INTRODUCTION

Writing during the late Roman Republic or early Empire, the architect and engineer Vitruvius lamented the scarcity of Latin compositions on architecture. The majority of those who had discussed the subject were Greek, he noted. Some Roman authors had written about the buildings they had constructed, others had concentrated on aspects of design, while still others had described various types of machinery. But only three, he believed, had written specifically on the topic of architecture: a certain Fufidius; the polymath Marcus Terentius Varro, who had included architecture among the liberal arts in his *De novem disciplinis*; and Publius Septimius, a friend of Varro.[1] His own work, *De architectura*, would, Vitruvius hoped, provide a new manual and, hence, go some way to redressing the balance.[2] Today, the dearth is even more pronounced. As the sole surviving Roman treatise to deal at length with building design, *De architectura* has been consulted as if it were an oracle. Vitruvius's work dominates modern studies of ancient architecture. It is now generally thought that during the Renaissance, when interpreting the classical idiom, architects turned mainly to two sources – the ruins and *De architectura*.

And yet, if we look at the classical literary corpus, we find that Roman writers after Vitruvius *did* address the topic, albeit in less detail. In the late first century AD, Sextus Julius Frontinus focused on the narrow subject of Rome's waterways in his *De aquaeductu urbis Romae*, while Pliny the Elder in the thirty-seven books of his *Naturalis historia* included passages on architecture

as part of a broader discourse on the natural world. In fact, Pliny's *Naturalis historia* contains an account of ancient architecture second only in terms of depth and scope to *De architectura*. Although he rarely enters into the technical niceties of building design, his section on mineralogy in Books XXXIII–XXXVII offers a wealth of information concerning construction materials and ornament. In Book XXXVI, moreover, Pliny gives an engaging description of the architectural Wonders of the World, which he divides into "opera mirabilia in terris" ("marvellous works in foreign lands")[3] and "Romae miracula operum XVIII" ("eighteen wondrous works at Rome").[4] As we shall see in Chapter 1, this portion contains descriptions of a number of structural marvels, covering aspects of their physical fabric, dimensions, and decoration, and, in some cases, stories about the architects and artists responsible for them. The sources, which Pliny helpfully lists in Book I, include Greek historians and naturalists, Varro, Pliny's own contemporary Gaius Licinius Mucianus, and Vitruvius.

This book examines the reception of Pliny's account of architecture during the central years of the Italian Renaissance. Pliny does not present a coherent survey in the manner of Vitruvius, nor is he exhaustive in his coverage; the relevant passages are scattered throughout his encyclopaedic work.[5] But, taken as a whole, they supplied the Renaissance reader with a substantial amount of material relating to buildings in Rome and across the ancient world, much of which is found in no other classical text.

PLINY THE ELDER, HIS "NATURALIS HISTORIA," AND ITS CRITICAL "FORTUNA"

Gaius Plinius Secundus, better known as Pliny the Elder, was a Roman citizen of equestrian rank. Born in 23/4 AD, he pursued a military career in Germany, eventually rising to become *procurator* of at least two imperial provinces and perhaps as many as four.[6] Despite his manifold duties, he devoted most of his waking hours to writing. His nephew, Pliny the Younger, has left a vivid record of his assiduous working method, as well as a list of his treatises.[7] Pliny the Elder died in the eruption of Mount Vesuvius in 79 AD: in charge of the fleet at Misenum at the time, he sailed too close to the volcano in an attempt to understand the geological event and save lives. His death is recorded in a famous letter of Pliny the Younger to the historian Tacitus. The body was recovered on the beach at the nearby town of Stabiae.[8]

The *Naturalis historia* was his last work and is the only one to reach us intact. Largely complete by 77 AD and dedicated in the preface to the future emperor, Titus,[9] its thirty-seven volumes were conceived as a compendium to celebrate the bounty of nature. From Pliny's political stance it is clear he was keen to support the régime; hardly surprising, given that he had lived through the

fearsome reigns of Caligula and Nero. His condemnation of Nero is absolute, just as his praise of the Flavians is fulsome. The result is a valuable document that chronicles not only the views of the author but also those of his age.[10] The subject of the work was original, as he proudly informs us; no Roman had attempted such a history.[11] The scope, likewise, was unprecedented. Pliny refers to natural phenomena from all over the known world, from India in the East to the Pillars of Hercules in the West. In Book I, a *summarium* to the rest of the work, he claims to have gathered 20,000 facts from around 2,000 treatises, while his authorities number close on 500 – and not 100, as he states – with no fewer than 146 Roman writers and 327 foreign.[12]

The composition as a whole is carefully structured. Book II provides a mathematical and metrological survey of the universe; Books III–VI explore the geography and ethnography of the known world; VII examines anthropology and the physiology of man, including monstrous tribes from the East; VIII–XI cover zoology, from mammals to fish, and birds to insects; XII–XIX deal with botany, agriculture, and horticulture; XX–XXVII plant products as used in medicine; XXVIII–XXXII medical zoology; and finally XXXIII–XXXVII minerals, fine arts, and gemstones.

Pliny's *magnum opus* was held in great esteem during the Middle Ages and the Renaissance, part of the author's appeal lying in the fact that his many-sided discourse always seemed somehow relevant. For mediaeval thinkers he addressed the vital issues of cosmology, herbal medicine, and gemlore. The *Naturalis historia* could be found in a number of monastic libraries.[13] But the manuscript tradition in Italy was limited.[14] As Michael Reeve notes in his extensive study of Plinian manuscripts, "after around 1390, the jigsaw of the Italian tradition has many brightly coloured pieces."[15] A considerable number of these were imperfect, such as the copy owned and annotated by Petrarch in the years following his acquisition of the manuscript in 1350[16] or the twelfth-century version that belonged to a succession of illustrious scholars, from Coluccio Salutati to Leonardo Bruni to Antonio Beccadelli ("il Panormita"), and was then collated by Angelo Poliziano.[17] During the early Quattrocento, manuscripts of Pliny, especially complete ones, were costly and relatively rare, a fact that only added to the sense of urgency.[18] In his *Vite*, the bookseller Vespasiano da Bisticci states that "Pliny was not in Italy" until the 1430s,[19] when, urged by the Florentine humanist Niccolò Niccoli, the ruler of Florence Cosimo de' Medici procured a "finished and perfect" copy for a hundred Rhenish florins from a monastery in Lübeck.[20] As late as 1460 the Benedictine scribe Girolamo Aliotti could still write: "Pliny on natural history is a rare book and known by few physicians of our time";[21] while in 1463 in Naples Antonello Petrucci was prepared to pay as much as 60 ducats for a manuscript of the text.[22] The paucity of complete copies was partly offset by the compilation of epitomes. Several examples from the fifteenth century have survived,[23]

the most popular of which was Ludovico de' Guasti's *Epitoma Plinii Secundi in Historia naturali*, produced no later than 1422 and dedicated to Paolo Guinigi, lord of Lucca.[24]

This high regard for Pliny's work continued into the age of printing. Indeed, the arrival of movable typeface led some humanists to muse about the fate of the rest of his *oeuvre*; as Giovanni Andrea Bussi, bishop of Aleria, remarked in the preface to his 1470 edition of the *Naturalis historia*, "if the ancients had possessed this art, we now would certainly not be wanting the other most outstanding works [*monumenta*] of both our Pliny and the rest of those glorious men."[25] For Poliziano, a leading philologist, Pliny was "a most serious and learned man" whose *testimonium* should be brought to bear on numerous matters.[26] Alongside key authorities such as Cicero and Caesar, Pliny was one of the earliest classical writers to be printed in Italy, Johannes of Speyer bringing out the *editio princeps* in Venice in 1469. The book proved hugely popular, with seventeen subsequent editions appearing in Italy between 1470 and 1499, and fifty-five in total between 1469 and 1599.[27] Pliny was also one of the first ancient Latin authors to be translated into the *volgare* during the Renaissance, in 1474–5 by Cristoforo Landino for Fernando I, king of Naples.[28] Landino's translation (into Tuscan vernacular) reached print the following year in Venice at the press of Nicolas Jenson and immediately proved popular.[29] Vitruvius, by contrast, appeared in print only in 1486, or shortly thereafter, in an edition prepared by Giovanni Sulpizio da Veroli and published anonymously at Rome, with just ten further editions being printed in Italy before 1550.[30]

Incunables of the *Naturalis historia* were often illuminated with as much care and expense as their manuscript counterparts, with exquisite frontispieces and historiated initials inserted at the start of each of the thirty-seven books.[31] In a copy of the 1472 Jenson edition, now held in the Musée Condé at Chantilly, the text of Pliny's *Praefatio* to Titus is mounted within a fictive architectural frame, giving the impression that it has been printed on torn parchment; strings of trophies hang from the cornices, and the base is decorated with a relief of disporting sea creatures.[32] Samples of the 1476 Jenson edition present a similar riot of detail and colour. One, now in Cambridge University Library, incorporates the first chapters of Book II into a polychrome wall monument (Plate I).[33] The flanking columns are blue, with capitals and banded ornament of gold. The architrave is a deeper blue and supports two friezes, the first of fighting men in gold on mauve, the second of dolphins and a floral scheme in aquamarine. The initial letter simulates scarlet marble. To the right of the text hangs a jewelled thread with an engraved seal and cameo set against an azure backdrop. The impression of classical opulence and antiquarian learning is overwhelming. Early printed editions of Vitruvius were rarely treated as lavishly, perhaps because they were intended to be annotated.[34]

1. Giovanni Rodari(?), statue of Pliny the Elder, 1480s(?), Santa Maria Maggiore, Como. Credit: Author

By the second half of the fifteenth century, Pliny had become so celebrated that cities feuded over his origins. Como and Verona both claimed him as a former citizen, the former citing Suetonius's fragmentary biography,[35] and the latter Pliny's own words in the *Praefatio* to his work.[36] The rivalry extended into the realm of sculpture, with each city placing a statue of the author on a major public building – the main façade of the cathedral and the Loggia del Consiglio, respectively (fig. 1).[37] In later centuries, Pliny continued to garner respect for his literary achievement, even if, on occasion, his reports were deemed to be mistaken or false.[38] For Edward Gibbon, the *Naturalis historia* was a giant concoction, "that immense register where Pliny has deposited the discoveries, the arts, and the errors of mankind."[39] More recently, Pliny has encountered a less receptive audience; his prose style has been denounced and he himself portrayed as a credulous man prepared to believe all manner of stories, no matter how dubious.[40] Still, a number of scholars have recognised that the work is arranged according to his objectives and requirements.[41] The *Naturalis historia* can be seen to explore a set of distinct and finely balanced relationships: between nature and man, between man and the divine, their possible collaboration or opposition; nature herself is presented as a theatre full

of curious and competing *mirabilia*.[42] The work as a whole represents a clear progression through the natural world – from cosmology to animals, plants to metals and minerals – with the discussion united by a correspondingly clear narrative.[43] A moralist with Stoic leanings, Pliny consistently condemns man's abuse of nature and his craving for *luxuria*.[44]

PLINY'S ACCOUNT OF ARCHITECTURE

As indicated above, Pliny's references to architecture are dispersed throughout the *Naturalis historia*. Book III (geography of the western Mediterranean), for example, contains a brief but important chapter on Rome's general topography, its walls and gates; Book XVII (arboriculture) presents a short account of the houses of rich patricians in Rome. But the main concentration of passages comes at the end of the work: Book XXXIII (precious metals) describes, for instance, the gilding of an entire theatre,[45] Book XXXIV (base metals) mentions column capitals made of bronze,[46] and Book XXXV (the uses of earth) includes a section about bricks.[47]

The principal location is Book XXXVI, in which Pliny considers the different types of stone. Pliny is fascinated by the ways in which stone is used after it has been quarried from the mountain, but is constantly horrified by the consequences. The book begins with a couple of striking images: man cuts through headlands, brings rare stones to the surface, and transports them by ship, just to satisfy his *avaritia*;[48] on other occasions, "he climbs to the clouds in search of a vessel to keep his drinks cool, and the rocks closest to heaven are hollowed out so that he may drink from ice [rock crystal]."[49] This kind of activity displays man's destructive hubris, Pliny observes; the lust for coloured rocks will disturb the natural order.[50]

After providing a history of marble sculpture, Pliny turns to the topic of architecture as part of a general discussion of the uses and properties of stone. His main sources are Varro, Vitruvius, Greek historians such as Herodotus, and the Hellenistic canons of architectural wonders.[51] He charts a linear development in the discipline. The Egyptians raised extraordinary monuments – granite obelisks, the pyramids, and the Sphinx, even a labyrinth. The pyramids were, though, a "superfluous and foolish display of wealth";[52] and at least one was morally suspect, since it had been founded on the proceeds of prostitution.[53] The Italian labyrinth was also impressive but flawed. Built by the Etruscan king Lars Porsenna as his tomb, it represented "insane folly" because it had been constructed for the benefit of no one, yet had exhausted the assets of an entire kingdom.[54] Similarly fatuous were the Hanging Gardens and Thebes with its hundred gates; Pliny quickly passes over both.[55] The Greeks were superior. They built structures of practical use, ingenuity, and artistry. Ptolemy erected a tower at Alexandria, the Pharos, to act as a beacon for ships at night;[56]

the Mausoleum at Halicarnassus was one of the Seven Wonders of the World because of its exceptional sculpture.[57] When designing temples, Pliny notes, the Greeks considered the relationship between architecture and nature. At the Temple of Diana (Artemis) at Ephesus, a building replete with decoration, they laid the foundations on marshy soil to counteract the threat of earthquakes;[58] at Cyzicus, the architect behind one particular shrine demonstrated his resourcefulness by inserting gold thread (or a small tube) between the stone blocks, thus allowing rays of light to enter the inner sanctum.[59]

But architecture, in Pliny's eyes, is redeemed only if it has utilitarian value. For this reason, Rome is exempt from criticism despite its degree of private extravagance. Over the centuries, he observes, the hills were tunnelled to create a network of sewers and watercourses;[60] aqueducts crossed the valleys to bring water to the highest points.[61] Herein lay the city's true strength. Rome vanquished the world not solely in military terms, he writes; it possessed more structural marvels that had been devised to support the populace.[62] This building programme had begun with Tarquinius Priscus, one of the seven kings, continued under Augustus and Marcus Agrippa, and was brought to fruition by Vespasian. Pliny reserves special praise for monuments that were at once magnificent and of civic importance. The Circus Maximus ranks among the grand projects,[63] while the Basilica Aemilia, the Forum of Augustus, and Vespasian's Temple of Peace are cited as "the three most beautiful works the world has ever seen."[64] The Temple of Peace, moreover, was a model of imperial patronage, since it contained all the works of art that had previously been looted from Greece by Nero.[65] The city's general appearance was overpowering. "If [the miracles of our city] in their totality were massed together and heaped in one pile," writes Pliny, "such grandeur would arise that it would seem some other world was being described, gathered in one place."[66]

THE PURPOSE AND STRUCTURE OF THIS BOOK

The myriad subjects covered by the *Naturalis historia* have received varying levels of scholarly attention. The books on zoology have been frequently studied;[67] so, too, have those on geography, anthropology, and minerals.[68] Among the most popular parts of the treatise are Pliny's chapters on art. Spread between Books XXXIII and XXXVII, they comprise a survey of painting, sculpture, and gem carving, and provide a valuable catalogue of works, as well as a host of anecdotes about the artists involved.[69] Scholars continue to assess their impact on Italian Renaissance art theory and practice,[70] often in connection with the great humanist Leon Battista Alberti's famous declaration in his *Della pittura* of about 1435: "we do not recite stories like Pliny, but are building afresh an art of painting."[71]

Far less has been written about the passages on architecture, perhaps because these are so diffused; indeed, it is the nephew, Pliny the Younger, who has garnered more academic interest with his evocative descriptions of his Laurentine and Tusculan villas.[72] Both Agnès Rouveret and Antonio Corso, in their commentaries on the *Naturalis historia*, have placed Pliny's account against the broader setting of architecture in the ancient world and analysed its relationship to Vitruvius's text,[73] an approach continued in Pierre Gros's masterful edition of *De architectura*.[74] Classicists and ancient historians, such as Jacob Isager, Sorcha Carey, Trevor Murphy, Valérie Naas, Mary Beagon, and Steven Rutledge, have defined the imperial and intellectual context behind Book XXXVI but have restricted their studies to the natural world and the *opera mirabilia in terris* and *Romae miracula operum XVIII*, without examining Pliny's sections on building materials and the different types of column.[75]

The response to Pliny's account of architecture during the Italian Renaissance has been largely overlooked. Commentators have noted references to Pliny: notably Anne Raffarin-Dupuis in an article on Flavio Biondo,[76] Ferruccio Canali in a short subdivision of his otherwise exhaustive study of Daniele Barbaro's sources for his commentaries on Vitruvius,[77] and Margaret D'Evelyn in her study of the relationship between text and architecture in sixteenth-century Venice;[78] but no one has surveyed the overall influence on Italian Renaissance authors and draughtsmen. More attention has been given to Pliny's impact on the Baroque and Neoclassical movements in northern Europe: Michael Greenhalgh has discussed the various attempts made in seventeenth- and eighteenth-century France to reconstruct the Temple of Diana at Ephesus on the basis of Pliny's description,[79] while Kerry Downes, Pierre de la Ruffinière du Prey, and Vaughan Hart have assessed the inspiration taken from the *Naturalis historia* by Robert Hooke, Sir Christopher Wren, and Nicholas Hawksmoor.[80]

The aim of this book is to fill the gap in scholarship by providing a detailed study of the reception of Pliny's passages on architecture in Renaissance Italy.[81] The time frame has been chosen to include the first signs of interest in Pliny's account from humanists, as well as the later attempts made by artists and architects to reconstruct the buildings described in Book XXXVI both on paper and in stone. I shall attempt to answer a variety of questions. How was Pliny's account of architecture used? What, for example, was the reaction to his moralising comments? Was the information he provides employed in conjunction with particular texts from antiquity? What was the relationship between the *Naturalis historia* and *De architectura*? Did Pliny's descriptions shape architectural practice? And, finally, was there a change in the way his account was received?

My intention is not so much to challenge the view that the Renaissance drew on Vitruvius, artefacts, and the ruins to interpret the language of classical architecture as to provide a reading of another major textual source on the

subject that was available in the period. It is undoubtedly the case that certain humanists and architects consulted Vitruvius meticulously from the 1440s, as Linda Pellecchia has shown in relation to the Roman *atrium* and the Greek house;[82] architects compiled numerous sketchbooks to illustrate the antiquities and so provide pattern-books or ideas for their next projects. But I would caution against any attempt to reduce the study of Italian architecture of the period to the consultation of Vitruvius, ancient works of art, and the ruins alone. The Renaissance response to the antique was more complex: Vitruvian guidelines played a part, but they were rarely followed to the letter in built architecture, while the ruins provided visual motifs that might be quoted in designs but the quotations were not necessarily literal; as Christof Thoenes and Hubertus Günther have argued, architects and humanists sought to emulate the antique rather than simply imitate it.[83] Sources of inspiration were abundant, and figures instrumental to the emergence of *all'antica* architecture embraced many aspects of the literary tradition, and not just the conditions that had been laid down in *De architectura*.

This book is divided into three broad sections, each arranged chronologically. The first, entitled "Pliny the Elder and Antiquarian Studies of the Roman Ruins," assesses the reception of Pliny's account among the most prominent characters involved in investigating the architecture of ancient Rome. After a brief look at Petrarch in the Trecento, it begins in earnest in the early 1440s with three curial humanists, Flavio Biondo, Poggio Bracciolini, and Giovanni Tortelli, continues with Pomponio Leto and his followers, and concludes with the explorations of Sebastiano Serlio, Andrea Palladio, and Pirro Ligorio in the mid-sixteenth century. The second section, "Pliny the Elder and Architectural Writings," deals with writings on architecture, including treatises and editions of Vitruvius. The material covered here embraces not only the theoretical works of such central personalities as Leon Battista Alberti, Antonio Averlino (better known as Filarete), Diego de Sagredo (a Spaniard who stayed in Rome), Cesare Cesariano, and Daniele Barbaro but also texts such as the enigmatic *Hypnerotomachia Poliphili* (1499) and Ermolao Barbaro's philological *tour de force*, the *Castigationes plinianae et in Pomponium Melam* (1492–3), in which architecture *per se* does not form the main subject. The final section, "Pliny the Elder, Architectural Drawings, and Built Monuments," considers Pliny's influence on architectural drawings and design. Commencing in the 1430s with the pioneering activities of Ciriaco d'Ancona, a traveller to the East who sketched monuments in Greece and Asia Minor that, he believed, had been mentioned in the *Naturalis historia*, it charts the attempts of successive generations to reconstruct Pliny's architectural *mirabilia* – both on paper, with the drawings of Leonardo da Vinci (c. 1496–7) and Antonio da Sangallo the Younger (c. 1519–46), chief architect of the New St Peter's in

Rome; and in stone, with the monuments erected by Giulio Romano, Michele Sanmicheli, and others in northern Italy (1530s–70s).

The study that follows is broad in scope, and its cast is large. Those with the most to say about Pliny's account have been afforded the most space, and sometimes given entire chapters; lesser-known figures have also been included in recognition of their contributions. Time does not permit a more expansive discussion of developments in Northern Europe and beyond 1600. Nevertheless, it is hoped that the material presented here will show how Pliny's many incidental, often non-technical, descriptions of architecture profoundly influenced Italian architectural thought, and will thus open new lines of enquiry into the Renaissance.