THE GRID BOOK

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1 BRICK **9000 BCE**

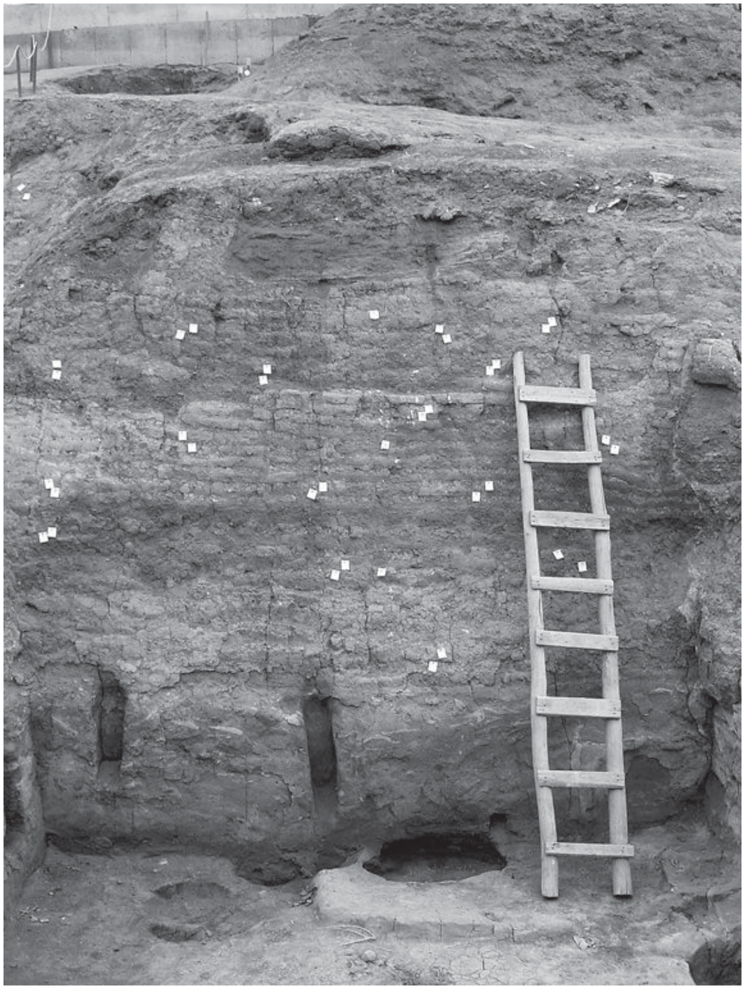
IMAGINE YOU ARE HOLDING AN EVERYDAY BRICK. You have probably pictured it in one hand. With few exceptions, since the brick was invented, it has been easily grasped this way. You might almost say that in order to be a brick, the object *must* be handheld. Of course the brick begins in the flesh of the hand; the hand is the agent of its incarnation, the instrument of its personality. Routinely shaped to a ratio of approximately 4:2:1, the handmade brick is clapped on each side into a roughly rectangular form and capped at each end by the slap of a palm. Do this enough to some malleable material and you get a nice, handmade brick. In addition to this manual imperative, the dimensions of bricks are pre-set by the human hand and their drying needs: whether mud or clay, parched by air or by fire, they must dry all the way through—too thin and they crack, too thick and the core stays forever moist. In other words, the form of the brick is a product of harmonious intrinsic and extrinsic demands. The grid character of the brick, however, is revealed in its use. Bricks are lined up end-to-end in rows staggered one on top of another, with mortar in between. The builder holds the brick in one hand and a mortaring tool in the other, producing a grid that is equal parts mortar and module.

1.1
Daily life and trade along the Nile. Making bricks from mud and chopped straw, Nile River, Egypt. Photo: Erich Lessing/Art Resource, New York.

In the Babylonian creation myth, God turned men out like bricks from clay molds. It was men who built bricks into walls. The first grid, the brick wall, easily evokes associations with the human body. The wall of handmade or hand-molded clay bricks, which is any clay wall made before the nineteenth century, has a rich and varied surface texture, like skin. The bricks seem to swagger up and down in undulating zigzag patterns; the wall pulses with dents, furrows, and bulges. In time, a brick wall will seem to breathe as the brick cells cohere in a unified field of vertical and horizontal, shifting like a tectonic plate. The much vaunted "warmth" of brick walls comes from their relationship to their makers—a human warmth that is added to the real warmth of fired bricks. In the words of one writer: "Brick and the building techniques of bricklaying … betray an alternative order of the flesh—not raw but purple and made of identical cells. We create everything in our own image. The brick is the elemental self-portrait of the human species."[1]

All this said, there are bricks that do not originate in the hand. There have been flatter brick forms, particularly in ancient Rome, where large, square, flat bricks based on the size of the Emperor's feet predominated. These slab-style bricks, when stacked up to make walls, created striated rather than gridded patterns. In modern architecture, this striated patterning would make a famous return in the double-length "Roman" bricks Frank Lloyd Wright used. There are other varieties as well. To make curved, angled, domed, towered, and lateral architectures, bricks have been formed in various nonquadrilateral shapes—wedges for keystones and arches, arced bricks for columns, and inverted pyramids for plazas, for example. Bricks with one ornamental face have been arranged to create both abstract patterns and representational images that obscure the staggered grid of the simple brick wall. Such variations notwithstanding, the standard brick and the wall it forms when stacked have remained largely unchanged since the birth of the grid some 11,000 years ago.

Beginning in about 9000 BCE (just prior to the waning of the last Ice Age), Neolithic humans in the Middle East discovered that rather than following the migratory paths of animals or the seasonal cycles of plant life, they might just stay put. Hence began the process of domesticating animals, cultivating crops, and making bricks. These early settlers of the Middle East discovered that mud, and later clay, could be formed by hand or squeezed between boards and sun-dried into the stackable form of a staggered grid still used to form brick walls.[2] The staggering, where the module is shifted regularly to one side of the one above it, is structurally necessary for brick walls since the long side of each brick supports the breaks between two bricks above. The staggered grid can be seen as small-scale versions of the force grid of familiar post and lintel architecture: two posts supporting a beam becoming two bricks supporting a third across the vertical and horizontal spread of a brick wall. Joined or placed just so, walls would become houses, irrigation canals, and security walls, the latter of which would make towns possible. A revolution in human life had occurred, one that would move civilization, and with it the brick, from the Fertile Crescent of the Tigris and Euphrates River Valley (Syria, Iran, and Iraq) along two paths: west across the Mediterranean to Greece, Italy, Spain, and the rest of Europe, and



1.2
Çatalhöyük, south wall sequence of walls in Shrine 10 with ladder showing modern archeologists' sole point of entry into the room. Photographer SHL, 2005. Location: Stanford University Çatalhöyük Image Database.

northeast into Central Europe and Asia, with the brick reaching England and Scandinavia last, in around 3000 BCE.

Archaeologists have dated the launch of this migration to the settlement in about 9000 BCE of Neolithic Jericho in modern Jordan, where the first bricks of sun-dried mud were produced sometime between 8300 and 7600 BCE. These archetypal bricks, the bricks that established the brick for posterity, were hand-formed like loaves of bread and mortared together with more mud. During the next millennium, they would become more regular in size and shape and take on thumb indentations, concave pocks that made them more receptive to the mud mortar. Though we certainly couldn't call this a signature in the modern sense, it nevertheless imprints the brick with the mark of its maker. One imagines a field of concealed thumbprints, elemental self-portraits, tucked away inside these ancient walls.

By about 6000 BCE, wooden molds that produced standardized bricks supplemented the hand-formed method. In an era before mechanical wood planes, the hand-hewn boards of these early molds would have taken inordinate amounts of time to produce. But the effort was worth it. These bricks were more uniform in size and more squared in form and could therefore be more reliably stacked into rectilinear walls. Still, the handmade brick was not replaced by the molded brick. Far from it. (Technological evolution seldom results in full replacement of the existing technology—you're reading this book, after all, on the age-old page.) Rather, those who could afford the new technology had more options from this time forward.

Jericho gives us the earliest examples of brick, but Çatalhöyük in modern Turkey tells more of its use in these ancient brick towns. Çatalhöyük, a Neolithic trading city of 10,000 inhabitants dating to 6500 BCE, had no streets or alleyways. Each mud-brick-walled structure of Çatalhöyük was added to another to form a continuous mass, like a propagating crystal cluster. The knot of buildings was navigated over rooftops and entered exclusively by ladder. Communal life was carried out on these rooftops, as were trade and religious rites. Though windows and doors were thus not particularly relevant to the function of brick for the earliest bricklayers, the homes in this ancient Turkish metropolis were no mere rudimentary structures. The builders at Çatalhöyük used many kinds of brick of varying texture, density, and rectilinearity; one building often consisted of some four different types of brick, produced both with molds and by hand and then plastered meticulously to a smooth surface. A first course of mud bricks was laid out to establish the floor plan of the building, including storage area, kitchen hearth, and benches in which the dried bones of dead family members were entombed. Above this, rougher and recycled bricks could be laid and filled in with mud mortar, ending with a finished, flat roof.[3] The variety of bricks made each part of the building, including built-in furniture, appropriately responsive to time, gravity, weather, and environmental change. When a building nonetheless collapsed, the rubble contributed to the elevation of Çatalhöyük, which grew to roughly sixty feet high during its thousand years of habitation.

Between 5000 and 3000 BCE the farming villages of the Fertile Crescent developed the religious, mathematic, and intelligible cultures we now associate with ancient Mesopotamia, the so-called cradle of civilization. In about 3000 BCE fired brick would appear in the region, making possible the large-scale permanent architectures of great kings and gods. (The technique then followed trade routes to the great cities of Ancient India, such as Harrappa and Mohenjo Daro, where fired bricks appear in the third millennium BCE.) Firing or cooking the brick greatly increased its life span and strength. Perhaps equally importantly, fire imparted symbolic warmth to the brick, an association that remains to this day in the image of the hearth. While the method was widespread, firing clay into brick was no small task, as clay must be brought to 950 to 1150 degrees Celsius before it vitrifies. This of course required kilns and fuel, which was scarce in the region. Recent explanations for why civilizations diminished dramatically in size in this area after this period speculate that destruction of the ecosystem stimulated by the need for burnable fuel used in brick

1.3
Aerial view of Ur, Mesopotamia, including "White Ziggurat," excavation area. Photo: Foto Marbur/Art Resource, New York.

manufacture was a contributing factor. In ancient Ur, which became a powerful city-state between 4000 and 3000 BCE, and where the first brick arch was built, fired brick was nearly thirty times as expensive as its more common mud counterpart. Savvy ancient builders found ways to economize, for instance by filling the core of their ziggurats with mud brick and saving the high-end fired bricks for the exterior. The famous Ziggurat of Ur was originally made with air-dried mud bricks, which were later replaced with more durable, fired clay bricks. A stepped pyramid, the ziggurat demonstrates that the rectilinear composite of bricks need not necessarily result in an overall rectilinear form.

The ziggurats of ancient Mesopotamia—enormous, stepped pyramidal bases for temples—stood at the center of ritual renewal, linking the prosperity of the state to the pantheon of gods and to their kings. The Sumerian word for brick, *sig,* also means building, city, and the god of the building. Like today, the laying of the first brick of a building could be ceremonial. In some places, for example, the laying of the first brick was accompanied by offerings of food and drink to the brick god. To initiate public buildings including ziggurats, the king himself would produce and lay the first brick. This brick was called the *asada,* or "invincible one"; its making was highly ritualistic and attended by divinity, as the following account attests: "[The king] put the blessed water in the frame of the brick mold…. He set up the appropriate brick stamp so that [the inscribed side] was upwards; he brushed on honey, butter, and cream; he mixed ambergris and essences from all kinds of trees into a paste. He … acted precisely as prescribed, and behold he succeeded in producing a most beautiful brick…. He struck the brick mould; the brick emerged into daylight…. The sun god rejoiced over [his] brick, which he had put in the mold, which rose up like a swelling river."[4] Clearly the brick was an object of not only functional but great ceremonial and aesthetic significance.

Perhaps the greatest (and most famous) ziggurat of all was built in Babylon some two thousand years later. Made of as many as thirty-six million bricks, it was about sixty yards, or roughly seventeen stories, high. Between 604 and 562 BCE Babylon reached the peak of its political power under the rule of King Nebuchadnezzar. At this time, the city was enormous by ancient standards, boasting a brick palace of hundreds of rooms that featured a great, glazed (waterproof) brick processional and molded ornamental bricks in the throne room, attesting to significant technical and decorative advances. There was also a complex urban fabric and a double ring of high-walled defenses, with the external ring wide enough for a four-horse-drawn chariot to circumnavigate the city. Imagine the effect in an era before highway overpasses—it would have resembled flight itself!

The grandeur of this accomplishment has suggested to many that the ziggurat at Babylon is the inspiration for the Tower of Babel, which appears in the Old Testament as a symbol of hubris, the crime of equating oneself with the very power of the divine. It is noteworthy, too, that here is where bricks first appear prominently in the biblical literature, albeit reduced to rubble, the anarchic rebuttal to the security and order represented by the seemingly permanent brick walls and towers of the ancient megalopolis. Babel appears in Genesis 11:

> Now the whole earth had one language and few words. And as men migrated from the east, they found a plain in the land of Shinar and settled there. And they said to one another, "Come, let us make bricks, and burn them thoroughly." And they had brick for stone, and bitumen for mortar. Then they said, "Come, let us build ourselves a city, and a tower with its top in the heavens, and let us make a name for ourselves, lest we be scattered abroad upon the face of the whole earth."
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> And the Lord came down to see the city and the tower, which the sons of men had built. And the Lord said, "Behold, they are one people, and they have all one language; and this is only the beginning of what they will do; and nothing that they propose to do will now be impossible for them. Come, let us go down, and there confuse their language, that they may not understand one another's speech." So the Lord scattered them abroad from there over the face of the earth, and they left off building the city. Therefore its name was called Babel, because there the Lord confused the language of all the earth; and from there the Lord scattered them abroad over the face of the earth.

Indeed the Tower of Babel was quite likely the *bab-ilu,* the "Gate of God," of the Babylonian tower temple, which translates to *bavel* in ancient Hebrew. That the punishment should be the infliction of *balal,* or "the confusion of language," represents a biblical etymological pun linking botched communication to the destruction of the brick tower.[5]

The association of the Tower of Babylon (the ziggurat) with the fragmentation of an original universal language suggests a simultaneous disintegration of culture and the body. This association in fact had its origin in the Babylonian creation myth, where, by some accounts, God created human beings as bricks in molds. In Genesis 2:7 the spirit of the divine gives life to the human being as he likewise mingles with the mud. "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul." In the Old Testament spoken language (breath) predates death itself, as it was given before the betrayal in the Garden of Eden that made human beings mortal. Human beings, then, represent God's mixing of the Earth and the word: a kind of speaking brick. When Yahweh destroyed the Tower of Babel, in other words, he both denied its builders the powers of universal communication bestowed on human beings since Creation and symbolically separated once again the formed clay (the brick/the human being) from the word, returning both to the soil when he scattered them over the face of the Earth. If the brick is the elemental self-portrait of the human species in this account, rubble is the unofficial portrait of a shattered civilization.

Ancient cities like Babylon slowly disappeared as the mud bricks, and later the fired bricks, broke down into great rubble mounds, called tells, upon which subsequent structures were built. Archeologists measure the passage of millennia by studying the strata, or levels, of these tells, which are now compressed one atop the other. Tells could be quite high; for example, the tell of Çatalhöyük was over sixty feet high, Megiddo in Palestine stood over seventy feet high, and Lachish, also in Palestine, was over one hundred feet high and eighteen acres in area. Ancient writers mentioned these tells. The description in Joshua 8:28 of the taking of the Canaanite city of Ai by the Israelites shows us that tells could form quickly by the hand of man, not just slowly as a course of nature: "So Joshua burned Ai, and made it into a tell, which it is to this day."

Joshua's plundering was not limited to Ai. His Israelite army reputedly decimated the fired brick wall of Jericho, which in about 1900 BCE replaced the earliest known wall—a mud-brick fortification that had protected this desert oasis since about 9000 BCE. Joshua's legendary Jericho battle is forecasted in Joshua 3:6: "And when ye' hear the sound of the trumpet, all the people shall shout with a great shout; and the wall of the city shall fall down flat, and the people shall ascend up every man straight before him." The actual outcome is debatable:

a tell has been found on the site, but no irrefutable evidence of Joshua leading the Israelites into Canaan after crossing the River Jordan. What happened was more likely a slow infiltration and transformation of the Canaanite civilization by the Israelites over the course of generations. The story's symbolism is nonetheless consistent with the association of the brick wall with the human body in the form of physical analogue. Both are upright, the wall functioning as body armor, until it falls down flat and the Israelites ascend up every unarmored man. Like the wall of Jericho, the Great Wall of China, the Berlin Wall, and the security fence between the United States and Mexico, walls function as prophylactics between human beings. Whether once wall or building, in its "down flat" state, pulverized brick signifies cultural collapse. To wit, throughout history, imagery of rubble accompanies virtually every story of the destruction of a civilization.

Albeit vulnerable to ruin like the rest of the ancient world, the structures of ancient Greece displayed a key difference: fired bricks were largely unknown there. This prompts a brief material detour:

1.4
West facade of the Parthenon Temple, Acropolis, Athens, Greece. Photo: Scala/Art Resource, New York.

the primary building blocks of Greece's ceremonial architecture were made of stone—which is plentiful there—large blocks of uniform color and much larger than bricks. Despite this disparity, the proportions of Greek architecture involve harmonious geometrical relationships that, though not displaying the graphically gridded surface created by mortared brick, express a precisely proportioned rectangle that is reminiscent of the brick itself. Another way to put this is that in ancient Greece, the object of the brick is effectively eclipsed by its idea as the brick became explicitly theorized in its ideal form as a rectangle.

Take, for instance, a rectangle drawn around the façade and pediment of the Parthenon in Athens, a classic example of Doric architecture and by many accounts an embodiment of the golden ratio, a proportion of 1.6180339887 that is commonly represented by the Greek letter Φ (or Phi). Phi is used to explain the harmonic patterns of simple musical tones and also reflects the proportions of the golden rectangle, which is formed such that when a square is drawn inside it using the length of the short side, the remainder on the long side forms another rectangle of equal proportion to the original, so that it too can be cut down into a square, and so on, to infinity. This proportion occurs repeatedly not only in architecture, art, and geometry, including contemporary fractal geometry, but in geometric forms in nature, such as the spiral of conch shells and rotating galaxies. Phi's ubiquity in both nature and culture inspired the medieval mathematician Johannes Kepler to call it "the divine proportion."

Modern mathematician H. E. Huntley extrapolated from the golden section (a single line demonstrating the ratio Phi) a three-dimensional golden cuboid that is shaped quite like a brick.[6] As Phi would have it, when three vertical lines bisect this horizontal form equally, the three sections each have the same ratios as the original rectangle, and their relationship to the original is a function of Phi. In other words, the geometry of the most ancient brick partakes of the so-called divine or golden proportion. Pythagoras, the first great mathematician in the West, developed a mystical philosophy of numbers as the common substance of all things, theorizing a world unified through numerical relationships. He is famous for figuring the area of the triangle as a function of the relative lengths of the sides of the right triangle ($a^2 + b^2 = c^2$), but patterns in his Pythagorean Theorem correspond to Phi. His mathematical mysticism would have taken quite a liking to the elementally geometric brick.

The Romans took a hybrid approach in their ceremonial buildings, using stone blocks, like the Greeks, for the facade, and bricks, like the Mesopotamians, for the substructure. This concealment might explain why Marcus Vitruvius Pollio wrote only a few words about bricks in his influential *Ten Books on Architecture.* Or perhaps the technology of the brick was still relatively new in Rome when Vitruvius wrote, between 30 and 20 BCE. In any case, bricks were central to the structural innovations of Roman architecture. The Romans preferred mud brick for domestic architecture, but fired brick was introduced by way of the Etruscans, and both paved the way for the great examples of Roman public architecture and early Christian buildings.

Although Roman bricks differ in proportion from the handheld standard of their predecessors in ancient Mesopotamia, the Romans maintained a strong link between the proportions of an ideal physical body and those of the brick. According to Vitruvius, the smallest brick was the *bessalis,* which was about eight inches (200 mm) square, or roughly the length of a hand. Another common brick was the *pedalis,* which was about one foot (295 mm) in length and based on the human foot, as dictated by Emperor Diocletian. The two largest, and least common, forms of brick Vitruvius mentions would more properly be called slabs. The *sesquipedalis* measures one-and-a-half Roman feet (450 mm) and the *bipedalis* two Roman feet (600 mm)—with both sizes again determined by the proportional ideal represented by the body. These had decorative functions when cut down, but also made significant appearances in brick and slab floors.

The peak of Roman brickwork dates to the end of the first and second centuries CE, nearly a century after Vitruvius wrote his historic books. Roman brick architecture is famous for the great leaps in space traversed by the bowed forms of enormous arches that made up the aqueducts and coliseums of classical renown, not to mention the unprecedented structural support of the concrete dome of the Pantheon. The coastal town of Ostia was built using elaborately carved and molded bricks that lay nearly flush thanks to the invention of a new, faster drying lime mortar. Bricks would find themselves at the center of Roman imperial grandstanding, whether by being spurned or extolled. Where Emperor Augustus boasted famously that he had "found a Rome of brick and replaced it with stone," Cicero would associate the brick architecture of the Forum with the glory of Rome itself.

Another Roman brick innovation is the increased use of identifying stamps, which enable the bricks to be dated and linked to specific manufacturers and landowners. This evolution occurred under Emperor Trajan, who reigned from 98 to 117 CE, when the Roman brick industry was rapidly expanding and Roman decorative brickwork coming into its own. The ruins of the famed Trajan's Market, with its arch-inlaid facade and multifloored corridors of shops, can still be seen within the Forum. Not only the decorative, but the engineering achievements of Roman brickwork reached a fever pitch at about this time. The earliest aqueduct, the Aqua Appia, was built in 312 BCE, and by Trajan's era ten of the eleven celebrated aqueducts of ancient Rome were complete. These brick wonders of civic infrastructure piped water into the capital from as far as fifty-six miles away—by gravity alone. They supplied not only drinking water, but the Roman baths of which the populace was so fond. Complex brick hydraulic systems in the bath buildings took advantage of the insulating qualities of brick, serving both to warm the water over hot gas pipes, and also, through evaporation, to cool the water for the customary final cold plunge.

The Roman Forum, domes, baths, and aqueducts would be followed by brickwork masterpieces such as Hagia Sophia (537 CE), the Byzantine masterpiece in Istanbul, and exquisite, patterned bricklaying like the basket-weave pattern of the Tomb of the Samanids (900 CE) in Bukhara, Uzbekistan, whose patterned beauty is said to have spared it from the 1220 Mongol invasion. This small building (about thirty-five feet square) presents a wide range of grids and checkerboard-like patterning. The resulting surface, softened by the earthy colors of the bricks yet dynamic in its starkly contrasting forms, represented both the actual bodies in the tomb as well as symbols of the "afterlife."[7] Likewise, Islamic brickwork in the Middle East would favor patterns of many kinds—stripes, grids, and more—that function as a kind of superrhythmic overlay to the brick walls that support them. Indeed, if the eye zigzags at a measured pace over the brickwork of a standard brick wall, it positively flies across the visually energetic surfaces of dark and bright squares found in Islamic architecture.

In medieval Europe as well as China, soaring churches and pagodas would use brick to link Earth to sky. In Poland and northern Germany, for example, *Backsteingotik* ("baked-stone Gothic") churches dominated from 1200–1600 CE. But medieval brickwork was as important for its place in the social evolution of complex craftsmen guilds across Europe as for any stylistic innovations. By association with the earth, given its clay origins, as well as for its handmade manufacture, brick came to represent both piety and poverty, labor and virtue. Whether because of the rejection of ornament by the Protestant Reformation in the north, or simple cost efficiency, a simple form of brick wall—straight layers carefully placed one on top of the next—came to dominate the Western world.

This style and double association made its way across the Atlantic. Beginning in 1768, Thomas Jefferson would famously use bricks in building his Monticello estate and later the University of Virginia. The millions of bricks that comprise Monticello were made on site, by slaves, but nevertheless reflect Jefferson's appreciation of local craft traditions. For him, the material was economical as well as democratic—appropriate qualities for a burgeoning democracy.

Come the nineteenth century, with the start of the Industrial Revolution, the brick's mode of production, and thus its appearance and perceived character, would change dramatically. Since 9000 BCE, bricks had been made by hand. Bricks could now be mass-produced with mechanical molds and wire cutters. Cheap in large numbers and flame-retardant, industrial brick was efficient and safe for building large factories and ever-expanding urban architecture and worker housing. In a century when cities doubled and tripled in size in the industrial world, bricks also made up the aqueducts, sewers, canals, and tunnels that carried the products of the people. The new bricks were very uniform, which must have sped construction. Not surprisingly, many architects "liked the uniformity of the product," while "others complained that the bricks lacked the texture and character of handmade ones." Thus an early example of faux finishing came to be, as "a number of devices were thus added to extrusion and pressing machines to produce surface variations artificially."[8]

Nineteenth-century English socialist writer and designer William Morris would make much of the new distinction in brick manufacture and appearance. Starting from the assumption that the democratically run medieval guilds were "the progressive part of the society of the time,"[9] Morris praised the medieval-type, handmade, or "good brick" (his term), for its unique ability to preserve "its own outlines right away to the end," and added, "I should like to see places built of good bricks and entirely of brick."[10] For Morris, the democratic nature of the guild that produced medieval brick bespeaks a homely materialism that appends to the brick wall itself. He continues: "This organic life of a building is so interesting, so beautiful even, that it is a distinct and definite pleasure to see a large blank wall without any ordinary architectural features, if it is really properly built and properly placed together. In point of fact this seems to me almost the beginning of architecture, that you can raise a wall which impresses you at once with its usefulness; its size, if it is big; its delicacy if it is small; and in short by its actual life; that is the beginning of building altogether."[11] In sum, the wall of "good brick" stands in the modern era as a symbol of the origins of architecture, valued not so much for its religious or political associations, but for its being properly built and socially progressive by virtue of its association with the seemingly egalitarian guild method of manufacture. By contrast, Morris cited industrial London and its worker slums as "the center and the token of the slavery of commercialism," wrought, one might conjecture, of "bad brick" (my term).[12]

Morris's acquaintance, critic John Ruskin, would likewise bemoan industrial brick as a symbol of the rapacious nature of industrial capitalism, "feeding the demands of the rows of similar brick houses, which branch in devouring cancer around every manufacturing town."[13] Charles Dickens, in his epic *Bleak House,* would devote a chapter to a London brick maker's family who lived in a "cluster of wretched hovels in a brickfield."[14] Industrial bricks, in other words, came to symbolize the negative consequences of the Industrial Revolution in terms of their manufacture, the quality of the end product, and the miserable social conditions they housed.

These double senses of brick—good and bad, crafted and mass-produced—remain with us to this day. In its day, the Soviet Union was routinely associated with the image of the utilitarian "red brick"—the color symbolizing "red" communism and the brick its emphasis on industrial labor. By contrast, the Mexican artist Gabriel Orozco describes handmade bricks used in Mexican architecture glowingly: "It's amazing how much physical effort and how much working class labor is behind each brick."[15]

Both images of the brick—the insidiously industrial and the rustic—are sufficiently established as to have found their way into popular fiction. J. R. R. Tolkien, for example, utilized this dual brick imagery in his novel, *The Lord of the Rings.* In the book the natural archaism of the original shire of "hobbit holes in the bank of the

North side of the pool" has been replaced by a poorly crafted "tall chimney of brick in the distance." Civic buildings, in this case a gatehouse, worker housing, and the "Shirriff-house" were "built of ugly, pale bricks badly laid." The new, industrialized mills of the modernizing shire, which are "full o' outlandish wheels and contraptions," pollute the pure earth of the shire, since "they pour out filth a purpose; they've fouled all the lower water." When the good Hobbits Frodo and Sam crush the leader Sharkey's corrupt and oppressive regime in a grassroots campaign, its symbols (the brick buildings) are also crushed: "Before Yule not a brick was left standing of the new Shirriff-houses or of anything that had been built by 'Sharkey's Men.'" Once reduced to rubble, the bricks take on a surprising new function: "the bricks were used to repair many an old hole, to make it snugger and drier."[16] The image is deceptively simple, for in it the brick returns to the earth from which it originated while also retaining its social utility. It is as if nature herself had plucked the brick from the industrial-socialist order and used it to plug a wound.

Among the modern architects most associated with the brick is Louis Kahn, who described himself as practicing a "religion of the brickwork" whose gospel clearly spoke to the elemental aspect of the material.[17] The son of an immigrant bricklayer, Kahn would extrapolate from the handwork of his father a modern brick architecture sensitive to the natural qualities of the material at hand. His most famous brick buildings include the Exeter Library (1969–1971) in Exeter, New Hampshire; the Institute of Management (1963) in Ahmedabad, India; and the National Assembly (1962–1974) in Dacca, Bangladesh, an agglomeration of pristine brick volumes, including curved volumes, that form enormous interior volumes punctured by deep window cuts. These cuts allow for precise direction of the natural light, causing the slow movement of lit geometric shapes over hand-formed bricks over the course of the day.

Speaking to a Master Class at the University of Pennsylvania in 1971, Kahn proposed the following imaginary conversation: "And when you want to give something presence, you have to consult nature, and that is where design comes in.... If you think of a brick, for instance, you say to brick 'What do you want brick?' And the brick says to you, 'I like an arch.' And if you say to brick, 'Look, arches are expensive and I can use a concrete lintel over you. What do you think of that, brick?' Brick says, 'I like an arch.' And it's important, you see, that you honor the material that you use."[18]

In his recent book, *What Do Pictures Want? The Lives and Loves of Images,* W. J. T. Mitchell, made the remarkable observation that as we interact with images, they seem to have many of the same qualities as living things.[19] The logic can be extended to virtually any man-made object, since the things we make embody our aspirations, the ways we would use them. When asked in an interview, "What do pictures want?" Mitchell responded in terms that reflect pithily back to Kahn, "ask yourself what the word *want* means. I attribute two meanings to it: One is desire, the other one is lack."[20] "I like an arch," said the brick, because it isn't one, but would like to be. Alone, the brick is just a lump of mud or clay. As a brick, however, it embodies aspirations like social grouping, reaching, stretching, expanding, securing, and breaking—an elemental portrait of a human being.