

famous cave art found at Lascaux, France, and Altamira, Spain. In northern Portugal a discovery of comparable age came to light: images of more than 60 animals such as bison, horses, ibexes, and deer chiseled with stone tools into the rock face along a deep gorge of the Côa River. The carvings, already partly covered by backed-up water from a dam on the Douro River, were being threatened with complete inundation by a second dam under construction in the region. News of the discovery came amid charges that knowledge of the prehistoric site's existence had been kept quiet for more than two years to allow building of the second dam to proceed.

To the extent that field work could be done in southwestern Asia, the attention to sites yielding evidence of agricultural beginnings continued. Particularly remarkable was the evidence for early pig domestication at Hallan Cemi in southeastern Turkey. Round or U-shaped house plans indicated year-round occupation around 10,500 years before the present. The site's early date and locality challenged the general current assumption that the beginnings of food production began only in the Levant (south and west Syria, Lebanon, Israel, and Jordan).

Excavations were especially active in southern Turkey and north-central Syria at sites yielding materials of the earlier urban periods. Public buildings with impressive wall paintings continued at the University of Rome's Arslantepe site near Malatya, and there were various other locations of interest farther south in the Euphrates valley in Turkey yielding further hints of Uruk (southern Mesopotamian) connections. There was also activity in northeastern Syria, where tributaries flow to the Euphrates. A Belgian expedition fueled the growing interest in the early literate range with a find of pre-Sargonid tablets at Tell Beidar. While many archaeologists working within the Euphrates drainage system might have preferred to work in southern Mesopotamia (Iraq), their enforced choices had nonetheless succeeded in opening a new area of considerable interest.

Excavations at sites of the historic ranges in Israel and Jordan were focused on sites in the later historic ranges, although work on the early village site of 'Ain Ghazal in Jordan continued. Many of the exposed Israeli sites appeared to have been of 1,000 BC or later, but interesting Chalcolithic materials appeared on Tell Shiqmim—a joint American, French, and Israeli excavation. Impressive Late Bronze Age architecture continued to appear on Tell Hazor. Several teams made new clearances at Petra, Jordan.

A variety of interesting excavations were reported north and west of the Tigris-Euphrates drainage—surely a reflection of the favourable prevailing circumstances for field work. At Troy a burned level discovered below Troy I, Schliemann's earliest excavations, demonstrated still earlier settlement, and broad later clearances (Troy II-VI) were made. More details of the tin mining and smelting at Goltepe-Kestel were recovered. Excavations on the long-worked sites of the later Bronze and Iron Age ranges and of Greco-Roman and Byzantine times continued.

The lack of field news from Egypt in 1994 reflected, to some degree, the prevailing political tension and perhaps the interest of some archaeologists there in not encouraging hordes of tourists. An Old Kingdom stone-paved road, about 12 km (7.5 mi) long, was cleared. It appeared to have facilitated the transportation of good stone for monumental use at Giza. In Sinai, near Egypt's border with Israel, a huge Roman fortress and large town were exposed in a region being cleared for a new agricultural development canal.

In early Europe continued study added to information about the life of "Ötzi," the 5,300-year-old "Iceman," whose frozen remains were found in the Ötztal valley high in the Alps

in 1991. Both the body itself and more than 20 artifacts and clothing had aroused much interest. In southern Russia and Kazakhstan, an impressive amount of evidence concerning the very early development of wheels (on remains of chariots) was recovered. Vast areas being prepared for drainage for agriculture, in the fenlands of eastern England, yielded over 2,000 sites (7th millennium BC to medieval times).

In Greece much interest turned to the clearance and yield of the site of the battle of Actium, near Corinth. The identification of ash (from a datable ice core taken in Greenland) was believed to fix the date of the Santorini volcanic eruption that buried the Minoan colony there at about 1623 BC. The eruption may well have given rise to the Atlantis legend.

As the centre of Athens was laid partially bare in recent months for the construction of a subway, graves dated from the 5th century BC as well as materials of later Byzantine and Turkish times were being recovered. The general dearth of archaeological news from Greece might be ascribed to something of a xenophobic attitude on the part of the country's antiquity service or possibly to the tensions between successive Greek governments (for example, Melina Mercouri [see OBITUARIES], who served as minister of culture under the former Socialist government, was an energetic campaigner for the return of the Elgin Marbles to Greece).

In Lugnano, a town on the Tiber River 110 km (70 mi) north of Rome, a large 5th-century AD children's cemetery was being exposed—thus far, 49 skeletons had been recovered. Skeletal evidence pointed strongly to a plague of malaria mentioned in contemporary records. Attila the Hun may have cut short his invasion of Italy because of a fear of malaria. Similarly, a comparative study of the depictions of women on the Pompeii frescoes with physical evidence from their skulls indicated hyperostosis frontalis interna, a hormonal disorder. At Suffolk, a Roman British site, 14,780 gold and silver coins, tableware, jewelry, and other ornaments were found and officially declared "treasure trove," thus the property of the Crown.

On the Chiang Jiang (Yangtze River) in China, where a new dam and flood plain was under construction, a government project began to recover a vast amount of archaeological materials spanning as much as 7,000 years. Many tombs and great quantities of pottery, porcelain, jade, and stoneware objects had already been recovered.

On a beach dune of Lake Victoria in New South Wales, Australia, a huge necropolis was located, with expected evidence of as many as 10,000 skeletons. The ancient people seem to have left their dead exposed on the sandy dunes, then bundled the disjointed bones for burial. The find suggested that far larger communities of hunter-gatherers existed before the arrival of Europeans than had been anticipated.

(ROBERT J. BRAIDWOOD)

**Western Hemisphere.** New World archaeology in 1994 was marked by the announcement of important discoveries concerning the arrival and antiquity of humans in North America, the emergence of significant new evidence suggesting that the agricultural foundations of the Maya may have extended back to preceramic times, and the combining of traditional archaeological techniques with modern biotechnology to resolve a long-standing debate over the origins of tuberculosis in the New World.

It had been generally assumed that the first human immigrants to North America traveled from Siberia across a land bridge over the Bering Strait. They then moved from Alaska southward via an ice-free corridor through western Canada and down into the U.S. Southwest, where many artifacts of Paleo-Indians and extinct big game were first found. The early peoples were believed to have migrated



A figurine from a tomb in Mexico's Yucatán Peninsula resembles figures of goddesses associated with Teotihuacán. It was reported in 1994 that the investigation of two tombs in Mexico indicated classic Mayan cultural patterns to have been more widespread than previously thought.

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eastward from the Southwest to the Atlantic Coast several thousand years later. In the past year, however, the discovery of a mastodon tusk in deeply buried sediments below a river in Florida challenged the common wisdom about both the early migration routes and the causes for extinction of the mastodon, an early relative of the elephant, and other Late Pleistocene mammals.

A team led by David Webb of the University of Florida determined that the tusk, which showed clear signs of butchering by humans, is at least 12,200 years old, centuries older than similar documented activities in the Southwest. Well-preserved marks around the base of the bone tusk suggested that it had been cut off the carcass with sharp knifelike implements. Stone butchering tools were recovered at the site, including a razorlike stone flake for cutting and scraping, as were associated tools and weapons made of ivory and decorated with geometric designs. The Florida excavation now had to be considered the earliest butchering site in North America. The astonishing find supported a new scenario, one in which humans first migrated from Alaska across Canada and down the eastern seaboard, only later spreading to the Southwest. Likewise, the antiquity of the tusk—at least 1,000 years older than the dated human finds in the Southwest—suggested that instead of there having been a rapid killing off of big game through overhunting, mastodons and humans coexisted for at least a millennium.

The discovery of what may be the earliest evidence of Mayan culture, potentially pushing back the known origins of this ancient Mesoamerican civilization by some 1,500 years, was announced. Working in previously unstudied areas and deposits at the Colha site in northern Belize, a multidisciplinary team led by Thomas Hester of the University of Texas at Austin used radiocarbon dating of pollen cores, botanical identification of the contents of buried refuse pits,

and analysis of a set of agricultural tools to establish that the ancient inhabitants were actually engaged in land clearing and the cultivation of domestic crops as early as 2500 BC, long before the introduction of the distinctive Mayan ceramics that were traditionally interpreted as the initial indicators for the advent of settled society in Mesoamerica. Distinctive chipped and carved stone tools with hoelike or axlike edges were similar to those of the later classic Mayan sites, suggesting cultural continuity over time. In addition, shifts in the range and diversity of the natural plants were documented through pollen evidence and indicated that swamp areas bordering the site had been drained. Maize (corn) and manioc pollen identified in refuse-pit deposits suggested that the inhabitants were early agriculturists, present perhaps 1,500 years earlier than previous projections for the earliest manifestations of this culture.

The 1932 discovery by Alfonso Caso y Andrade of Tomb Seven at Monte Albán, Mexico, renowned for the whole gold mask and pectoral (chest piece) it contained, remains one of the most spectacular single discoveries in New World archaeology. Heated controversy over the site broke out in 1994 over a reinterpretation of the identity of the human skeletal remains in that tomb. Sharisse and Geoffrey McCafferty, associated with Brown University, Providence, R.I., announced that one of the skeletons, which had been thought to be that of a great king or priest, may in fact be that of a queen or priestess. The McCaffertys based their surprising reinterpretation on the fact that one of the original researchers at Monte Albán had belatedly included a female jawbone among the inventory of the contents of the tomb. Furthermore, the site contained a wide assortment of artifacts commonly taken as indicators of female activities—weaving batons, including an assortment of full-size and miniature spinning tools, and small “spinning bowls” on which the base of a spindle is rested when it is twirled—as well as two miniature gold rings that the archaeologists suggested may have served as ritual thimbles. This reinterpretation could result in a radical shift away from the former predication of a predominantly male power structure in ancient Mesoamerican society. It could cause reexamination of artifacts from other early sites to see if they contain similar evidence of elevated status of women. The debate went into high gear when the McCaffertys’ reassessment, which some perceived as long overdue, came under attack from others, notably Kent Flannery and Joyce Marcus of the University of Michigan, who charged that the McCaffertys, in the words of a *Science News* article, “parlayed a political concern about inequalities heaped upon women in ancient and modern societies . . . to promote a vision of once-powerful Mixtec woman.”

The first successful use of genetic analysis techniques in the study of ancient disease was reported in 1994 in research into the origin and antiquity of tuberculosis in the New World. While not enjoying the broad media coverage that forensic DNA testing received in U.S. criminal court cases during the year, the study of DNA genetic structure in tissue samples from ancient South American mummies nonetheless proved to be an important new diagnostic tool for researchers.

The story began in 1990 with the excavation of some 600 pre-Inca burials near the village of Ilo in southern Peru. Archaeologists Jane Burikstra and Todd Holcomb of the University of Chicago investigated some 600 graves in 11 prehistoric cemeteries in the valley belonging to highland peoples who had migrated down to this lowland desert drainage on the coast about 1000 BC. These migrants, as evinced by their distinctive Andean pottery, apparently dominated the lowland valley for at least 2,000 years, until

just before the arrival of the Inca empire. About 140 of the burials contained the well-preserved, naturally mummified remains of 700–1,000-year-old individuals.

The archaeologists enlisted paleopathologist Arthur C. Aufderheide and molecular biologist Wilmar L. Salo both from the University of Minnesota, Duluth. Together they identified and extracted tissue samples from what appeared to be tubercular lesions in desiccated lung and lymph node tissue from the body of a 40–50-year-old woman. They then used a modern genetic testing procedure called polymerase chain reaction (PCR), which amplifies traces of ancient DNA by an amount sufficient to permit the identification of particular DNA types—in this case the ancient “molecular fingerprints” of the tuberculosis-causing bacterium. This new tool of DNA analysis thus provided unequivocal evidence that tuberculosis existed in the New World at least 1,000 years before the arrival of the first Europeans and demonstrated that the disease probably evolved in the Americas independently of the European strains carried to the New World in the 15th century.

In addition to throwing new light on the antiquity of tuberculosis, an important disease worldwide, PCR also provided a new line of evidence for archaeologists to use in assessing such issues as the political and economic structure of the large pre-Inca settlements. Given the association of tuberculosis with poverty, crowded living conditions, and poor diet, it seemed probable that the ancient coastal population of Peru may have suffered under such conditions—a type of existence most people did not usually associate with societies predating the arrival of highly centralized empires and their expanded political and economic power.

(JOEL W. GROSSMAN)

See also Anthropology.

This article updates the *Macropædia* article The Study of History: Archaeology.

## Architecture

Probably the most widely noted building of 1994 was the new home of the American Center, which opened in June on the Seine River in the Bercy neighbourhood of Paris. Designed by Los Angeles architect Frank O. Gehry (see BIOGRAPHIES), the centre contained stage and motion-picture theatres and a variety of other performance and exhibit spaces, as well as 26 apartments for resident scholars and artists.

Gehry employed the free-form tilting, curving, and colliding shapes that made him famous, but they seemed tamer than usual because of the traditional warm-toned limestone in which the entire building was clad. Many critics noted the appropriateness of the choice of Gehry, among the most innovative of contemporary U.S. architects, as designer of the American Center, which was founded in 1931 to promote French understanding of U.S. culture.

A more typically wacky Gehry design, the Frederick R. Weisman Art Museum, opened late in 1993 at the University of Minnesota. Known to students as “the Fred,” it was a childlike jumble of shapes on a bluff overlooking the Mississippi River, with several facades clad in brushed stainless steel that reflected the sky and the sunset.

**Awards.** The Pritzker Architecture Prize, which bills itself as the equivalent of a Nobel Prize, retained its rank as the most prestigious architectural award despite a glut of rival \$100,000-plus prizes. The 1994 Pritzker was awarded to Christian de Portzamparc, a French architect whose best-known work was the Cité de la Musique, a school for music and dance in Paris. The award ceremony was held

in Columbus, Ind., as a way of honouring the town and its remarkable collection of works by modern architects. The Pritzker jury called Portzamparc “a powerful poet of forms and creator of eloquent spaces” and spoke of his “exuberant collage of contemporary architectural idioms, at once bold, colorful, and original.”

Among other awards, the American Institute of Architects (AIA) gave its 1995 Gold Medal, its highest award for lifetime achievement, to Cesar Pelli. Pelli was born in Argentina, served as dean of the School of Architecture at Yale University from 1977 to 1984, and established a practice in New Haven, Conn. He was known for his buildings with a lightweight, almost tentlike, appearance, often surfaced in glass or thin stone veneer. Among his best-known works were the Pacific Design Center in Los Angeles, the World Financial Center in New York City, Herring Hall at Rice University, Houston, Texas, and Carnegie Hall Tower in New York City. The AIA named the Ford Foundation Headquarters in New York City as recipient of its 1995 Twenty-Five-Year Award, given to a building whose design has stood the test of time. The architect was Kevin Roche of Kevin Roche John Dinkeloo and Associates, with Dan Kiley as landscape architect. The AIA also named 17 buildings by U.S. architects as recipients of its annual Honor Awards for good design. Among the most prominent were Carnegie Hall Tower by Pelli, Oriole Park at Camden Yards baseball stadium in Baltimore, Md., by Hellmuth Obata & Kassabaum, and the United States Holocaust Memorial Museum in Washington, D.C., by James Ingo Freed, a New York City architect. The Gold Medal of the Royal Institute of British Architects went to Michael and Patty Hopkins, known for their marriage of high technology with tradition in such works as the new Glyndebourne opera house in England.

**Civic Buildings.** Of all types of buildings, it was those designed for transportation that dominated the world of architecture in 1994. The most spectacular was in Japan—the \$14 billion Kansai International Airport, which opened in September. It was built on an island created from landfill in 18 m (59 ft) of water in Osaka Bay, connected to the mainland by a 3-km (1.85-mi)-long double-deck bridge. The building itself was 1.6 km (1 mi) long and four stories high under a single curving metal roof. The terminal’s architect was Renzo Piano of Italy.

In France the Lyon airport railway station opened as a railroad station linked to an older airport, thus bringing users of cars, trains, and airplanes together beneath a structure of concrete ribs that resembled the skeleton of a vast whale. The architect was Santiago Calatrava of Spain.

In England a new Waterloo terminal, at the British end of the new Channel Tunnel, imitated the great glass-roofed railroad stations of the 19th century. Its architect was Nicholas Grimshaw. In the United States, Denver (Colo.) International Airport, the largest in the country, covered 137 sq km (53 sq mi) and included parking for 12,000 cars. Its main terminal, roofed in Teflon-coated tensile fabric, was the world’s largest tent and looked, as one critic noted, like a Sioux encampment on the plain. The team of architects included August Perez and the firm of C.W. Fentress J.H. Bradburn & Associates. Designed and built with great speed in just over four years, the airport caused frustration when it failed to open on time because nobody could figure out how to get its \$200 million automated baggage-handling system to work. Scheduled to open in late 1993, Denver was still not operational at the end of 1994, a delay that caused severe cost overruns.

In Washington, D.C., a new embassy for Finland by Mikko Heikkinen and Markku Komonen was an elegant collage of