

INTRODUCTION

I am the tomb of Harpalos. Which Harpalos? Why, Harpalos most skillful in the Daedalian craft. This I know, o Fates: his all-inventive art has perished with him. What other man alive was his peer? He who laid out beetling temple walls, who raised columns for high-ceiled porticoes – he would often move the very mountaintops, servants to his puny ropes, as easily as boys gather twigs. So Amphion, so Orpheus once charmed the rocks with song and led them effortlessly away.¹

– Greek inscription from Hermoupolis Magna

Rabirius modell tooke from heav'n to build
 Our wondrous pallace sure; hee is so skill'd.
 For Phidian Jove a worthy fane to reare,
 Pisa must begg him of our Thunderer.²

– Anonymous translation of Martial 7.56

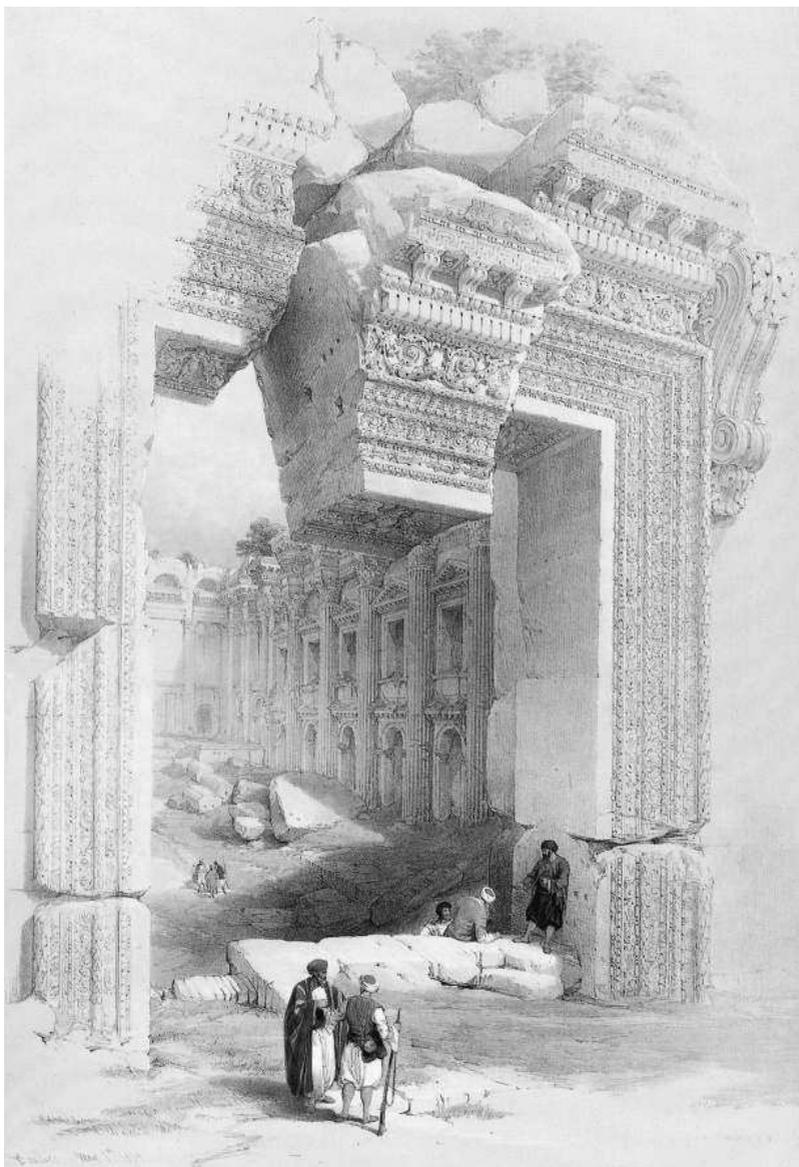
In 1586 Domenico Fontana oversaw one of the greatest spectacles in the history of building, the moving of a monolithic Egyptian obelisk from its nearby site in the Vatican, where it had been placed by the Roman emperor Caligula, to its modern position in the Piazza San Pietro. This undertaking involved a towering wooden derrick, miles of rope, hundreds of men and horses, the moral support (or otherwise!) of a huge throng of onlookers, and – most important of all – the oversize personalities of Fontana

himself and his patron, Pope Sixtus V. It has thrust itself into the annals of ingenuity, even if the achievement itself pales in comparison to the building for which it serves as a frontispiece. The original transport and erection of the obelisk must have generated excitement on a similar scale. Pliny the Elder remarks on the specially built ship for its transport, complete with its ballast of eight hundred tonnes of lentils!³ Yet the Vatican Obelisk was only one of many extravagant projects punctuating an almost continuous program of urban monumentalization in the late Julio-Claudian period. Many other great building campaigns were to follow. One scholar has recently brought to life a comparably ostentatious project in the early second century, the raising of the Column of Trajan – another monument of calculated difficulty contributing to a stupendous building program. Another has estimated that the largest blocks and column shafts of the Baths of Caracalla would have required carts drawn by three hundred pairs of oxen apiece.⁴ The great temple complex at Baalbek in Lebanon included the famous Trilithon blocks in the podium of the Temple of Jupiter, the largest weighing perhaps a thousand tonnes.⁵ The fine limestone of the superstructure was cut with laser precision into interlocking shapes of remarkable complexity and worked into a glistening lather of carved decoration (Fig. 1).

Great building projects have always been glamorous. Even today, in an age of high-tolerance materials and low-risk methods, construction sites present an irresistible spectacle. How much greater the interest and excitement in antiquity, among a people notorious for their love of a good show. The stonecutting in the workyards, the thickets of timber scaffolding, the processions of carts and sledges carrying stone quarried a thousand miles away, the creaking capstans and chanting gangs, and (of course) the occasional spectacular, homicidal failure must all have seemed as profoundly Roman as the blood sports to which so much architectural ostentation was devoted. But they also gave material proof of the rigid Roman system of social control. The imperial granite quarries in Egypt were so notorious for their expenditure of labor and lives that they became the setting for a martyrology, the *Passio sanctorum quattuor coronatorum*, in which the four saintly protagonists (still patron saints of stoneworkers today) quarried a single column shaft in twenty-six days while their wretched colleagues labored at the same task for three months.⁶ These events putatively happened in the time

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1. Baalbek: Temple of Dionysus before excavation. David Roberts, *The Holy Land* (1843). By permission of Duke University Museum of Art.

of the emperor Diocletian: Perhaps the story evolved not only from traditional mythopoeic processes, but from firsthand knowledge of the great persecutor's imperial baths in Rome, their hulking Egyptian granite columns visible to all. And so they remain today, standing intact in the old frigidarium, which serves the new dispensation as the transept of the church of Santa Maria degli Angeli (Fig. 2).⁷

From our clouded vantage point, we have trouble looking beyond the forms that loom in front of us or lie broken on the ground

to inquire into the narrative behind them. Rarely have we attended to the *facture* of buildings, instead beginning our inquiries with the *fact* of their existence. This is puzzling. Architectural process is, after all, supreme theater, captivating onlookers and participants alike in ways that the completed building does not. Moreover, the phases of a building's potentiality – the evolution of its design and construction – can contribute much to our understanding of it. Scholars have relied too heavily for their understanding of Roman architectural process on Vitruvius' *Ten Books on Architecture* (*De architectura*), written probably in the 20s B.C.⁸ Grateful as we are for this treatise from a professional Roman practitioner, we must also recognize its limitations. It was intended not as a manual for working architects but rather as a “work expounding the virtues of architecture to patrons and other non-specialists . . . who were yet concerned with putting buildings up.”⁹ It is more didactic than practical, as much a product of reading and research as of experience; indeed the scope of Vitruvius' book exceeded the breadth of his own experience. And for all their historical value, his descriptions of the design and building process exclude many essentials. He does not acknowledge the inevitable compromises when design evolves into execution.¹⁰ Even as he prescribes numerous size options for buildings of various kinds, he seems indifferent to the structural or logistical problems of scale (a most odd omission for a man with a background in military engineering). He is even silent on his method for erecting the fifty-foot columns for his basilica at Fano.¹¹ Apart from large engines, he says little about tools, and nothing at all of wooden scaffolding, of the centering for arches and vaults, of formwork for concrete. His style is often elliptical, even scattershot. For example, even though he describes the *chorobates*, or leveling instrument, he never even hints at what one does with it after it has been set up (8.5). Vitruvius shows minimal interest in the sequential logic of design and construction, such as the allocation of labor or the overlapping of tasks to ensure timely convergences. Like most modern studies of Roman materials and techniques, his book is a series of descriptive or prescriptive snapshots organized topically without much attention to the binding matter of architecture as a process, the generation of design and the logistics of building.

Vitruvius would probably have agreed that the building process itself was a principal concern of architectural patronage and a leading component of design. The potency and effect of a building re-

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sided as much in its conception and construction as in its finished state. The Latin word *magnificentia*, a term favored by Vitruvius and tailor-made for such display, evokes not the immanent greatness of a thing but the “making much” of it – the appearance and emergence of greatness. In a similar mold, the companion term *auctoritas* evokes the author of the enterprise (i.e., the patron, not the architect) and his or her investment of intellect, energy, money, and generosity in monumental buildings.¹² The imprint of monumental architecture came as much from its staggering difficulty, great expense, and organizational intricacy as from its finished form. The intended effect, heightened by the theatricality of process, was amazement tempered by unease. These natural reactions are largely processual. They highlight ingenuity and craftsmanship. They invite the questions, How is it done? and Is it being done soundly? Cataclysmic failure would not have been a mere abstraction in the mind of the average Roman. Suetonius writes of a panic attack in the Theater of Marcellus shortly after its completion under

2. Rome: Baths of Diocletian, frigidarium. Now the transept of Church of S. Maria degli Angeli. Photo: R. Taylor.

Augustus, brought on by the crowd's fear for the building's structural integrity. And the collapse of an amphitheater at Fidenae, which killed perhaps twenty thousand people (fifty thousand dead and wounded are reported independently), was considered such a grievous calamity that it drew the reclusive emperor Tiberius off his island retreat of Capri.¹³ A frisson of fear no doubt informed the awe and pride that many Romans felt in the event of a great building project.

This is a study of the realization of architecture. I wish to evoke, if only hypothetically, the cultural and cognitive processes involved in the act of creating buildings. My method exploits the case study, progressing in a roughly logical sequence from the planning stage to final decoration. No effort is made to follow a single narrative; rather, I try to find the essence of each distinct procedure wherever it presents itself. I will bypass the "typical" Roman project in favor of the especially creative, the remarkable, the monumental. Somewhat unfairly, I adduce only a handful of famous buildings, each chosen not because it is a paradigm of architectural process but because it is sufficiently complex, well preserved, and well published to merit extensive treatment. While I cannot hope to restore any such project in its vast but now obscure complexity, or resurrect the pragmatic wizardry of the master builders, I do hope that this study of architectural process will animate those old stone and concrete bodies afresh, projecting a kind of mind into the matter.

This book deals mostly with Roman architecture in its maturity, between the first and fourth centuries. It therefore encompasses the famous central-Italian vaulted concrete style, associated with an economy of means and speed of execution. But even the purest concrete forms of this so-called Architectural Revolution were married to the more traditional and measured style of columnar orders, sometimes on a colossal scale, rendered in solid stone. In conjunction, these styles generated dialectical tensions that have drawn commentary ever since the Renaissance. Quite apart from their aesthetic astringencies, they also unsettle presumptions about the Romans as quintessential pragmatists. Dressed stone, the preferred monumental building material in most pre-Roman Mediterranean societies and in many building traditions within the Roman Empire as well, embodies prolonged effort, diligence, high craftsmanship, and expense. Concrete is a vehicle of speed, efficiency, and expressiveness mediated only by its modes of containment during con-

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struction. Roman patronage never settled on one style or the other, choosing instead to mix them; I will say more about their two economies below. Munificence required a level of ostentation and *au-toritas* – old-fashioned monumental grandeur – that could not be achieved in haste or indifference. At the same time, however, the sheer volume of building from Augustus onward, the demand for skilled artisans, and the nearly miraculous properties of pozzolan concrete driving these changes must have shaken up the old ways of building on a scale that Vitruvius, writing at the beginning of the boom, could barely imagine.

ROMAN ARCHITECTURE IN TIME

The architecture that accompanied Roman conquest emerged from a repertory of symbols, forms, and types mostly emanating from Italy. Whether or not they had originated there (and many had not), their Romanness stems from the fact that they flowed into the provinces through the city of Rome and its environs, a region extending from the Bay of Naples to Tuscany. Central Italy was a laboratory where architectural ideas, mostly native or Greek, were tested and tempered before being distributed abroad. A visual and spatial language emerged around the empire. The arch, the vault, the Greek or Tuscan columnar order, the pediment, the bathing suite, the garden courtyard, the ornamental fountain, the aqueduct, and many other architectural features all became part of the pan-Mediterranean koine.

During the mid-Republic, Roman architecture began to reveal qualities that distinguished it from earlier traditions. Alongside the usual criteria driving architectural decisions, such as patronage, form, and function, two other considerations gained predominance in a building's creation: speed and accountability. The ancient Greek practice of engaging an architect for most of his career in a single grand building project without comprehensive budget projections¹⁴ became virtually unthinkable in the context of the Roman imperial bureaucracy. Roman building contracts were not normally open-ended. Vitruvius deems allocation of time and resources one of the basic components of the architect's profession, and he particularly notes how the Romans' "passion for quick results" influenced their technical approaches to building.¹⁵ The habit of speed emerged directly from the political system. During the Republic, magistrates

were expected to produce physical results within the short span of their offices – in the case of the censors, a year and a half. And it was the censors who drove many advances in Roman architecture, including the widespread use of concrete in vaulted structures.¹⁶ At least some Roman building contracts included a promise to complete the project within a given span of time; a sample *stipulatio* contract specifies two years for the completion of an apartment building.¹⁷ Under Augustus building activity reached a furious pace, and for the next two centuries it continued at a volume that would have been unimaginable in earlier societies. By the second century of our era, a vast and reasonably efficient bureaucracy controlled the movement of fine building stones all around the Mediterranean basin.¹⁸

The result was not what we might expect: simplification, pattern-book building strategies, a degradation of the process and the product. Instead, architects and builders made practical innovations. Among these were the widespread use of working drawings and the development of concrete. Made with volcanic sand first quarried near Pozzuoli (hence, *pozzolana*), Italian concrete proved so strong and durable that it revolutionized building design. Structurally comparable to stone while enjoying the advantages of malleability, cheapness, and speedy application, it is an artistic medium for expression in large forms of an architecture “more modeled than assembled,” in William L. MacDonald’s phrase.¹⁹ Fueled in part by concrete, the ferment of architectural styles, types, and forms was so intensive, the permutations so numerous, that the idea of pure and “classical” architectural paradigms, even if Vitruvius promoted them at the very beginning of the imperial period, seems misplaced at the height of Roman power and productivity.

Roman buildings always carried meaning; indeed they could not be called Roman without it. In one way or another, they expressed the unifying principles of dominion lying at the heart of the empire’s diversity. They spoke of strength, control, and stability. The intent was to induce participatory pride and willing submission and allegiance to the emperor. Sometimes meaning was straightforward: Public imagery exhibited a taste for triumphalism heavy with war narratives and sculptural allegories of pacified nations. At other times the message came by a subtler, more sensory way: by a mythological vignette on a wall, the chatter of a fountain, the lure of a verdant courtyard through darkened bowers of imported columns.

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Roman buildings always had an imagined center: the idea of Rome, the source of power and prosperity. Architecture was rarely, if ever, revolutionary in a political sense. Innovation, far from signaling a rude reversal of tradition, always seems to have been turned to the advantage of continuity and familiar Roman values such as religion, militarism, and patronage.

ARCHITECT AND PATRON

In English the word “architecture” can mean either a process – the thoughts and acts of designing and erecting a large artifact – or its product – a building, a bridge, a defensive wall, a ship. Viewing buildings from a distance over time, we tend naturally to focus our attention on the finished product. We try to “read” it much as we do works of art, music, and literature. We ask what a building has to say, or how it resonated among its contemporaries and later generations. We trace the influence of styles and ideas. While this approach yields rewards, we must not presume that architectural achievement in Roman society (or any other, for that matter) was regarded in the same light as other intellectual or artistic achievements. In some respects the differences are obvious. Buildings have a functional importance in life quite apart from aesthetics. They do not carry a “subject matter,” such as a mythological narrative or a moral message, in the same straightforward way as other artistic genres. Yet it was understood that architecture was full of meaning, and every effort was made to exploit its expressive and communicative potential, often through ornamentation. Almost uniquely among the creative arts, credit for architectural achievement redounded to the patron; the architect or builder was reduced to a facilitator.²⁰

Like other artists, architects strove to be recognized for their accomplishments. The finest gained widespread respect among their fellow practitioners and the educated patron class. The extent to which they achieved recognition in society at large, however, has never been fully appreciated. A recent compilation of architects’ inscriptions in the Roman period suggests that as artists they were held in high esteem indeed.²¹ Nevertheless, an architect’s social stature could never be allowed to match that of his patron. A few prominent architects are associated in Roman literature with individual building programs but never with personal styles that transcended

their sponsors' wishes. It was the lot of every architect, from the humblest jobber to a great imperial architect such as Rabirius or Apollodorus of Damascus, to subordinate himself to his patrons. Roman architects might commemorate themselves in inscriptions on or near their buildings, but characteristically their names ceded the marquee position to the patrons, dedicatees, or presiding officials.²² In the rare event when an architect made an independent claim to fame, he did so indirectly, as by inscribing his name and deeds on a secondary monument appended to the principal building or becoming a sponsor of the enterprise.²³ The celebrated Trajanic bridge of Alcántara in Spain listed the sponsors, a group of Lusitanian towns, on the central commemorative arch spanning its deck (Fig. 3).²⁴ But on an arch at one bridgehead was the following grandiose proclamation:

A consecration to Emperor Nerva Trajan Caesar Augustus Germanicus Dacicus: a temple on the rocky shore of Tagus, filled with images of the gods above and of Caesar, where art succumbs to its own building material. Who gave it, and with what vow, might the curious traveler ask, and whom does its newfound glory delight? The one who completed this mighty bridge in all its bulk – Lacer – made that sacred place with well-omened sacrifices – noble Lacer, who with divine skill made a bridge that will endure for all earthly eternity. Lacer, who made this bridge, dedicated the new temple as well; of course even a single benefaction pleases the gods. He founded the temple for the gods and Caesar: Happy are both objects of the consecration. Gaius Iulius Lacer with his own money made and dedicated it with his friend Curius Laco of the Igaeditani.²⁵

Lacer, evidently the architect but not a sponsor of this magnificent bridge, was almost as skillful at self-promotion as at his craft. Through his cosponsorship of an unrelated project, a riverside temple to the gods and the imperial cult, he found a way (perhaps after the fact) to attach his name to the bridge. But not too directly: The patrons of the bridge held the privileged position at its center.

At most Roman sites there are no artists' signatures on the buildings at all – though they do sporadically appear on their discrete parts, an extension of independent artistic traditions.²⁶ The foremost claimants to the act of making are the patrons, those with the initial generative urge and the resources to realize the project. The patron's privilege of attribution in architecture is so obvious, and so universal across many societies, that we rarely pause to reflect on