense emotion invested in scripts, they tend to live longer than they have any right to do,” says Mayan anthropologist Stephen Houston of Brigham Young University in Salt Lake City, Utah.

Houston was part of an unusual collection of scholars who met this spring at the University of Oxford to hash out a wide variety of script deaths and their meanings. Anthropologists and philologists presented case studies of more than a dozen scripts, including Egyptian hieroglyphics, Mayan glyphs, and Sumerian cuneiform, plus some less traditional recording systems (see sidebar, p. 32), in order to discern larger patterns in the scripts’ last gasps. “Their decline is as worthy of investigation as their origin,” says Oxford Egyptologist John Baines. He and his colleagues believe that the death of scripts can provide new insight into cultural collapse and the relationship between a script and its culture. But they also differ in how far to go in comparing script disappearance.

The 2-day meeting exploded some general assumptions about the way scripts live and die. Although in some cases a script and its culture slowly degraded in tandem, in other instances writing systems were decoupled from cultural crises and persisted in the face of natural or political disasters. Nor did scripts inevitably disappear when people began to speak a new language. “Scripts and language don’t correlate in any simple way,” notes Baines; in some instances a script kept alive a language not spoken by the general population for 1000 years. And in case after case, scripts survived in pockets long after their culture was all but dead.

Three millennia of Sumerian symbols
Perhaps the most stunning example of a script’s protracted life span is cuneiform, which began around 3200 B.C.E. to express the Sumerian language of Mesopotamia. More than 3000 years later in 75 C.E., a Babylonian scribe in a crumbling temple completed an astronomical tablet written in wedge-shaped symbols impressed in wet clay with a reed stylus. This work, the last dated example of cuneiform, was completed in the same way as the earliest known tablets. Scholars have long marveled that this awkward and difficult system, which required years of training, survived for so long amid Mesopotamia’s turbulent history, fraught with foreign conquests, nomadic incursions, and merchants who brought new religions and languages as well as scripts.

Cuneiform uses more than 400 signs, which can represent a word, a syllable used alone, or a syllable that can be combined with other syllabic signs to spell out a word phonetically; most scribes typically relied on 100 to 200 signs. Before 2000 B.C.E., the general population stopped speaking Sumerian and adopted Akkadian and eventually its Babylonian and Assyrian dialects. Scribes used cuneiform to express the new languages but also continued to write in the old Sumerian.

By the 7th and 8th centuries B.C.E., Aramaic—a Semitic language written in an alphabet and which, unlike cuneiform, assigns a sound to each symbol—was displacing Assyrian and Babylonian. Aramaic numerals made by workers on the back of...
As cuneiform inscriptions in the northern Mesopotamian capitals of Assyria attest to the widespread use of the Aramaic language and symbols, yet cuneiform was retained for administrative and religious purposes. In 539 B.C.E., Mesopotamian political control came to an abrupt and permanent end with the arrival of Persian armies, followed by Alexander the Great and his Seleucid successors and then by the Parthians in 126 B.C.E. Along with the conquerors came new writing technologies, such as leather and papyrus for Aramaic and Greek writing, although their perishable surfaces have rarely survived.

Yet through the centuries of profound cultural and political changes, numerous school texts show that scribes continued to teach Sumerian and Akkadian and to write in cuneiform, churning out graduates who took up posts in temples and palaces and among merchants, conducting a host of official tasks, from recording deeds to noting sacrificial rites. Cuneiform was almost never used to express Aramaic or Greek. “By the time Aramaic and Greek [languages] dominated, the scripts were robust enough to survive,” says David Brown, a philologist at University College London. The Seleucids insisted that slave and land contracts be made out in Greek script, but some legal documents continued to be written in cuneiform until as late as the start of Parthian rule. Finally, when the scribal schools ceased—perhaps in the 1st century B.C.E.—cuneiform’s fate was sealed.

Brown proposes that a boom in astrology—essentially a niche market for the script—kept cuneiform alive for the last few centuries of its existence. Around 200 B.C.E., he notes, there was a great flowering of astronomical texts. “This was a spinoff product of temple culture,” he says, because the Babylonian temples were long famed as centers of astronomical observations. “Elite scholars made money doing astronomy,” he suggests. Although the direct evidence for this is lacking, he argues that the prevalence of astrological tablets in these later years hints strongly at an economic basis for the continued existence of cuneiform guilds, or families of scholars. But 2 centuries later, Babylon’s monopoly over the astrology business weakened, Brown says, as more accessible Greek horoscopes spread through the Roman Empire. That shift, he suggests, pulled the rug out from under cuneiform’s economic basis, although the system’s existence may have continued for another century or two.

Brown’s theory has met with interest and some skepticism. “We don’t really have any proof that doing horoscopes was lucrative,” says Jerrold Cooper, a cuneiform specialist at Johns Hopkins University in Baltimore, Maryland, who thinks the temples supported themselves by agriculture rather than astrology. But Cooper adds that the appearance of the Greek-language horoscopes about the same time as cuneiform’s demise does give credence to Brown’s argument.

Write like an Egyptian

To the southwest, another great and difficult writing system was also finally nearing extinction, after thousands of years of use. In Egypt, as in Mesopotamia, a complex script arose at the end of the 4th millennium B.C.E., and by the start of the 1st century C.E., it still lingered in a few temples. The last inscription is found at Philae, a temple complex in southern Egypt, dated 452 C.E., says Martin Stadler, an Egyptologist at Germany’s University of Würzburg. By then, Egypt’s traditional high culture had been restricted for at least 2 centuries to temples, which increasingly were islands amid Greek, Roman, and Christian influence, and their priests were living a largely secluded existence. “The question is why did it [Egyptian script] persist for so long,” says Stadler.

Unlike cuneiform, Egyptian writing was always tied to a single language, Egyptian. But the secret to its long life may be that it had evolved into various forms, written in different media for different uses, says Stadler. The primary form was hieratic, which was the daily cursive used for administrative purposes and typically written on perishable materials such as papyrus. Hieroglyphic was used for monumental stone inscriptions for royal and religious purposes. Around 700 B.C.E., another system, which scholars call demotic, appeared in lower Egypt, eventually replacing hieratic for everyday use.

Thus when cultural challenges came—for example, during the Hellenistic control of Egypt, which began in the 4th century B.C.E. under the Ptolemies—the scripts had so many uses that they lingered. But the Roman conquest in 30 B.C.E. gave Greek language and writing—favored by the empire in the east—a further boost, and demotic was eventually overtaken by Greek for law and trade purposes. Still, Egyptian script persisted, primarily in the temples, which were not only tolerated but honored in Ptolemaic and Roman times. “The Ptolemies and Romans put enormous
No Pen or Ink Needed

For most of us, the term “writing” conjures up images of paper and pen. But recording systems through time have developed in a surprising variety of forms, many of which have been ignored, dismissed, or suppressed. Now, as researchers begin to consider how writing systems die (see main text), they also are examining lesser known systems to understand how societies long considered illiterate transmit knowledge.

In the Andes, for example, Incans manipulated knotted strings long before the arrival of the Spanish in the 16th century. Whether this system could record narrative or was simply an accounting device remains fiercely contested, because the precise meanings of the complex strings have yet to be unraveled (Science, 13 June 2003, p. 1650). Yet despite attempts by Spanish authorities to destroy the tradition, it proved surprisingly resilient. Ecuadorian factory workers still employed khipu in 1653 for labor and accounting purposes, and it is used in remote villages for similar purposes even today. “This is not simply a story of attrition,” says Frank Salomon, an anthropologist at the University of Wisconsin, Madison, who has spent years traveling Andean villages to understand khipu. “This is not a dying tradition.”

One key factor may be the common use of khipu. Mesopotamia’s cuneiform, Egyptian hieroglyphics, and Mayan writing, for example, were the province of a privileged and mostly male elite; at most, only 1% of ancient Egyptians could write, according to Oxford University’s John Baines. When the palace or temple cultures supporting those elites vanished, the scripts eventually died out. But when Incan elites were wiped out by disease and war after the Spanish arrival, khipu use continued quietly, even secretly, among peasants, including large numbers of women who may have been using khipu along with the elite. That fact kept khipu under the radar of authorities. “The survival of khipu has a lot to do with confidentiality,” says Salomon.

Whereas the Inca culture, rich in textiles, developed knotted strings, other agricultural peoples turned to landscape itself as a kind of writing tablet. The Huli people of the central New Guinea highlands, for example, live in a marshy area that they have scored with irrigation ditches named for their ancestors. Although not traditional writing, this method does record history.

“These ditches are genealogical maps,” explains Oxford anthropologist Christopher Gosden, who has studied the Huli. A canal recalling an esteemed clan leader, for example, may be the central artery in that clan’s waterway, with newer ditches representing his successors clustered around it. Many ancient scripts emphasize recording genealogy: the early books of the Bible, for example, or the Sumerian king lists. The Huli’s past may extend that far or even further. Gosden says archaeological evidence in the form of traces of ancient canals and stone implements shows at least 6000 years of human habitation and agriculture in this swampy area. “The very nature of the Huli depends on the preservation of their cultivation system,” says Gosden. Any threat to the Huli’s livelihood—such as today’s increasing pressure on the land from a growing population—also threatens their record of the past. There could be no better example of the way in which a writing system is deeply rooted—in this case, quite literally—within culture. —A.L.

resources into Egyptian temples,” says Baines, at least in part to honor local gods and thereby win domestic support. The temples provided a last refuge, but even they withered during the economic crisis of the disintegrating Roman Empire in the late 2nd century C.E., according to Baines. In 394 C.E., someone scrawled demotic and hieroglyphic text on the Philae temple in the remote south; the following year, the Christian Church ordered all pagan temples closed. Although some demotic graffiti dates to 452 C.E., and worship continued at Philae well into the next century, nearly 15 centuries would pass until hieroglyphics could be understood again.

The tenacity of Egyptian scribes through the centuries—despite cultural and language change—shows how scripts can linger even as their cultures are transformed. Scripts such as cuneiform and hieroglyphics require extensive schooling, bulky writing material, and significant financial support. Yet the very institutions set up to make this possible can prove remarkably durable, says Baines.

A long death

As hieroglyphics and cuneiform were falling into disuse, a new script was arising in the pre-Columbian world. Maya, which flourished in Mexico and Guatemala from 250 C.E. until 800 C.E., is made up of some 800 picture and syllable symbols that have not been fully deciphered, says Brigham Young’s Houston. Like Egyptian, the script is closely tied to a single language, and like cuneiform it was closely tied to the ruling class and to religion, used to tell of rulers’ exploits and to keep the sacred calendar. In this case the script mirrored its culture’s decline, degrading into peculiar forms, yet it still managed to persist in pockets for a surprisingly long period, says Houston.

A mélange of ecological, social, and political crises afflicted the 9th century C.E. Mayan empire, marking the end of its classical period and leading to a complicated series of disruptions still being debated among scholars. Mayan writing reflects these disasters—script vanishes abruptly and completely at sites such as Tikal in the southern lowlands, which may have encountered devastating droughts. Yet some sites, particularly in the Yucatán to the north, show only a gradual decline in writing, notes Houston.

Overall, he notes a steep decline in the number of texts during this period and the appearance of glyphs without meaning, which may have been an attempt to imitate the script without understanding its rules. By the start of the 10th century, Mayan writing is drastically simplified and nearly illegible and irregular. Mayan classical culture never recovered fully from these disruptions, although small groups of scribes clearly persisted and passed on old traditions. But without a “court culture,” Houston says, there was no place for the “literary sculptors” of Mayan script to flourish.

Maya revived later, as shown by the 13th century Dresden and Paris codices and numerous other manuscripts. It is a matter of some debate whether the script was dying in the 16th century when the Spanish arrived, as Houston maintains, or whether it waxed and waned during the centuries following the end of the classical period—perhaps as Latin degraded during the Middle Ages only to revive in the
Renaissance. Ultimately, though, the burning of codices, introduction of new diseases, and the disruption of scribal schools by the Spanish spelled the end for Maya. A handful of glyphs were used into the 19th century, probably because users kept these remaining shards of knowledge secret and thus safe from Spanish depredations. But the already-weakened Mayan script, tightly linked to Mayan culture, could not survive in any meaningful way.

The tale of invaders finishing off a writing system is not always so simple, however. Even scripts that appear to vanish suddenly can have an extended afterlife. On Crete, for example, the writing form known as Linear A emerged around 1800 B.C.E.—the first known writing system in Europe—only to vanish abruptly around 1450 B.C.E. Scholars disagree on virtually every aspect of Linear A—from its emergence to its disappearance to what the repertoire of 100 symbols means. It was long thought that invading Mycenaens from the Greek mainland had crushed the existing Cretan culture and replaced the script with what is called Linear B, which records ancient Greek. But rather than being imposed by invaders, University of Sheffield archaeologist John Bennet suspects that the script was simply retooled by Cretans who came to favor the new language. “Linear B is essentially Linear A with new characters to record Greek rather than the Linear A language,” Bennet explains. Thus the story of Linear A is not one of extinction but transformation, he says.

Same culture, new script?

Even scripts that suffer what appears to be a true extinction don’t necessarily signal a dramatic change in local culture. Nearly 2 millennia and half a world away from ancient Crete, another script came to an abrupt end. Called Kharosthi, this system emerged just before the common era began and the Kushan Empire came into prominence. The script grew at a natural meeting place of east and west, the high mountains and deep valleys of today’s Afghanistan and Pakistan, where Persian influence traditionally met Indian. It was influenced by the Gandharan language, which was based on India’s Sanskrit and on Aramaic, brought from the west by the Achaemenid Empire of Persia.

Kharosthi appears in the mid-3rd century B.C.E., just as the Kushans began to create a vast but little-known empire that flourished at the same time as Europe’s Roman, China’s Han, and Persia’s Parthian empires. Until the 3rd century C.E., the Kushans controlled critical caravan routes along the Silk Road, minted gold coins, and revitalized and spread Buddhism to China. Then the empire disintegrated into a set of small and fragmented kingdoms. Nearly simultaneously, Kharosthi rapidly disappears from the region. (As with many scripts, however, it hung on for a century or so in some remote areas such as in western China.)

Yet this wasn’t a case of tandem decline in culture and script, because despite the political fragmentation of the kingdom, “there wasn’t a traumatic cultural break,” says epigrapher Richard Salomon of the University of Washington, Seattle. “There is a gap before we have records again, and this probably was a time of chaos,” he says. But written records emerge again within 2 centuries—and “when they reappearance of Kharosthi, therefore, may not have signaled the end of a culture as it did in other times and places. “This script was not an emblem of culture,” says Salomon.

No unified theory

The scholars at the Oxford meeting stopped well short of proposing any grand theory to account for the death of scripts. The meeting did expose the profound difference between New World script experts and their Old World counterparts. Whereas the former tend to be anthropologists trained in comparative studies, the latter tend to be more narrowly focused archaeologists and philologists. “Anthropologists are looking more for commonalities, but we’re not trained to do that,” says Cooper. He argues that New World specialists like Houston go too far in trying to account for the similarities in script death, such as those between Maya and cuneiform. “I don’t feel there is any one single major breakthrough or theory,” to explain script disappearance, adds Salomon.

Houston acknowledges that no theory can embrace script diversity, but he suggests that scholars focus on the communities of individuals who keep particular forms of writing alive for their own peculiar reasons. The next step, says Houston, is to go from why scripts die to understanding the local processes at work in their decline: “Why do people not choose to teach the next generation? What motivates these decisions?” He believes that threatened scripts seek out “ecological niches” to survive change, but thereby make themselves more vulnerable to obsolescence. Cuneiform and hieroglyphics scribes, for example, retreated to the safety of the temples, but in so doing cut themselves off from the emerging political and social changes.

Both sides agree, however, that the sheer tenacity of many scripts has much to say about cultural survival and destruction. “The question,” says Houston, “is not how rapidly scripts die, but why they didn’t die sooner.” The appearance of the innovative and flexible alphabet in Mesopotamia, for example, did not lead people to abandon cumbersome cuneiform. The two coexisted for centuries. “That tenacity shows that if you lose the script, it is often the last marker of a civilization; it seems to survive longer than any other aspect,” says Oxford’s Baines. Such an indicator, he says, can provide scholars with a concrete set of data in theorizing on the decline and fall of civilizations. On that point, scholars are speaking the same language.

—ANDREW LAWLER