Introduction

When Giorgio Vasari published the second edition of the *Lives of the Most Excellent Painters, Sculptors, and Architects* in 1568, he went beyond memorializing artists past and present, flattering his patron Cosimo de' Medici, and declaring Florence the epicenter of creativity. Wittingly or not, he laid, with this text, the groundwork for the theoretical principles that inform the practice of art history to this day. Critical to the argument developed in this book is the enshrinement of a split between the so-called major and minor arts, the former acknowledged in the title while the latter go unmentioned. From Vasari onward, painting, sculpture, and architecture received credit for their cognitive reach on the assumption that a driving *idea*, *istoria*, or *concetto* had imprinted them with a self-reflexive muscle. In contrast, the products of goldsmiths, tapestry makers, ivory carvers, and other materially oriented artistic endeavors were bundled together in the department of the decorative—the unthinking—arts. By the nineteenth century, the theoretical division between fine and applied arts solidified into a rigidly tiered system, amplified by separate institutional frameworks, professional networks, and intellectual priorities.

During the European Middle Ages, the relative valuation of the arts was nearly the opposite.[1] Gem-enriched objects, among the great contributions of that period to the canon of Western art, represented a far greater financial investment than other media. But the products of metalsmiths' forges and goldsmiths' chisels were also praised as achievements of unequaled aesthetic appeal, technical expertise, and cultural significance. Were crowns, reliquaries, jewelry, and liturgical vessels not crafted from auratic materials, mined in the depths of the earth, and yet imbued with a starlike radiance? *The Mineral and the Visual*'s premise is

that assertively material objects are neither mute nor dumb even when established methods of interpretation (such as iconography and narratology) fail to detect their meanings. It focuses on precious stones, a unique case of an artistic medium that also constitutes a class of natural objects. In that capacity, gemstones were so highly valued that they became the building blocks of an intellectual undertaking formalized in a distinct literary genre: the lapidary. That may come as a surprise. We are used to rating gems as no more than liquid assets for the rich or glitzy baubles for the nouveau riche. And we rightly hold the extreme esteem they garner as complicit with ruthless monopolistic practices, poverty-level subsistence mining, conflict minerals, blood diamonds, and extractive industries that violate landscapes across the planet. Singularly accursed, shiny rocks are deemed corrupt, vulgar, and unworthy of academic attention. It, therefore, requires something of a leap of faith to admit gems and jeweled arts to the arena of cultural analysis.

Definitions

But what exactly was a precious stone in medieval understanding? *Pretiosus* (derived from *pretium,* meaning price) could designate any desirable asset, including Christ's blood, kings' authority, wives' chastity, moral qualities, and physical attributes, not to mention a vast array of material possessions. To start with a visual proposition that articulates the preciousness of precious stones, we can look at an intriguing miniature found in a late fourteenth-century copy of Pliny the Elder's *Natural History* (fig. 1). The handsome book, finished in 1389, belonged to Pasquino Capelli, secretary to the Duke of Milan, Giangaleazzo Visconti.[2] Fra Pietro da Pavia, an Augustinian friar and experienced illuminator, executed the initials that announce each of the text's thirty-seven books, adding a proud self-portrait to the initial *M* for book 35 on the art of painting. The *U(t nichil)* initial for book 37 on precious stones captures the sense of wonder generated, in Pliny's estimation, "in the minds of many by the variety, the colors, the texture and the elegance of gems."[3] Appreciative in its own way, the image shows delicate gem-set rings dangling from a larger ring silhouetted against a densely diapered background. Within this main ring is a cluster brooch that crystallizes the initial's color scheme—pale red, blue, green, and white—into rubies, sapphires, emeralds, and pearls, presenting them as the fruit of a close collaboration between painter, goldsmith, and nature.

Contrary to modern classifications, the medieval lapidary discourse did not distinguish between semiprecious and precious stones. Nor did it discriminate between minerals proper and fossils, barnacle shells, coral, fossilized botanicals (such as amber and jet), and calcified biogenic materials secreted by animals (including pearls, ambergris, and the "Lynx stone" *ligurius*). (To distinguish lapidaries' verbal creations from existing stones, I preserve their Latin names; *adamas*, for example, usually translates to diamond, but it could also designate other "invincible" metallic and mineral substances.) Above all, premodern lapidaries blurred the line between factual and fictional items, admitting the "Hail stone" *gelacia* and the "Wild goat stone" *gagatromeus* side by side with rubies and sapphires. As a consequence, the medieval lapidary archive features specimens we recognize at once, others we call by the same name though they no longer mean the same thing, and

FIGURE 1
Pietro da Pavia, Initial *U(t nichil)*, in Pliny, *Natural History*, book 37, northern Italy, 1389. Milan, Biblioteca Ambrosiana, MS E.24. Inf., fol. 352r. Photo © Veneranda Biblioteca Ambrosiana / Mondadori Portfolio.

many more that have devolved into pure signifiers (assuming they were ever more than that).

Expansive as this catholic taxonomy may have been, it nevertheless drew a sharp dividing line between stones that counted as precious and common rocks. Put simply, the former were capable of actions, and it is that cryptoanimation, that ability to capitalize on the "basic dynamism lurking in matter," that converted ordinary geological entities into precious specimens.[4] Stones' actions went under the name of *virtutes* (virtues). Admirably extensive and varied, virtues imbued seemingly inert matter with a measure of agency, engineering stones capable of altering the bodies and minds of animate beings, meddling with natural phenomena, trafficking in the supernatural, averting diseases, bringing relief and even permanent cures. Medieval audiences discovered minerals that make one smart, attractive, and sexually fit; others that grant invincibility and invisibility; and still others that protect crops and insure against travel accidents. Readers of postmodern theory will recognize in the concept of *virtus* a prefiguration of what Jane Bennett incisively describes as "vibrant matter." Building on Bruno Latour, she has forged that concept to further problematize the great divide between subjecthood and objecthood, the (Eurocentric) foundational myth of modernity. Bennett sums up her anti-idealistic philosophical project as one intent on rattling "the adamantine chain that has bound materiality to inert substance and that has placed the organic across a chasm from the inorganic."[5] Instead of a binary—alertness here, inertness there—medieval views about the cosmos and its varied inhabitants supported the idea of a continuum. Moving from immanence to

transcendence, creatures populating the mineral, vegetable, and animal realms up to the angelic orders were conceptualized as being strung across a golden chain (*catena aurea*) that leads, step by step, to the creator of everything, stones included. That is the gist of an observation volunteered by Gervase of Tilbury (d. 1220) in his riveting *Otia imperialia* (Recreation for an emperor), a text I will lean on repeatedly. Elaborating on the normative conception of a vegetative, sensitive, and rational soul, the Anglo-Norman court writer envisioned the human body as a microcosm that "has existence in common with stones, life in common with trees, sensation in common with animals, and intelligence in common with angels."[6] The twelfth-century scholar Marius (of Salerno?) thought no differently when he opined that humans are no more than a particular conglomerate of air, fire, water, and earth. They share that elemental constitution with every other animal, plant, and, "in a certain way," stone. The last kinship led Marius to the startling conclusion that if "a man is lifted up, he will fall to earth like a mineral; and after death he can be counted among the minerals."[7] Take away the soul, and rocky essence is all that is left.

Only in the seventeenth century would the axiom of an unbridgeable cleft between beings animate and objects inanimate replace the medieval concept of a graduated scale. By then, the notion that stones are equipped with a measure of vitalistic potency struck naturalists as thoroughly naïve. Chemical composition and internal structure now reigned as the only admissible truth in a scientific framework predicated exclusively on direct observation, experimentation, and factual description.[8] In such a corseted epistemic regime, the restless lithic virtues treasured by medieval lapidary knowledge could only appear as animistic fantasies of a bygone mindset warped by credulity and ignorance. Modern mineralogy was no longer willing to detect slivers of divine presence and perceive the rumblings of life in geological bodies—rocks had truly turned into inorganic matter. Confidence in precious stones' performative talents was, by contrast, a universally recognized feature of premodern conceptions of the mineral. The difference between a scholastic natural philosopher such as Albert the Great (Albertus Magnus) (d. 1280), for whom thinking about agency-packed stones was an abiding cognitive passion, and a parturient woman, who put faith in the obstetrical assistance of the "Eagle stone" *aetites*, was one of degree, not kind. Neither in the early Christian centuries nor in the late medieval period was there a two-tiered scenario that divided the learned from the untutored, pitting cool rationality against superstitious folk belief. The few critical voices, some of which we shall be hearing, did little to stem the general enthusiasm for stones' deployment of divinely implanted *virtutes*.

If lithic motility expressed itself, first and foremost, in curative *operationes* (operations) effected on human bodies, it also affected stones' own lifecycles. Far from immutable, stones were believed to experience invigorating growth and erosive decay—they "suffer maladies, old age, and death," in the succinct statement of Girolamo Cardano, a sixteenth-century Italian humanist.[9] Singularly baffling to a twenty-first-century reader is the related tenet that geological quasi-subjects can procreate. Reproduction was an identifying trait of the just-mentioned *aetites*. While our disenchanted language identifies this stone as a hollow geode or a concretion harboring loose matter, medieval lapidary parlance characterized it as one that "conteyneth another stone as a womman

with childe."[10] Mineral childbearing traced back to the very ancient postulate of Mother Earth's womb, generously fecund, eager to breed mines and nurture ores.[11] Pliny pushed the reasoning to its opposite extreme when remarking that Spanish lead mines replenish themselves after having been abandoned "just as a miscarriage seems to make some women more prolific."[12] Such a gendered geological universe even allowed for the open expression of stones' sexual identity: an intensely glowing carbuncle was thought of as the male variant of the invariably female pale balas ruby.[13] What should be noted is that the medieval churchmen who authored lapidaries felt no particular urge to censure or to spiritualize that sort of carnal information, derived, as much else, from Greco-Roman scientific literature.

The language of things alive permeated lapidary knowledge beyond the realm of sexuality. Attractive and repulsive magnetic forces were couched in terms designed to recall animate comportments. King Alfonso X of Castile's mid-thirteenth-century *Lapidario*, a text examined in chapter 4, is home to a panoply of minerals that act out deep-seated sympathies and antipathies. Experiencing motion and emotions, stones run away when placed next to hostile substances lest they develop cracks and blemishes out of discontent. So intense are their likes and dislikes that they can tear into their siblings' inner fabric. Take poor *baciz*. A short-term closeness to the dreaded red jacinth will merely cause it to lose its luster. But should the nefarious proximity last, the *baciz* will theatrically shatter beyond repair. Emery, meanwhile, seems inflamed by a cannibalistic élan vital that encourages it to eat away at the bodies of other stones (*su propriedat es comer todos los cuerpos de las otras piedras*).[14] The Alfonsine lapidary is, in many regards, an idiosyncratic work, but signs of mineral vitality can easily be found in canonical lapidaries. Examples include a stone that "weeps" (water-exuding *enhydros*), one that "feels" changes in ambient conditions (*hyacinthus*), and another that "turns anxious" when the moon starts to wane (*selenites*).[15] The Dominican Thomas of Cantimpré (d. ca. 1271), hardly an unorthodox thinker, went as far as to countenance a specimen that explicitly encroaches on human rationality. His *onychinus* roams inside our diseased eyes to extract corrupted humors "spontaneously, almost as if it were a sensible thing (*quasi res sensata*)."[16] Most disconcerting is the same author's decision to admit the unnerving *pyrophilos humanus* into his popular encyclopedia, the *Liber de natura rerum* (Book on the nature of things). Being nothing else than a human heart, killed by cold venom and baked without interruption for as many as nine years, this "most precious" hybrid formation utterly voids the distinction between human flesh and rocky matter.[17] Sympathetic analogizing predisposes the thermophilic creation to protect from sudden death and keep its lucky owners alive—or perhaps not so lucky, considering that its "great power" is powerless against infirmities and suffering, turning the unnatural prolongation of life granted by an uncanny stone into a curse.

Performative mastery, in short, was the quality that separated precious stones from the common geological lot. In gem-grade rubies, sapphires, diamonds, pearls, emeralds, amethysts, topazes, and the like, action and appearance matched up. People love the carnelian "because of its beauty, and also because of its virtues," Alfonso X's *Lapidario* assures us.[18] When that was not the case, physics beat aesthetics, and a meek-looking rock was still held to be *pretiosus* as long as it could act. Foul-smelling

gagates (jet), for example, transcends its off-putting facade by accomplishing much, whether by facilitating menstruation and helping with stomach upsets or by chasing away serpents and evil spirits. In the view of lapidaries, the ability to *do* things defined a stone's precious essence, and it did so irrespective of its visual appeal or economic worth, the evaluative criteria that mattered most to merchants, collectors, and artists.

Sources

Pliny's aforementioned *Natural History* served as the archetypal model for medieval projects of encyclopedic ambition.[19] Its first influential offspring was Isidore of Seville's early seventh-century *Etymologies,* though it would not be until the thirteenth century that the medieval encyclopedia (a postmedieval term) reached full maturity.[20] Responding to the teaching and preaching ideals of the new orders, these all-embracing books were copied in Dominican and Franciscan scriptoria in Paris, Oxford, Cologne, Padua, and many other cities across Europe. Their titles reflect the systematizing ethos baked into scholastic philosophy, whether as *summa* (sum), *speculum* (mirror), *de natura rerum* (of the nature of things), or *de proprietatibus rerum* (of the properties of things). Like Pliny's *Natural History* and Isidore of Seville's *Etymologies*, thirteenth-century encyclopedias are omnivorous. They make it a point to survey everything from cosmology, world geography, meteorological phenomena, human beings, and all manners of nonhuman animals to trees, plants, minerals, and metals. Compared to stand-alone lapidaries devoted to "precious" stones only, encyclopedias broaden the purview, accepting a greater variety of telluric bodies, dust, pebbles, marbles, earths, salts, sulfurs, metals, and more. Unlike lapidaries, which subscribe to *virtutes* without any explanation, the encyclopedias compiled by Bartholomaeus Anglicus, Thomas of Cantimpré, Vincent of Beauvais, and others explicitly broach the question of the origins of stones' active powers. They also address, however briefly, the formation of geological bodies in accordance with insights gained from up-to-date Arabo-Aristotelian scientific paradigms.[21]

Ever since its formal beginnings in Hellenistic scientific literature, the lapidary genre accomplished for the mineral realm what the bestiary and the herbal did for the animal and vegetable kingdoms: inventory its objects, establish lists and embryonic taxonomies, hone descriptions. Cross-fertilizations between the three genres occurred all along their reception history, which explains why the bestiary and the herbal feature a handful of stones each. All of this is to remind us that the premodern natural-scientific discourse was, for the most part, a bookish affair.[22] It would take another few centuries for field geologists to set out on rock-gathering expeditions, and for painters, armed with notebooks and experimental mindsets, to explore the countryside and record notable rock formations. Collecting raw specimens and painting *en plein air* were no more part of the medieval intellectual landscape than geology, mineralogy, and metallurgy were discrete fields of knowledge. Not that direct observation was entirely unknown or that sensory evidence was invariably met with distrust. Albert the Great's mid-thirteenth-century *De mineralibus* (Book of minerals), a landmark publication in the history of geology, is a good case in point. Here and there, it relies on data gathered through direct observation (*experientia*),

adding those to a bedrock made of the creative appropriation of existing literature.[23] "Creative" is the key word, for medieval literary historians have amply demonstrated that even in modest works, the *compilatio* of *auctoritates* (pronouncements in authoritative texts) was never a mindless intellectual venture. Sifting through existing sources necessarily required emending, completing, and updating; at every step, decisions had to be made as to which writings deserved to be reactivated or, on the contrary, consigned to oblivion.[24]

But what about illustrated copies? What about the presence of images in the medieval lapidary, broadly understood? The delicate initial of Capelli's Pliny has already provided an example of visual meaning-making applied to the mineral domain. Its proposition that the preciousness of precious stones stems, in equal measure, from nature and artifice is not exceptional. What is unique is the particular form that statement takes with its gem-set rings, brooch, and pixelated background. For a radically different approach, we can look at a colored drawing that belongs to an earlier encyclopedia (fig. 2). At 335 illustrations, the Romanesque reissue of Rabanus Maurus's ninth-century *De rerum naturis* (On the nature of things) invited viewers on an unprecedented pictorial journey during which creator and creation, angelic existence and human toil, star and stone, came into sight.[25] Produced at the prestigious abbey of Montecassino, birthplace of Benedictine monasticism, the groundbreaking visual enterprise was sponsored by the art-loving Abbot Theobald (d. 1035), who perhaps intended it as a gift for a royal benefactor. As a prime witness of the meandering *Nachleben* of ancient representational models, Montecassino codex 132 has attracted the attention of a distinguished roster of art

FIGURE 2
Precious stones (*De gemmis*), in Rabanus Maurus, *De rerum naturis*, book 17.7, Montecassino, 1020s. Montecassino, Library of the Abbey, Cod. 132, fol. 421A. Photo: A.M. Rosati / Art Resource, New York.

historians of Warburgian sensibility, from Adolph Goldschmidt and Fritz Saxl to Erwin Panofsky and Rudolf Wittkower.[26] Yet, by combining tradition with innovation, the monastic limners did more than reformulate existing contents and forms.[27] They broke new representational ground, including, I think, for several of the nine vignettes that punctuate book 17 devoted to the products of the earth. Some of those, like the informative

glass-blowing and marble-splitting scenes, focus on human-material transactions, while others meet our gaze as stills of lithic objects. The thirteen *gemmae* scattered across the page in orderly disarray belong to this latter category. Cheerfully nonnaturalistic, they exhibit the same pigmentation (yellow, orange, pink, red, green, and blue) that defines everything else in the manuscript: all natural and manufactured objects, all initial letters, and all purely decorative embellishments. But where the palette is generic, the designs are specific—and specifically predicated on a formal grammar built around circles, triangles, diamonds, and squares. At once didactic and elegant (to adopt Bert Hall's terminology), this formal restraint is neither a failure nor a gauche attempt at rendering objects that had never been painted before. Indeed, and until proof to the contrary appears, the Montecassino codex contains the first known freestanding image of precious stones (as well as of pearls and rock crystal) in Western art.[28] The self-confident choice of a distinctive, hard-edged visual identity to distinguish mineral entities was a novelty, and so too was the notion of a geological representation unencumbered by human actors and free of narrative activities.

The Montecassino image proved precocious. By and large, it was not until around 1300 that mineral images became more plentiful. Measured against the continuous chain of illustrated herbals and the plethora of Romanesque and Gothic bestiaries enriched with extensive pictorial cycles, lapidaries' pictorial record seems meager indeed. Independent lapidaries rarely carried pictures, and it is only in thirteenth-century encyclopedias and their vernacular translations during the following century that visual glosses solidified into something of a tradition. Even so, the medieval lapidary's illustrative fortunes were erratic at best. Compositional formulas seem to emerge from nowhere only to disappear without leaving much of a trace. It may be a distorting effect produced by now missing connective tissue and manuscript copies that still wait to be unearthed in some obscure repository. Yet the fact remains that mineral iconography could rarely rely on tested graphic templates, something it shares with other secular topics. It had to invent and reinvent itself, with the result that it is a varied and plural tradition. Still, the forays into uncharted visual territory epitomized by the Montecassino Rabanus Maurus, the Capelli Pliny, and others we will be discussing paved the way for early modern mineral pictorial achievements of a decidedly realistic temper. In turn, the fantastically particularized portraits of stones in the works of Conrad Gessner, Ulisse Aldrovandi, and other sixteenth-century natural historians would set the standard for the hyperrealistic textbooks and digital archives of our own age.

Interpretations

Rabanus Maurus conceived his *De rerum naturis* as a considered tribute to God's unrivaled handiwork, a primer for the intricate art of biblical exegesis, and an introduction to the book of nature, all at once. Its pages ought to lift the minds of young monks toward spiritual meanings concealed behind the surface of things and guide other readers of a literalist persuasion to plumb sensory realities for meaning-laden truths.[29] Throughout the Middle Ages, allegorical exegesis was the royal road to decode *res* as *signa* in line with the Christian doctrine rooted in Romans

1:20, *per visibilia ad invisibilia* (from the visible to the invisible). As you contemplate that heap of precious stones, remember the glorious community of saints, Rabanus and like-minded churchmen insisted. They suggested doing the same with individual stones: convert shiny pearls into unblemished virgins, greener-than-green emeralds into verdant faith, and beryl into holy men because both give off light, the former when hit by sunbeams, the latter when illumined by religious fervor.

Christel Meier has traced the layered tradition of allegorized lapidaries. Her comprehensive *Gemma spiritalis* offers ample proof of exegesis' sophisticated conceptual acrobatics when applied to dry primary materials, such as the fairly repetitive information contained in lapidaries. Among other things, her survey shows that the genre, especially prevalent until around 1100, never produced a list of fixed meanings. Take the carbuncle, a stone much admired for its incandescent properties (as explored in chapter 5). While in the view of some its fiery color was evocative of the Passion of Christ, others saw it as pointing more diffusely toward martyrial blood. Another line of reasoning coupled it with fire, though in that case it could be glossed in terms of the spiritual ardor imparted by the Holy Ghost, the burning desire for charity, the consuming love for God, and, *in malo*, the scorching flames of Hell.[30] Nor was this semantic adaptability limited to theological hermeneutics. For Chaucer, the same stone stretched its signifying muscle from martyrdom (*Prioress's Tale*) to lordship (*House of Fame*) via love (*Troilus and Criseyde*).[31]

Even though *The Mineral and the Visual* prioritizes secular cultural productions, two biblical twelve-stone sequences need to be mentioned because they functioned as authoritative points of reference for the mineral imagination throughout the Middle Ages. The first appears in relation to the splendid breastplate (*rationale* in Latin, *choshen* in Hebrew) that the High Priest Aaron, Moses's brother, wore over a golden and purple tunic called an ephod (Exodus 28:15–21; 39:10–14). Each of its twelve gemstones was engraved, like a memorial, with the name of one of the tribes of Israel. Early Christian interpreters of the Hebrew Bible took over the idea of foundational stones. However, monumentalizing it, they redirected the twelve stones from a place of origin to an eschatological topography. In Apocalypse 21:18–21, those stones—boulders, really—support the Heavenly Jerusalem, the golden, crystalline, and pearly dwelling place of the righteous revealed to St. John during the harrowing vision that announces the end of times. All in all, the two series yield sixteen stones, eight shared (*amethystus*, *beryllus*, *chrysolitus*, *iaspis*, *saphirus*, *sardius*, *smaragdus*, *topazius*) and four each specific either to the breastplate (*achates*, *carbunculus*, *ligurius*, *onychinus*) or to the celestial city (*chalcedonius*, *chrysoprasus*, *hyacinthus*, *sardonyx*). It bears mentioning that the illustrative tradition of the Heavenly Jerusalem represents a rich and lively chapter in the history of medieval mineral iconography, one that merits its own separate treatment.

Allegorical meaning-making, promoted by medieval clerical culture, has had a considerable impact on the practice of art history. The continuing confidence in readings filtered through a theological lens makes acts of interpretation that seek to avoid transitive referentiality (ruby means blood) as challenging as tautological mutism (ruby means ruby). By shifting emphasis from symbolism to literalism without foregoing meaning, the approach adopted here wishes to avoid

predetermined significations in the manner of an iconology of materials.[32] Instead of making sense of the pervasive presence of precious stones in the medieval visual regime in a spiritualizing, moralizing, or otherwise metaphorical fashion, I foreground their cultural workings. Programmatically consonant with the material turn in the humanities and object-oriented analyses, my methodological priorities are indebted not only to postmodern theory.[33] Nonallegorical, nonspiritual, and nontheological interpretations are routine for both historians of medieval literature and historians of science. Thus, in his immensely learned and influential *History of Magic and Experimental Science*, Lynn Thorndike observed apropos painted bestiaries that "in the main medieval men represented animals in art because they were fond of animals, not because they were fond of allegories."[34] That is, in essence, what *The Mineral and the Visual* argues about stones.

It turns out that the dominant strand of the medieval lapidary genre was also literal-minded. Take its most successful representative, Marbode of Rennes's *Liber lapidum* (Book of stones). The Angevin churchman wrote it in the 1190s, when he was serving as acting head of Angers's cathedral school and shortly before his election to the episcopal see of Rennes. Though authored by a prominent ecclesiastic at a moment when the influence of the Church was at its peak, the poem forgoes sermonizing to celebrate stones' lovely appearance and amazing powers instead. Contemporaries admired Marbode's classicizing Latin, and the *Liber lapidum* did not disappoint in this regard. In addition to 732 polished hexameters, it offered its literate readers the pleasure of recurrent ancient cultural references. It even ends on a grand Greek myth involving Prometheus as the inventor of the jeweled arts. When Zeus chained the civilizing god to the Caucasus for having taught humans how to tame fire, he found ways to forge an iron ring from the fetters. Once he had set it with a rock, it would take only a short step to upgrade the materials and create jewels that, in Marbode's words, dress the human hand with the triple honor of precious metals, expensive gems, and art.[35]

Even nonallegorized lapidaries, such as the *Liber lapidum* and its goodly progeny, implicitly legitimized the task of inventorying things-of-nature—of paying attention to nature as it is and as it behaves—with a religious goal in mind. To avoid any misunderstanding, the "secular" of my title should be understood as sitting in tension with "clerical" (in the social domain) and with "spiritual" (in acts of interpretation), not with "religious" or "sacred." It goes without saying that the Christian belief system gave meaning to all facets of medieval life and thought, more or less autonomous explorations of the natural world not excluded. Nor is this trait particular to the Middle Ages, since physics and metaphysics went hand in hand well into the nineteenth century. Practicing natural history amounted to confirming God's continuing, if vestigial, presence in creatures of the most varied kind. Anselmus Boethius de Boodt (d. 1632) alluded to this mystical connection when stressing that his patron Rudolf II collected gemstones less to boost his social profile than to experience the "grandeur and infinite power of God."[36] The renowned Renaissance mineralogist may have been inspired by Pliny, who enthused in the *Natural History* that, in a single *gemma*, "Nature's grandeur is gathered together within the narrowest limits." And this compacting is so masterful that "no domain of hers evokes more wonder in the minds of many who set such store by the

variety, the colors, the texture and the elegance of gems." In Pliny's imperially scaled panorama of all that Nature has on offer, the brilliant clumps—so painfully extracted from earth's womb, so vehemently desired by men, and so rewarding to scrutinize—constitute a teleological fulfillment. Book 37 devoted to gems may be the *Natural History*'s last section, but without gemstones, the natural world would be incomplete. It would also lack a specific visual dimension, given that the contemplation of a single gemstone can lead "very many people" to feel immersed in "a supreme and perfect aesthetic experience of the wonders of Nature."[37] Replace Nature with God, and the appreciation for the mineral as a locus of visual ecstasy is the same for de Boodt.

Vincent of Beauvais (d. ca. 1264) provides a medieval example of analogous feelings. Playing on the double meaning of *gemma*, at once bud and gem, the Dominican encyclopedist wondered: "And what to say about gems? Theirs is a domain crowned with flowers. What pleasant spectacle it offers. How delightful it is to sight and how it incites our passions. We see red roses, white lilies, purple violets, and see in them not only beauty but the origin of what is admirable since God in his wisdom has produced their forms from the dust of the earth."[38] His massive *Speculum maius* (Great mirror) will not figure much in the following pages because its first volume, devoted to natural history, was rarely illustrated and, if so, only minimally. A miniature taken from the French translation of the third part, the *Speculum historiale* (Mirror of history), however, captures the sense of cosmic elation at the sight of mineral creations (fig. 3). The exceptional image stands out from an otherwise run-of-the-mill Genesis cycle. It shows, in front of empyrean alpine peaks, an expansive landscape

FIGURE 3
Third day of Creation, in Vincent of Beauvais, *Miroir historial*, ca. 1463. Paris, Bibliothèque nationale de France, MS fr. 50, fol. 18r. Photo: BnF.

that materializes as a patchwork of gleaming fields of gold, silver, bronze, and a now oxidized metal. Shimmering gem-flowers flourish in this mineralo-metallic ecosphere, strewn about the ground and tucked behind orderly ranks of rocks, shrubs, and trees. Given the primordial context, we might

expect inchoate mineral masses rather than a collection of well-formed amethysts, emeralds, rubies, and sapphires, complemented by a few iridescent pearls and point-cut diamonds (painted in black in a then-current artistic convention). The gambit of the *Speculum* image is to have us believe that human-made and god-created perfection coincides. And that, as a result, the world has been mineralized *ab aeterno*.

Trajectories

In combination with "lapidary knowledge," I use the anachronistic term "mineral" to push beyond precious stones' existence as physical objects and capture their broader cultural, social, and epistemological roles. The mineral so understood converged in a number of artistic genres. I have retained three as main case studies: the jeweled crown, the illustrated lapidary, and the illustrated travel account. Each category enacted distinctive permutations of the mineral and the visual, each reached beyond the sphere of artistic production to orient social and cognitive practices, and each, finally, was invented in the Middle Ages.

Part 1 considers the cultural workings of precious stones in a single category of objects: crowns. The loss of secular jeweled art is so severe that the number of surviving regalia is infinitesimal. I focus on three gem-encrusted crowns—of the Holy Roman Empire, of the kingdom of Castile, and of the kingdom of Bohemia—that have escaped destruction to query the role of both objects and materials in the performance of kingship, the choreography of sovereign power, and the ideology of luminosity. An image is again helpful to elucidate this initial claim. Silhouetted against an imperially purple background, the monumental miniature portrait of the Carolingian emperor Lothair I (d. 855) exudes jeweled authority (fig. 4).[39] The mustachioed grandson of Charlemagne sits upright on an honorific faldstool in the classic pose of majesty, though his legs are parted as if ready for action.[40] His hands clutch a long staff (*baculum*) and a sword, a set of power objects complemented by a bulky crossbow clasp that energetically projects from his right shoulder. Even more extravagantly outsized is the crown, its two lateral sapphires reiterating in a petrified idiom the ruler's transfixing gaze. What is more, the illuminator sprinkled the footrest, cushion, and sword with multicolored stones and also crowded them on Lothair's cloak, giving the impression of a swarm of scintillating ectoparasites having alighted on the body of the *rex Francorum*. The private prayer book's first viewers would have taken the sapphires, emeralds, garnets, and pearls as indicators of social status, natural treasures, and objects of culture. They would have known that the blue-green-white triad derived from the late antique and Byzantine imperial material lexicon. Meanwhile, the red stones anchored the subject's Frankish visual identity, since garnets counted as mineral capital of the highest order among varied ethnic groups of the migration period.

The implication of a regal body colonized by precious stones is that brilliant materiality produced more lasting effects than passing acts of conspicuous consumption. Massing mineral and metallic substances on a sovereign's body was

FIGURE 4
Emperor Lothair enthroned, Lothair Psalter, 842–55. London, British Library, MS Add. 37768, fol. 4r. Photo © The British Library Board.

akin to injecting a dose of symbolic immortality into otherwise corruptible flesh. One might want to call this inhabitation a *becoming-mineral,* in reference to the becoming-animal theorized by Gilles Deleuze and Félix Guattari in *A Thousand Plateaus*. As they saw it, the hyphenation defines a relational equation, one equidistant from substantive physical metamorphoses and disembodied poetic analogies. "A becoming is not a correspondence between relations," they wrote, adding that it is not "a resemblance, an imitation, or, at the limit, an identification" either.[41] The Lothair image expresses a hybridization between mineral and human that is as dynamic and insightful as the French philosophers' recognition of fluid boundaries between human and nonhuman animals. Of course, no one in the Middle Ages believed their monarchs to have turned literally into precious stones. Yet they could countenance the idea that gems' salient properties—hardness, colorful luminosity, rarity—seeped into the fabric of kingship.

Medieval writers need not wait for postmodern discourse to conceive of humans as permeated by geological characteristics and, in the same breath, believe in stones' animate leanings. They could take inspiration from the Song of Songs' assured mineral imagination in depicting a Bridegroom with a belly "as of ivory, set with sapphires," hands "turned and as of gold, full of hyacinths," and legs like "pillars of marble, that are set upon bases of gold" (5:14–15). To this glistening biblical eroticism, the theoretician of poetry Geoffrey of Vinsauf (fl. 1200) responded in a purely secular manner by anatomizing the ideal female body into mineral clusters: eyes radiant like emeralds, a chin "smoother than polished marble," a neck like a "precious column of milk-white beauty," and a "crystal throat" placed above snow-white "twin virginal gems."[42] Many more examples could be adduced, though they would all prove that becoming-mineral was neither a royal prerogative nor a gender-specific privilege. High rank, regardless of sexual identity, coincided with a light-emitting appearance. The German language explicitly recognizes both this gender-neutral and class-specific commingling of human and mineral, for it links *Edelmann* and *Edelfrau* to *Edelstein*, scoring preciousness into the very definition of noblemen and noblewomen.

To make visible that distinctive mode of being, and do so with haptic force, mantles, tunics, sleeves, hoses, shoes, necklaces, brooches, rings, belts, swords, hilts, helmets, and a host of other objects owned by the medieval nobility were encrusted with pearls and gems. Gaston Bachelard, who has written some beautiful pages about the poetics of mineral reveries, nicely calls these conspicuous supplements "droplets of concentrated ostentation." He also points out how they support a near-universal, class-specific "will to shine."[43] Georg Simmel's discussion of the guiding role of jewels, dress, tattoos, and other *Schmuck* offers another excellent model to think about brilliant "accessories" in terms of social acts of communication. Adornment, the German fin de siècle sociologist thought, "intensifies or enlarges the impression of the personality." That is why its choice materials "have always been shining metals and precious stones," for those are capable of producing something akin to a perceptual "radiation."[44] Astute, if counterintuitive, was Simmel's conclusion that gems' very superfluousness and impersonal abstraction is the reason for their functional nimbleness, conceptual malleability, and remarkable cross-cultural success. Indetermination detaches stones from particular historical contexts

and preassigned meanings without canceling their ideological charge. Acting like a form of soft power, they are meant to dazzle and, therefore, seduce rather than compel subjects into a subaltern position.

To properly appreciate the optical impact of bodies lit up by gems and other lucent materials, it is good to remember that for the overwhelming majority of people in the Middle Ages, the spectacle of everyday life came in unaccented tones, muted colors, and washed-out pigments. No peasant garment shone, nor did gold and silver embroideries enliven the sartorial appearance of urban artisans and tradespeople. Even modest pieces of jewelry, such as rings wrought from lead or copper and set with locally sourced stones, were beyond the reach of most buyers. It is only with the appreciable expansion of the European economy during the second half of the twelfth century that a consumer culture, properly speaking, started to emerge. From that point onward, urban shops were better stocked with wares that catered to a more socially diverse clientele, one able—and eager—to afford a measure of glitz. Sumptuary laws were quickly put in place to counteract the rise in sartorial behavior that muddied the semantic clarity of a divinely ordered body politic. Social climbers who dared to trespass visual hierarchies by flaunting expensive furs, silks and damasks embroidered with metallic threads, vivid colors, pearly accents, and gem-rich accessories could expect fines and confiscations. Among the first of such regulations, the one passed in 1294 under King Philip IV the Fair of France barred wealthy burghers from owning high-end furs, adornments in gold, gilded and silver crowns, and precious stones. It even mandated that the owners turn in those treasured possessions, although that clause was aimed as much at replenishing the royal coffers as imposing visual restraint.[45]

Boasting among the highest concentrations of high-grade gems, royal crowns advanced over the centuries into the august realm of quasi-sacred thinghood. Several legal documents indicate that their appropriation was considered an attempt to usurp royal authority in its visible manifestation. As a crime of *lèse-majesté*, it deserved extreme retribution: capital punishment. Shockingly unreasonable as such a response might seem, it touches on the same taboos that surround the handling of the American flag, proving that thing-signs of authority maintain essential bonds with what they represent.[46] Without crowns, there was no enactment of kingship; without gold and precious stones, there were no crowns. The constitutive function of materials explains why royal crowns, and coronation crowns especially, had recourse to the same two substances—gold and precious stones—irrespective of changing designs and styles. Compared to the former, which has been dissected from multiple interdisciplinary perspectives, the latter have suffered from scholarly neglect.[47] In particular, what has not received adequate attention is the prominent jewel affixed on the front of many medieval crowns. Distilling the essence of royal power, this metaphoric lodestone can be viewed as a compelling exemplification of a nonnarrative object charged with a political message.

In part 2, we change perspective from objects to representations and add knowing to owning. Throughout the Middle Ages, lapidary knowledge was presented as a pursuit worthy of royal attention. It promised discursive ownership and, consequently, cognitive mastery over a splendid collection of lithic *virtutes*. Rather than a general survey of stones' multipronged actions, particular

attention will be given to those that intersect with optical realities and visual experiences. The boldly abstract image of gemstones in a Catalonian manuscript of around 1400, featured on the cover of this book, provides the springboard for assessing lapidaries' attentiveness to color. From visually based taxonomies, we move to consider virtues related to the sense of sight, encompassing vision-enhancing mineral aids as much as reality-distorting perceptions. Less immediately accessible is the theme addressed in chapter 6: the art of sigils. Corresponding to what we identify as intaglios and cameos as well as to naturally figurative stones—veined marbles, moss agates, fossil impressions, and the like—sigils encompassed the entire typology of gems bearing representations. While much admired, "stones signed with figures" (as one author christened them) also confronted medieval viewers with an intractable enigma. How could one tell if the extra dose of *virtus* carried by those mysterious glyphs had been instilled through legitimate channels and not incised by some artistically talented demonic agent? Such worries, strange to us, filtered into scholastic debates about licit and illicit practices, of which those concerning image magic and astral magic are of particular relevance. Given the medieval reticence to theorize image making beyond technical considerations, the visual focus of those debates should be underscored. We shall see how they led Albert the Great to elaborate a sophisticated etiological model in which images on stones were coupled to images in the sky via human artistry.

Part 3 looks at travel literature, trade, and the medieval geographic imagination to delve deeper into the economics of mineral preciousness. After visiting the jeweled realm of Prester John, we will pick up Marco Polo's travel memoirs and related accounts to pursue mineral rarities to their points of origin. Once again Simmel provides excellent conceptual signposting to grasp the mechanisms whereby commercial value is accrued. In the course of dissecting the social workings of money, he reaches the conclusion that the "difficulty of acquisition" attendant to distant imports amounts to the "unique constitutive element of value." Scarcity, which we tend to prioritize, is in his shrewd diagnosis "only the external manifestation, its objectification in the form of quantity."[48] How pictorial renditions fleshed out textual accounts and lent credibility to the difficulty of acquisition is this section's main issue, in part because those same representational strategies nurtured the mystique about Orient rubies, sapphires, diamonds, and pearls.[49] Unfortunately, the *Letter of Prester John*, drenched in stony fetishism, failed to capture the imagination of visual artists. The opposite holds for Polo's quickly translated *Devisement du monde* (to use the original title of his *Travels*). Widely read, the "Description of the World" enjoyed several visual transcriptions. Spectacularly ambitious is a cycle of illustrations found in a book aptly titled *Livre des merveilles* (Paris, Bibliothèque nationale de France, MS fr. 2810). Produced in early fifteenth-century Paris, the hefty volume contains a selection of travel narratives and related works dealing with the Matter of the East. It unveiled for the book's original users a world magnificently endowed with natural and human-made marvels, in both positive and negative incarnations. Above all, it gave them unprecedented access to a visual survey of different regions, people, mores, fauna, and natural resources. Indeed, at 265 miniatures, the pictorial program of fr. 2810, which provides the iconographic backbone of part 3, was itself a feat worthy of admiration. Conveniently for my

FIGURE 5
Jean de Berry inspecting gems, in Bartholomaeus Anglicus, *Livre des propriétés des choses*, trans. Jean Corbechon, 1410–15. Paris, Bibliothèque nationale de France, MS fr. 9141, fol. 235v. Photo: BnF.

purpose, several of those images deal with the sourcing and circulation of precious stones, and quite a few activate the trope of the difficulty of acquisition to reframe natural objects into desirable commodities.

The first owner of the *Livre des merveilles* was Jean de Berry, easily the best-known individual collector of the entire Middle Ages. The duke's intentional hoarding habits involved, in addition to first-rate manuscripts, paintings, and sculptures, vast quantities of jeweled art and unmounted stones. A miniature from a copy of the French translation of Bartholomaeus Anglicus's encyclopedia *De proprietatibus rerum* (On the properties of things) flatters him as a connoisseur of mineral matters (fig. 5).[50] Two kneeling merchants are tempting the seated, warmly dressed princely client into buying their fine wares. Their studied deference, mandated by courtly etiquette, should

not hide the fact that the mercantile elite was superbly aware of its worth as the chief purveyor of costly commodities, including the things that satisfied the aristocratic cravings for trappings than made them shine. Unfortunately, the profile of long-distance traders specializing in mineral assets remains hard to discern, as economic historians have scanted this professional group before the sixteenth century.[51] Commercial entrepreneurs were especially busy during the Gothic era, when the pace of luxury imports from the East accelerated thanks to a favorable conjunction of political, social, and demographic circumstances. The thirteenth-century Commercial Revolution, as historians have dubbed it, more or less coincided with the *pax Mongolica*. Even if somewhat of a misnomer because interethnic conflicts made the century far from peaceful, this period, lasting from the 1240s to the 1360s, unified half of the northern hemisphere under Mongol hegemony. It networked the world more intensely than ever, making gems imported from Afghanistan, the Persian Gulf, India, and Sri Lanka more abundantly available to buyers in Venice, Paris, and London. In turn, increased access fostered both competitive gem collecting habits among global elites and an efflorescence of jeweled arts, only an infinitesimal fraction of which has survived. Subscribing to the spirit of connected histories, *The Mineral and the Visual* recognizes Europe's literal and metaphoric enrichment from continued imports of goods (gems) and ideas (lapidary knowledge) from Byzantium, the Islamic world, Persia, India, and China.[52] A broad geographic scope is appropriate when examining the circulation of people, knowledge, and things, and so is a temporal framework of the *longue durée.* Instead of conventional chronological divisions, we see continuities between late antique lapidary knowledge and its late medieval iterations or between the Romanesque and the Gothic conceptions of jeweled arts. Taken from across the Middle Ages, the case studies upon which the arguments of this book rest have been retained less for the way they exemplify specific historical circumstances than for their creative amalgamation of the mineral and the visual.