

Chapter 1

I. ARCHITECTURE AS A SECOND NATURE: SACRED CAVES AND PRIMITIVE HUTS

A. The Act of Dwelling: Shelter and Symbol

1. From roughly 500,000 to 3000 BCE, the idea of architecture emerged through the awareness of two recurring themes: symbol and shelter.
2. The primitive hut, the mythical first dwelling, appeared all over the planet.
3. Works remained tentative and unobtrusive. The earliest designers made shelter in the pleats of the earth.
 - a. The trees of central Africa more than 3 million years ago ("Lucy")
 - b. The Oldupai Gorge (Tanzania)
 - c. The hearths of the Neanderthals
 - i. The hearths at the great cave of Escale near Marseilles in southern France, and the cave of "Peking Man" at Zhoukoudian, China
4. Neanderthal hunter-gatherers built huts in the open as early as 400,000 BCE.
- a. Traces of twenty oval huts at the camp of Terra Amata, near Nice in southern France
5. The Stone Age
 - a. Anthropologists often refer to the long period of prehistory as the "Stone Age," named after the prevailing technology of stone tools.
 - b. Around 40,000 BCE, the Neanderthals coexisted with but were eventually replaced by the Cro-Magnon peoples, a distinct strain of Homo sapiens sapiens.
 - i. Homo sapiens began to formulate religious behavior.
 - ii. The cults that formed to appease human anxiety prepared the foundations for architecture as the setting for ritual actions. The cave acquired a new status as sanctuary.
 - iii. At its mouth, the hunter might make a dwelling, while reserving the dark inner recesses for rituals addressing life, death, and afterlife.
 - iv. Stone-Age nomads began to use painting and sculpture to decorate special hillside caves:
 1. Caves at Lascaux, in southwestern France
 2. Altamira, in northwestern Spain
 - c. The Chauvet Cave appears to be the oldest in Europe, tentatively dated around 30,000 BCE.
 - i. Like Lascaux and Altamira, one entered from above into a three-part sequence of descending spaces articulated by ritual markings.
 - ii. The "end chamber" of the Chauvet Cave has as its central icon a painting of a gigantic woman, associated with a presumed cult of the Great Goddess of the Earth.

B. Living Together: Neolithic Settlements in Southwest Asia

1. 16,000 BCE: dramatic climate change. Humans began to take more active control of the environment, reshaping the land:
 - a. Channeling water
 - b. Terracing hillsides
 - c. Shaping the fields through constant tilling
 - d. Fashioning shelters from the basic materials offered by the land—mud, wood, and stone—and covering them with woven grasses and animal hides
 - e. Clustering their houses into villages
2. Earliest Stone-Age settlers migrated to Southwest Asia, where wild grains grew in abundance.
 - a. Oval structures unearthed in 1994 at Göbekli Tepe, a mound in southeastern Turkey.
 - i. These early works of architecture belonged to a community of hunter-gatherers.

- ii. The architects of the “temples” at Göbekli Tepe set a series of T-shaped megaliths in radial positions to serve as ribs in the thick oval walls made of stone and rubble.
 - iii. About twice human height, the prized stones weighed up to 20 tons and required the effort of hundreds of people to drag them from the quarries. The builders carved the megaliths in relief into animal figures.
 - iv. Sometime in the early eighth millennium the entire site was purposefully buried under a thick layer of soil.
 - 3. Transition to agriculture inspired the earliest forms of urbanism in Southwest Asia.
 - a. Jericho, settled around 7500 BCE, is the oldest city in the world.
 - i. The presence of imported obsidian demonstrated that these first towns in Palestine maintained distant trading relations.
 - ii. Initial cluster of round houses exploited the spring of freshwater that now gushes from a place called Elisha’s Fountain.
 - iii. Hunters, who followed their prey to the drinking hole, slowly converted to farming and a more settled life.
 - iv. Occupants of Neolithic Jericho added an impressive fortification to protect their homes and silos: a wall, a conical tower, and small round houses inside the wall.
 - v. About 6500 BCE, the original town fell to outsiders; the newcomers built rectangular rather than round houses.
 - b. Khirokitia, which occupied a hillside on the southern coast of the island of Cyprus, was contemporary with Jericho.
 - i. It shared a few architectural traits with ancient Jericho, including a ditch, a stone wall, and a series of small round houses.
 - ii. Also had a rounded plaza, with a splendid view, which served as a place of social exchange and assembly.
 - iii. This public space had no precedent or imitators.
 - c. Çatalhöyük, on the Konya Plain of southern Turkey, was the largest and most complex Neolithic settlement of Southwest Asia.
 - i. Çatalhöyük arose as a transitional settlement caught between nomadic and agricultural ways of life.
 - ii. Çatalhöyük’s success came from its control of the market for obsidian.
 - iii. One entered a typical house through a hole in the flat roof, served by a wooden ladder.
 - iv. The house plans at Çatalhöyük were fairly uniform.
 - v. The half-timber construction method used at Çatalhöyük remained a standard practice.

II. VERNACULAR ARCHITECTURE: A LANGUAGE OF MUD, LOGS, HIDES, AND STONES

A. Nomadic Shelter: Tensile Strength in Temporary Dwellings

1. Nomads perfected increasingly lighter structures, using tensile strategies that allowed them to create sturdy shelters with a minimum of material.
2. The San, or Basarwa, people of Botswana and the Baka Pygmies of Cameroon, still survive in similar conditions to the primeval hunter-gatherers.
 - a. Baka Pygmy women build half-dome structures made of intertwined branches, covered with woven grasses and leaves.
 - b. Currently, the Baka and the San peoples are being coerced toward permanent settlement.
3. The Tuareg people have crossed the Sahara Desert for millennia as traders and shepherds.
 - a. They carry tents of sewn hides and woven goat hair; the strength of Tuareg structures relies upon the tensile forces of the coverings and the ropes.
4. The indigenous nomadic peoples of North America carried and assembled tipis (Sioux) or built domical wigwams (Chippewa).

5. The nomads of the steppes in Mongolia, Kyrgyzstan, Kazakhstan, and Turkmenistan build yurts.

B. Building out of Earth

1. Unbaked mud provided the most common building material of the ancient world and remains very popular among traditional builders.
 - a. Flexible but vulnerable to seismic tremors.
2. The easiest and safest way to build with earth is to dig or cut into it.
 - a. For three millennia builders have carved deep into the Loess Plateau (the northwestern Shaanxi Province in China) to make pit houses.
 - b. The village of Banpo is one of the best-known prehistoric sites in China.
3. The next-best method of building with earth involves mixing soil, water, straw, reeds, and leaves into balls that can be stacked—known as cob technique in English and banco in West Africa.
 - a. The Batammaliba people, (translated as “architects of the earth”) in the area between Togo, Burkina Faso, and Benin, build walls as coils of mud balls, usually on circular plans.
4. The two most widespread varieties of earth construction, rammed earth (often called by the French word *pisé*) and adobe brick, require more skill and foresight.
 - a. Rammed earth uses slightly moist earth poured into a rigid, wooden formwork and pounded into place, layer upon layer, with a heavy rammer.
 - i. Dwellings by the Hakka people in Fujian Province, China
 - ii. Adobe homes in Neolithic Jericho and Southwest Asia
 - iii. Mud-brick tower houses of Yemen
 - iv. Semi-permanent settlements in South America, Africa, and Asia
 - b. With skill and foresight builders can assemble mud bricks into sturdy vaulted coverings.
 - i. Falsework
 - ii. Catenary arch
 - iii. Standardized fired bricks

C. The Wooden Skeleton

1. The great forests of northern Europe provided the major building materials for the primeval settlers of the region.
 - a. Variations of the Neolithic longhouse type have been found at European sites as widely spread as France, Norway, Romania, and Greece.
 - i. The longhouse builders made invariably rectangular structures, which were at least 10 m (33 ft) long, with spaces reserved for farm animals either at one end or along the sides.
 - ii. The longhouse appeared in many other cultures outside Europe, including Southeast Asia and North America, with similar social implications of a single container for a large extended family and its animals.
 - b. The other major vernacular type of wooden building rises on stilts. Neolithic villagers along Swiss lakes at Egolzwil built their modest wooden houses on raised piles to protect them from sudden floods.
 - i. The timber frame house possesses some of the expediency and tensile virtue of the temporary huts built with poles.
 - ii. Wooden frames, while subject to fire and rot, proved particularly resilient in seismic locations and thus became the preferred construction method in places like Japan, California, and Turkey.
 - c. The cruck frame, found mostly in England, appears as one of the most primitive and spectacular versions of the wooden skeleton.
 - d. No examples of prehistoric wood joinery have survived, but we can see various representations of wood sculpted in stone:
 - i. Stonehenge in Neolithic England;
 - ii. Saqqâra in ancient Egypt;
 - iii. The Parthenon in classical Greece.

D. Of Stones and Compression

1. Neolithic builders chose stone for foundations, buttressing, or the hearth.
 - a. Skara Brae consisted of eight small stone houses linked by stone-lined alleys.
 - b. At Ain Ghazal the inhabitants constructed their houses of rectangular sack walls, a sandwich of two outer layers of stone stuffed with mud and rubble infill.
2. The roof proved the weakest part of prehistoric houses.
 - a. The easiest way to cover a room was to lay a solid slice of stone on top of two upright walls.
 - i. This method is limited, since slabs of stone rarely reach more than 3–4 m (10–13 ft.) across.
 - ii. One means of spanning involved the corbel.
 - iii. A corbel arch resulted from cantilevering one stone over the next from the tops of two opposite walls, reaching a point of convergence in the center that was locked into place by a capstone.
 - b. The introduction of metal tools meant that stonework became more precise and refined.
 - i. The skill and theoretical knowledge needed to cut and design stone led to a class distinction among builders: Masons.

III. MEGALITHS AND STONE CIRCLES: BUILDING AS MEMORY

A. Menhirs, Dolmens, and Cairns: To Honor the Dead

1. The need to commemorate the dead instigated the earliest design of monuments.
2. Megaliths, large stones dragged across the land and erected as markers, remained icons for remembering the lives of those who came before.
 - a. Megalith markers have been found on all continents and were particularly common in the years 4000 to 1000 BCE.
 - b. Menhirs (meaning “raised stone”) appeared in northwestern France, in Brittany.
 - c. Kerlesan, another field of megaliths at Carnac, has a few hundred menhirs arranged in a fanning series of lines. While the great stones initially served as burial markers, their function evolved into pieces of an astronomical observatory.
3. In contrast to the openness of the free-standing menhirs, Neolithic builders also created closed, cave-like spaces for their tombs. The basic tomb type was the dolmen.
4. Cairns were great mounds of stone and earth.
 - a. Newgrange was the grandest of over 150 cairns in Ireland.
 - i. Artisans lined the interior passage with a series of dolmen-like megaliths.

B. Malta: The Roundness of Architecture

1. The prehistoric communities in the Maltese islands, located 90 km (56 miles) south of Sicily, produced an extraordinary collection of enclosed megalithic temples, built between 3600 and 2500 BCE.
2. All of the 23 temples on the Maltese islands correspond to a single design concept, seen in the complex of Hagar Qim.
 - a. There were a pair of rounded apses, which over time they multiplied.
 - b. They surrounded the curving cells by a layer of thick walls lined with megaliths.
 - c. They oriented the entry toward the rising sun and created an articulated threshold.
 - d. The designers conceived of the temple as a place of assembly.
 - e. The curving apses of Maltese temples seem to have been inspired by the great underground cemetery, or Hypogeum, at Hal Saflieni.

C. Stonehenge: Responding to the Order of the Cosmos

1. Stonehenge prevails as the most famous prehistoric monument in Europe.
 - a. Its final form revealed a superior refinement of craft, geometry, and astronomical knowledge.
 - b. Stonehenge underwent at least five major phases of construction over the course of nearly two millennia.
 - i. A first generation built the outer ring and ditch.
 - ii. About 500 years later another team of builders added the so-called Aubrey holes.
 - iii. Around 2200 BCE new builders removed the timber columns at Stonehenge from the Aubrey holes, which they reused to bury the ashes of their cremated dead.
 - iv. A fourth campaign came two centuries later, when the bluestones were replaced by thirty sandstone piers, known as "sarsens."
 - v. Sometime around 1600 BCE, a millennium after the first megaliths had been delivered, the bluestones were reintroduced into the design. The new builders set a ring of these smaller stones inside the trilithons and a circle of them outside the sarsens, considerably complicating the composition.
 - vi. The meaning of Stonehenge resided in the ritual life that humanized this calendar of stone and earth set in the open count.
 - c. Castlerigg, an earlier stone ring, dates from 3200 BCE and provides a fine example of the precedents of Stonehenge.
 - d. Avebury, north of Stonehenge, hosted the largest of the stone circles.