

## THE BEGINNINGS OF ARCHITECTURE

Some readers may be discouraged by the prospect of a chapter about the “beginnings” of architecture or “prehistory,” imagining that the really interesting constructions and provocative ideas lie many pages ahead; fortunately, this is not the case. The structures that appear in this initial chapter are rich and varied and often sophisticated. Moreover, because they are “ancient” and always local, they are in some ways more exposed to revelation than later structures. That is, they lay bare for consideration certain fundamental principles of architecture and, arguably, certain fundamental aspects of the human condition.

In 1964, polymath architect-engineer-historian Bernard Rudofsky organized a then surprising and ultimately extremely influential exhibition, “Architecture without Architects,” at the Museum of Modern Art in New York City. The exhibition created something of a sensation, appearing as it did at a time of general cultural upheaval in the United States, and the subtitle of the book accompanying the exhibition, *A Short Introduction to Non-Pedigreed Architecture*, suggests why it was so sensational or perhaps more accurately, so iconoclastic. Illustrating, with obvious personal admiration, what he called “vernacular, anonymous, spontaneous, indigenous, rural” architecture, Rudofsky argued for a much more chronologically and geographically inclusive study of the built environment and one that did not cater exclusively to constructions for the wealthy and powerful and did not result exclusively from the efforts of what we might today call academically trained designers. The images of architectural objects that he displayed and analyzed ranged from earth mounds in China to rock-cut dwellings in Turkey, to reverse-action chimneys in Pakistan and much else in among them.

Reading Rudofsky’s book and particularly the initial pages of this chapter, you will be directed away from matters of fashion and even style, in favor of “anonymous” but distinctive, even archetypal, forms, and you may come away with a deeper understanding of human responses to

particularized environments, to specific local building materials, to elementary but expressively logical structural systems, and to early but nuanced social conditions. You will be able to embrace the essentials of function, space, and meaning by “beginning” with the architecture of prehistory, that is, the era before the appearance of written language.

Prehistory begins as early as 35,000 B.C.E. and extends to about 3000 B.C.E. in the lands of the eastern Mediterranean, and until well after 2000 B.C.E. in parts of western Europe. On the timescale of humankind, these dates correspond to the earliest years of “modern” human evolution from cooperative hunting-and-gathering societies into agricultural civilizations with a fixed settlement area and a ruling class. In the absence of written records, archaeologists and historians must interpret the fragmentary evidence of ancient people—pottery, household implements and rubbish, burials, tombs, and building remains—found in locations scattered across Europe, Africa, and Asia. New technologies have assisted the dating of artifacts through the use of radioactive carbon 14, thermoluminescence, and dendrochronological analysis (the study of growth rings in trees), but both the methods and the hypotheses derived from them are subject to continual revision as researchers discover new evidence and reexamine old ideas. Reconstructions based on post-holes or masonry foundations help us visualize the simple buildings erected by early societies and provide clues to the more elaborate structures that came later.

### Chronology

beginning of prehistory	ca. 35,000 BCE
Sumerians develop a written language	3500 BCE
construction of Stonehenge	ca. 2900–1400 BCE
Egyptian Old Kingdom	2649–2134 BCE
construction of the pyramids at Giza	2550–2460 BCE
construction of the Ziggurat at Ur	2100 BCE
Egyptian Middle Kingdom	2040–1640 BCE
Egyptian New Kingdom	1550–1070 BCE

Hypostyle Hall, Great Temple of Amun, Karnak, Egypt, ca. 1390–1224 BCE.

This vast roofed hall composed of closely spaced columns of large diameter was illuminated by sunlight filtered through clerestory gables, one of which is seen here. Mysterious gloom inside the hypostyle hall contrasted with brilliant sunlight in the temple’s open courts.

## PREHISTORIC SETTLEMENTS AND MEGALITH CONSTRUCTIONS

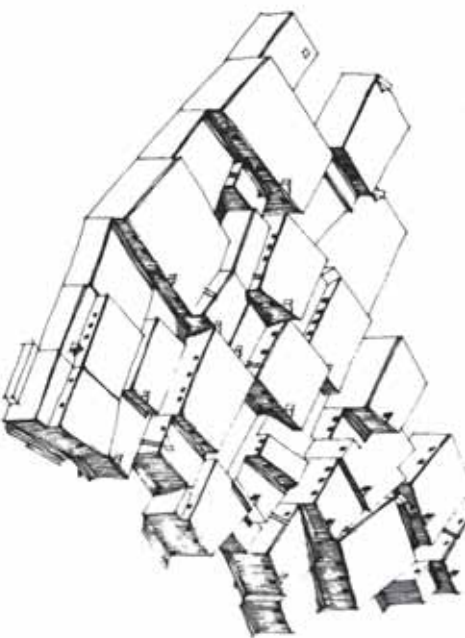
### EASTERN EUROPE

Human settlement seems to have originated at the small clan or family level, with a sufficient number of people living together to provide mutual assistance in hunting and food gathering and joint protection against enemies. Among the earliest huts to be discovered are those at sites in the central Russian Plain (today's Ukraine), dated to about 14,000 BCE. Constructed of mammoth bones and pine poles, with a lining of animal skins and a central hearth, the largest dome-shaped hut incorporated skeleton parts from nearly a hundred mammoths in its framework. Archaeologists have also found clusters of skin-covered huts dated to about 12,000 BCE between Moscow and Novgorod. The largest of these huts, measuring about thirty-nine by thirteen feet in plan, had an irregular shape formed by three interlocking cones of inclined tree branches and was open at the top to allow smoke to escape from three hearths.

Excavations of town sites suggest that larger communities were a much later development. The existence of urban settlements depends on an agricultural surplus that enables some people to assume specialized roles (priest, ruler, merchant, craftsworker) not directly tied to the production of food. Two of the earliest known urban communities were Jericho, Israel (ca. 8000 BCE) and the trading town of Catal Hüyük (6500–5700 BCE) in Anatolia, part of present-day Turkey. Jericho was a fortified settlement, with a stone wall up to twenty-seven feet thick enclosing an area of about ten acres. Its earliest dwellings consisted of circular mud huts that may have had conical roofs. The inhabitants were farmers and hunters who buried their dead below the hut floors. Although by contrast Catal Hüyük appears to have been unfortified, the town was a dense package of dwellings without streets (Figs. 1.1a,b). Residents gained access to the dwellings across roofs, while high openings in the walls were for ventilation. Mud-brick walls and a post-and-lintel timber framework enclosed rectangular spaces that abutted the neighboring houses so that together they established a perimeter town wall. Interspersed with the houses were windowless shrines containing decorative motifs of bulls and cult statuettes of deities. These seem to indicate that the themes of prehistoric cave art—hunting and fecundity—had not been discarded by this early urban society. The settlement at Catal Hüyük is the precursor of more sophisticated communities that developed in the fertile valleys of the Tigris and Euphrates rivers at the beginning of the fourth millennium.

### WESTERN EUROPE

In western Europe the transition to urban communities was slower in coming, although the shift from hunting-



**1.1a** Reconstruction view of buildings, Catal Hüyük, Anatolia, ca. 6500–5700 BCE.

Notice how buildings abut one another, forming a continuous grouping broken occasionally by open courtyards. The buildings represent a mixture of dwelling houses, workshops, and shrines, all of which were accessed from the rooftops.

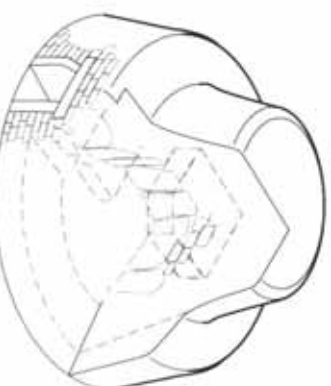
**1.1b** Reconstruction of shrine room, Catal Hüyük, Turkey, ca. 6500–5700 BCE.

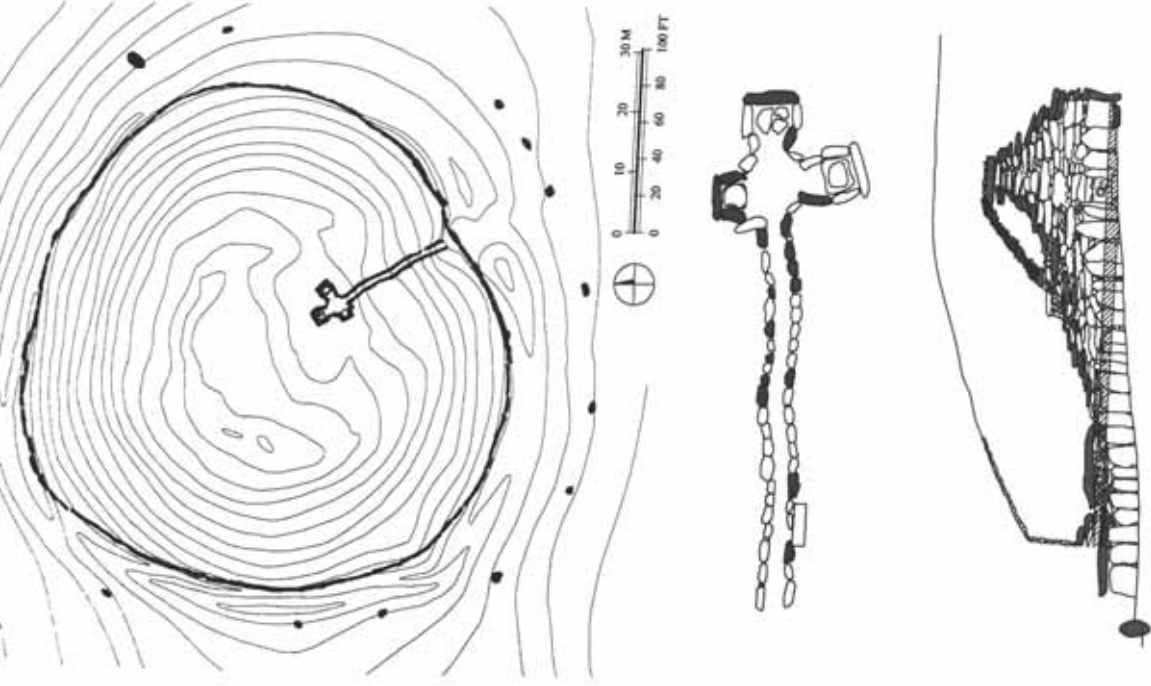
The central figure on the left-hand wall represents a woman giving birth, while the horned bull skulls suggest masculine properties. Without written documentation, it is difficult to understand completely the significance of other architectural features, such as the stepped floor levels.



**1.2** Megalithic tomb, Er-Mané Carnac, Brittany, France, ca. 4200 BCE.

This structure presents an early example of corbelled construction, in which stones are laid without mortar in layers, with each course projecting slightly beyond the previous one, to enclose space. The same area contains other prehistoric tomb chambers and nearly 300 standing and fallen megaliths set in rows aligned to indicate the direction of sunrise at summer and winter solstices and fall and spring equinoxes.





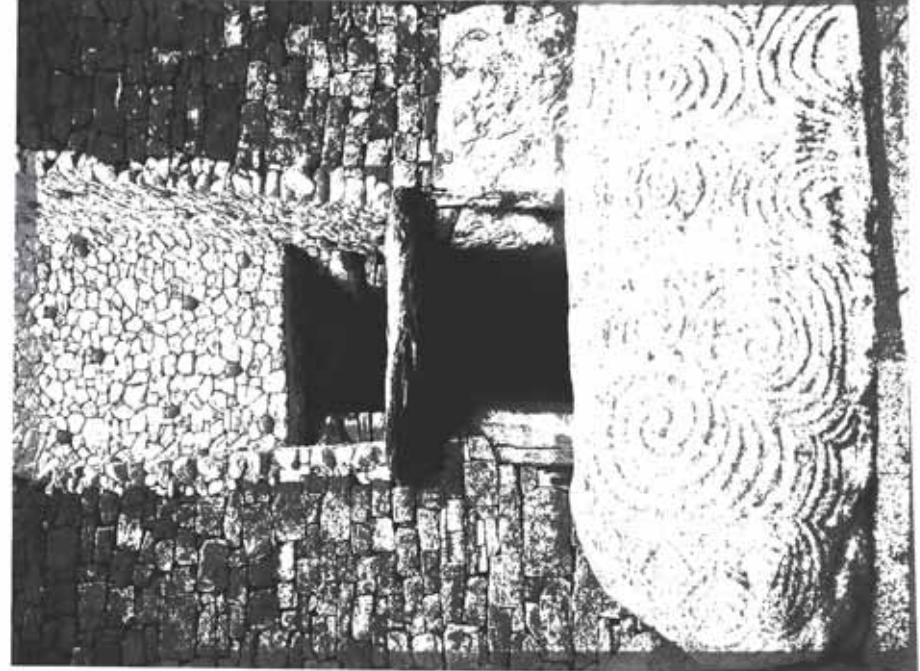
1.3 Plans and section, Newgrange passage grave, County Meath, Ireland, ca. 3100 BCE.

The cruciform chamber of this communal grave is approached through a long passage created by upright stones. The near-horizontal shaded area represents the path of early morning sunlight on the winter solstice, which illuminates the passage and chamber floor, establishing a connection between the human and celestial worlds.

Ireland is particularly rich in megalith tombs, having over 500 documented sites. Constructing these communal graves for cremated or skeletal remains seems to have been not only an expression of reverence for ancestors but also a means of establishing claims to land, and megalith tombs are frequently located on prominent sites. Among the most impressive is the passage grave at Newgrange, County Meath, built about 3100 BCE on the crest of a hill overlooking the Boyne river. An earthen mound nearly 300 feet in diameter and thirty-six feet high covers the tomb, with the weight of the soil providing stability for the megaliths below. Decorated boulders surround the perimeter of the mound. (The white quartz facing is a modern reconstruction based on excavations, providing visibility from a distance.) The south-facing entry leads to a sixty-two-foot-long, upward-sloping passage covered by stone lintels terminating in a cruciform chamber covered by a beehive corbeled ceiling twenty feet high. Parts of the stonework in the passage and chamber are decorated with incised patterns, including diamond shapes and spirals, whose meanings are unknown (Figs. 1.3–1.4). The whole

1.4 Entranceway, Newgrange passage grave, County Meath, Ireland, ca. 3100 BCE.

This view shows the stone facade as reconstructed by archaeologists. Note the rectangular opening that serves as a “transom light” over the portal, providing the path for sunlight on the winter solstice. Spiral designs on the stone that blocks direct entry may represent sun signs. The old stone door is visible to the right of the opening.



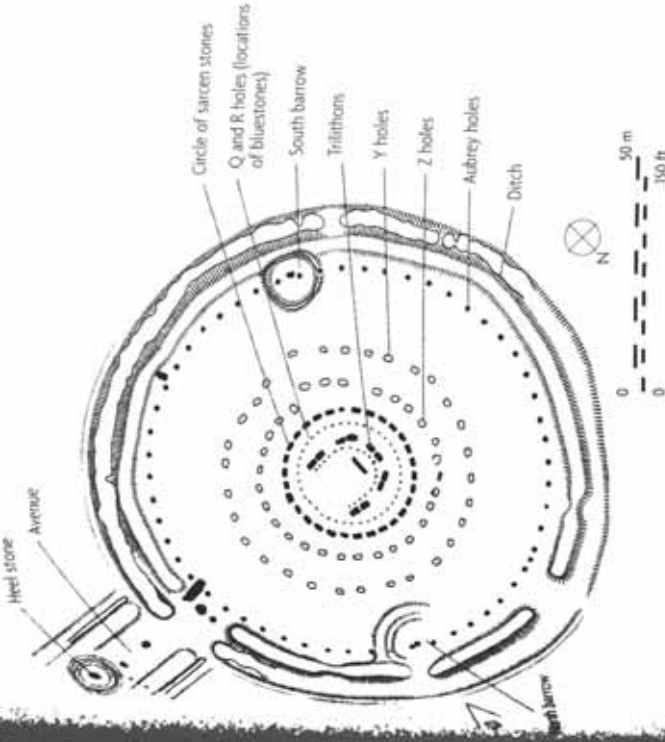
and-gathering societies to larger agricultural groups under the direction of a priest-king was similar to the experience of societies on the eastern rim of the Mediterranean Sea. The significant prehistoric architectural achievements of western Europe were megalith constructions, composed of large stones or boulders (**megalith** literally means “great stone”), many of which were erected for astronomical observatories or communal tombs for the privileged classes. Before 4000 BCE, chambered tombs of dry-wall masonry (stones laid without mortar) with corbeled roofs were constructed in Spain and France. One of the earliest of the megalith tombs, dated to 4200 BCE, is at Er-Mané, Carnac, in Brittany (Fig. 1.2). As with many other chambered tombs, this one was stabilized by a covering of earth.



**15 Stonehenge, Salisbury Plain, England, ca. 2900–1400 BCE.**

Perhaps the most famous monument from prehistoric times, Stonehenge exemplifies the ability of some early civilizations to organize workers and materials to create evocative ceremonial places. The heel stone stands to the upper left beyond the circle.

construction is carefully oriented so that, in the five days around the winter solstice, light from the rising sun enters through the doorway and a transom-like light box creeps along the passage, and illuminates the chamber within for about fifteen minutes (Fig. 1.4). To those fortunate enough to witness this annual event (the only time there is any light in the interior), the effect is magical and very moving. Constructing such a massive tomb (and there are two others on the same scale nearby) would have



1.6 Plan, Stonehenge, Salisbury Plain, England, ca. 2900–1400 BCE.

This plan includes the original earthworks. The trilithons set in a U-shape establish the axis of the avenue, which passes between perimeter stones to align with the heel stone set outside the circle. On the summer solstice, the sun rises precisely over the heel stone, when viewed from the center of the concentric circles.

At least three distinct building phases can be observed. The first phase began about 2900 BCE with excavation of two concentric circular ditches. Inside the perimeter, fifty-six evenly spaced holes (the Aubrey holes) were dug and filled with chalk, while a northeasterly line of sight to the horizon was established from the center across a pointed upright (the heel stone) outside the ditches. About 2400 BCE eighty-two coffin-sized stones of gray-blue dolerite, weighing about two tons each, were transported from quarries in the Preselly mountains of Wales and erected in a double ring of thirty-eight pairs, with six extra stones defining the northeast approach axis. At some point, perhaps before this second phase was completed, the bluestones were removed (their sockets are the so-called Q and R holes). The third and final phase involved transporting thirty-five lintels and forty sarcen stones (a form of sandstone) weighing up to twenty tons each. These were erected in a circle of thirty uprights enclosing five trilithons (two uprights capped by a single lintel) arranged in a U shape to focus on the Avenue, the axis leading northeast toward the heel stone. Knobs (tenons) left on the tops of the uprights fit into socket holes (mortises) carved into the undersides of the lintels, so that the stones lock together in a mortise-and-tenon joint when correctly positioned.

To many modern visitors, the sophisticated design and massive construction of the site has seemed beyond the capacities of prehistoric people. Thus the site has been interpreted variously as the work of giants, magicians, people imported from the Aegean, or even extra-terrestrials. The truth is more prosaic but ultimately more meaningful: archaeo-astronomer Gerald Hawkins demonstrated

required sustained effort over many years. Available technology provided nothing harder than copper or bronze tools for shaping stone, and there were no wheeled vehicles or draft animals to assist with transport. Nonetheless, ancient builders made the necessary astronomical observations and organized a work force sufficient to maneuver stones weighing up to five tons.

The ability to work large stones and to observe fundamental astronomical phenomena merged in the most celebrated of megalith constructions, Stonehenge, located on Salisbury Plain in southwestern England (Figs. 1.5–1.7).

1.7 Stonehenge, Salisbury Plain, England, ca. 2900–1400 BCE.

This view from the north shows the present-day configuration of stones. Where the lintels are gone, the knobs (tenons) that held the horizontal stones in place can be seen on top of the uprights. The heel stone is the tall stone to the left.



that Stonehenge was a great observatory for determining the solstices (thus establishing the annual calendar) and predicting lunar and solar eclipses, knowledge that could have proved very useful in a society without almanacs. Its circular layout may well reflect a symbolic tie to the heavens, a link between human and celestial realms.

Experience gained in the construction and orientation of megalith tombs enabled early inhabitants of the British Isles to erect one of the most haunting architectural works of all time. Stonehenge represents the culmination of construction skill and scientific observation in the prehistoric era. Its builders met the challenge of moving and shaping massive stones. Bluestones from Wales were transported, largely by water, over 190 miles to the site, being dragged overland for the last leg of the journey. The larger sarsen uprights came from the Marlborough Downs, about fifteen miles from Stonehenge, and were probably dragged to the site. Modern experimentation with moving and erecting a trilithon on the scale of Stonehenge shows that erection could be accomplished with simple machines (lever and inclined plane), a sledge and greased track, wooden scaffolds, stout ropes, and about 130 people working together.

## ANCIENT MESOPOTAMIA

The distinction between the prehistoric world and historic times involves the development of written language, which was achieved by about 3500 BCE by the Sumerians in the Middle Eastern land of present-day Iraq and Iran. There, in the fertile lands between the Tigris and Euphrates rivers (named Mesopotamia or “between the rivers” by the ancient Greeks), the earliest literate civilizations developed in independent urban communities called city-states. Writing first developed as a means of documenting governmental transactions and was only later employed for what might be called literary purposes, communicating the legends, glorious deeds, hopes, and fears of the people. In about 3000 BCE, perhaps as a result of contacts with Mesopotamia, another center of civilization emerged in northeast Africa, along the banks of the Nile River in Egypt. These two regions, Egypt and Mesopotamia, are considered the cradles of Western history and architecture.

Despite on-going conflict in the Middle East, probably no culture seems more remote to the current student of architectural history than that of ancient Mesopotamia. There are strong religious images from Judeo-Christian scripture of flood stories and the Tower of Babel, both with Mesopotamian connections, but such textual images can only go so far, and Hollywood has not seen fit to dramatize the place and its people as they have Egypt and the ancient Egyptians. You can best begin, perhaps, by reading the accompanying essay for some sense of Mesopotamian culture, then consider the larger picture, and that picture begins with rivers.

Mesopotamia encompasses an area about 500 miles long by no more than 300 miles wide. Its southern boundary is the Persian Gulf, the shore of which was about 130 miles farther north during the third millennium than it is today. In addition, shifts in the river channels, climatic changes, and increased salinity of formerly irrigated lands have combined to bring about profound changes in the environment since antiquity. The Tigris and Euphrates rivers flow separately into the gulf. The Euphrates originates in the mountains of eastern Turkey and meanders across the plains in its lower reaches. The more easterly Tigris rises in the same mountains, but develops into a more swiftly flowing stream because of its numerous tributaries in the Zagros mountains. As a result, the Tigris was less navigable and did not have as great a unifying effect on settlements along its banks as did the Euphrates.

The Mesopotamian cultures did great things by exploiting their rivers. They regulated them as best they could and from them they constructed elaborate irrigation canals that made possible a fertile, even Edenesque landscape. Within this landscape, they cultivated sufficiently abundant crops to permit the large-scale storage of surplus grain. This relatively stable and plentiful supply of food, in turn, permitted the growth of large urban populations and that corollary of urbanism: specialization. Mesopotamian specialists included not only priests and merchants but also artisans, artists, and architects who could make beautiful objects, express their culture’s worldview, and make gestures toward the connection of humankind to the cosmos.

## SUMERIANS, AKKADIANS, AND NEO-SUMERIANS

The Sumerians are generally credited with forming the world’s first civilization, which began to take shape around 4000 BCE. At this time, the people of the fertile lands of southern Mesopotamia mastered arts of agriculture and developed irrigation systems to control the waters of the Euphrates River. Their civilization, which lasted until about 2350 BCE, is known as Sumerian, and the typical form of their settlements was the city-state, a political and religious center devoted to serving gods based on natural elements. These deities included the divine triad of Anu, god of the sky; Enlil, god of the earth; and Ea, god of water, supplemented by Nannar, god of the moon; Utu, god of the sun; and Inanna, goddess of fertility. The Sumerians believed that the sky and earth were two disks that had been blown apart and that all existence was governed by the gods, who represented the unpredictable elements affecting human life. They believed that human beings were created from the alluvial silt deposits in the river valleys to serve the gods and to relieve them of toil. Because the gods benefited from human praise, they had to remain in human favor. Thus there was a balance in the creative and destructive forces of the gods and a mutual inter-dependence between people and gods.