





THE LIBERAL ARTS STUDIOLO FROM THE DUCAL PALACE AT GUBBIO

OLGA RAGGIO AND ANTOINE M. WILMERING



THE METROPOLITAN MUSEUM OF ART

DIRECTOR'S NOTE

In mid-May the Metropolitan will proudly put back on exhibition—after nearly thirty years—a masterpiece of fifteenth-century Italian intarsia, the *studiolo*, or private study, of Federico da Montefeltro, duke of Urbino, formerly in his palace at Gubbio. This small room, about sixteen by twelve feet, is without doubt one of the most precious Renaissance works of art in this country not only for its technique of perspectival inlay—a tour de force of illusionism—but also for its rich historical associations and, of course, its great beauty. Made for one of the most powerful condottieri of his time, the *studiolo* displays a dazzling array of the accoutrements of the duke's life—armor and insignia referring to his prowess as a warrior and wise governor, together with musical and scientific instruments and books attesting to his love of learning. This humanist's treasure trove is all stored on shelves behind half-open latticed doors and rendered with the most admirable understanding of the laws of perspective. The objects depicted and the shadows that give them such volume are composed of thousands of pieces and slivers of different varieties of wood, each set with uncanny accuracy. The shaded side of a tiny rivet or screw on a spur, for example, might be composed of many slices of differently toned wood to create the fall of light changing color on a curved surface. The benches that look so inviting around the sides of the room cast realistic shadows according to the various original light sources from the windows and entrance when the *studiolo* was at Gubbio. These visual effects are matched only by those of a slightly earlier room of the same type commissioned by Federico da Montefeltro for his palace at Urbino, where it remains in situ.

Federico's patronage of such works may be ascribed to his own intellectual curiosity as well as to the widespread knowledge of the theories of linear perspective propounded in the first quarter of the fifteenth century by the Florentine architect Filippo Brunelleschi. According to Vespasiano da Bisticci (1421–1498), who chronicled the lives of illustrious men of the quattrocento, the duke “was ever careful to . . . learn some new thing every day.” His library was said to rival the pope's. He knew architecture thoroughly and was skilled in geometry, arithmetic, and music. For his palace at Urbino, Federico employed the finest architects of the time and an artist from Flanders, who “painted from life a portrait

of the Duke which only wanted breath.” The duke owned a copy of Piero della Francesca's *De prospectiva pingendi* (“On the Perspective of Painting”), the first study to treat perspective in painting with scientific methodology.

While we understand the patron's impetus to create the *studiolo*, we have only recently, after years of curatorial and conservation research, been able to present plausible arguments for its artist-designer and intarsia maker. Although the public has not benefited until now from the *studiolo*'s years behind the scenes—while it waited its turn for installation in the final stages of our Master Plan—one could say that the room itself did, as our knowledge of the *studiolo*'s origin, structure, and materials has been greatly augmented during this period. For this important contribution we are greatly indebted to Olga Raggio, Iris and B. Gerald Cantor chairman of European Sculpture and Decorative Arts, and to Antoine M. Wilmering, conservator in the Department of Objects Conservation. Both made numerous trips to Italy and to Gubbio—to observe the site, study related works and archival documents, and to collect scientific data—all essential to a fuller knowledge of the room's history and the art of Italian Renaissance intarsia. Their research has produced a much deeper understanding of the *studiolo*.

In the following pages Olga Raggio shares some of her fascinating discoveries about the *studiolo* and places the room in its art-historical context. Antoine Wilmering presents a number of his technical discoveries, and he also explains the methods used to preserve the wood paneling, stabilize the structure, and protect the room in its new environment. A major book on the Gubbio *studiolo* by the same authors has been funded by the Andrew W. Mellon Foundation and is scheduled for publication in 1998.

Ultimately, the gallery area outside the *studiolo* will be installed with early Italian Renaissance sculpture and decorative arts from the Museum's collection. For the first year, however, after the *studiolo* reopens to the public, we will present an exhibition, “The Art of the Renaissance Woodworker: The Gubbio *Studiolo* Restored,” to help explain its history and conservation.

Philippe de Montebello, *Director*

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Color photography of the Gubbio studiolo by Bruce Schwarz of The Metropolitan Museum of Art Photograph Studio. Additional MMA photography by Caitlin McCaffrey of the Photograph Studio. Front cover: Detail of cabinet with Order of the Garter, books, quill case, inkwell, and brush. Inside front cover: Detail of cover. Title page: Arms of Federico da Montefeltro. P. 3: Armillary sphere, books, and quadrant. P. 4: Cabinet with armor

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OLGA RAGGIO

FEDERICO DA MONTEFELTRO

In 1461, in the early hours of a hot July day, Pope Pius II (r. 1458–64) rode out of the Vatican on his way toward Tivoli, where in the fresh air of the hills he planned to spend the rest of the summer. Shortly after crossing the river Aniene, the pope's party met with that of the young Federico da Montefeltro (1422–1482).

The count of Urbino, for such was his title, and commander of the pope's troops had come with a small escort of cavalry to ensure the safety of the pontiff as he was crossing the Roman Campagna. By now the sun was high and shone brightly on the soldiers' plate armor, shields, and crests, all made resplendent by a thousand reflections, offset by the forest of lances carried by the men.

The soldiers rushed in all directions, the horses caracoled, the swords vibrated as if in the midst of battle. As Pius, delighted, watched the spectacle, Federico, "who had read much," asked the pontiff whether he thought that "the ancients wore armor similar to those of our times." Pius replied that "Homer and Virgil describe all sort of arms which are still used in our days, but also many others that have gone out of fashion." And as the two rode side by side, their "sweet and lively conversation" went on, touching upon the Trojan War and other stories from ancient times, until their party reached the bridge where delegates from Tivoli had come to welcome the pontiff.

No account could set the stage better for this history of the Gubbio liberal arts studiolo than the record of this conversation between the Siennese humanist pope, born

Enea Silvio Piccolomini and author of the memoirs from which the passage is taken, and Federico da Montefeltro, one of the most admired military leaders of his day, famous for his humanistic knowledge and his understanding of architecture, mathematics, and all the arts.

Born at Gubbio in 1422, the natural son of Guidantonio da Montefeltro (1378–1443), Federico succeeded his half brother Oddantonio (1427–1444) after the latter's assassination, becoming the tenth count of Urbino and lord of the small state of Montefeltro, which had been ruled by his ancestors since the twelfth century.

A mountainous region nestled in the Apennines in the northern part of the Marches, and reached by high passes from Tuscany to the west and Umbria to the south, Montefeltro formed in the fifteenth century part of the Papal States, its counts recognizing the pope as their feudal lord. The city of Urbino, high in the mountains overlooking the Romagna, was their capital, while Gubbio (annexed in 1384), strategically placed close to the high valley of the Tiber and the plain stretching south toward Rome, defined the southernmost border of their state.

Like many other minor lords who owned cities and lands in the Marches and the flat reaches of the Romagna, two regions with modest natural resources and commercial activities, Federico chose a military career as a source of revenues and of political success and influence. As a child, however, he had had the advantage of exposure to other cultural centers in



Fig. 1. *Federico da Montefeltro as a Victorious General*. Volterra is in the background. From Poggio Bracciolini's *Historia Florentina*, ca. 1455. Painted on parchment. Attributed to Master of the Hamilton Xenophon, ca. 1473–74. Ms. Urb. Lat. 491, Biblioteca Apostolica Vaticana, Vatican



Fig. 2. Federico da Montefeltro and a Humanist Scholar. From Cristoforo Landino's *Disputationes Camaldulenses*, 1472. Painted on parchment. Attributed to Francesco d'Antonio del Chierico, ca. 1473–74. Ms. Urb. Lat. 508, Biblioteca Apostolica Vaticana, Vatican

northern Italy, and especially of receiving an excellent classical education.

At eleven he spent a year and a half in the brilliant and bustling city of Venice. Then, because of an outbreak of the plague, he was sent to Mantua and entrusted to the tutelage of the marquis of the city, Gianfrancesco Gonzaga. Here, together with the three Gonzaga children and other gifted boys, Federico became one of the most eager students of the great humanist teacher Vittorino da Feltre (1378–1446). At the Cà Zoiosa, the school founded by Vittorino at Mantua, he was inspired by his teacher's devotion to the classics, his knowledge of mathematics, and his insistence on the importance of exercise and outdoor life, as well as his deep commitment to Christian values. Although destined from the beginning to a military career,

Federico became fluent in Latin, read Cicero, Virgil, and Livy, and learned the art of public speaking.

The years during which Federico grew up and achieved his first military successes, from the 1430s to the 1450s, have been called “the heroic age of the Italian *condottiere*”: an age when the Italian peninsula was divided among five major “powers”—the republics of Venice and Florence, the duchy of Milan, the kingdom of Naples, and the Papal States—all competing for hegemony or expansion. The continuous wars and fluctuating alliances and the lack of permanent armies created a demand for professional captains (or military contractors), who trained and maintained cavalry units, on the ready to be hired by anybody able to pay the high fees charged for their services.

Count Guidantonio's friendly relations with the duke of Milan prompted Federico to seek his military training under Niccolò Piccinino, one of the leading *condottieri* in the service of Milan. Early military successes and a reputation for fairness and loyalty, an ability for shrewd diplomatic maneuvering, as well as sheer good luck, soon propelled Federico to the center of Italian political life. An early alliance with Florence, where Cosimo de' Medici became his firm supporter, and a warm friendship with the humanist pope Nicholas V (r. 1447–55) allowed the count to play a central role in the major turning point of fifteenth-century Italian politics: the creation in 1454 of a mutual defensive alliance among the five major powers known as the Italic League.

The league was designed to create a balance of power among the five states and to achieve an era of stability for the entire peninsula. Thanks to the network of friendships he had been able to establish, Federico saw himself elevated to the post of commander of the league, as well as, in subsequent years, captain general of the kingdom of Naples, lieutenant general of the duchy of Milan, and gonfalonier of the Holy Roman Church, becoming by the mid-1460s the most respected and highly paid Italian *condottiere* of his day.

Yet, although the 1450s had been so rich in political and financial successes, they had also been marked by several tragic events in the count's private life. In 1451, in the course of a festive joust held at Urbino, he was accidentally wounded and lost his right eye. And in 1458, a year after the death of his wife Gentile, he endured the sudden loss of his eldest son, Buonconte, a gifted young man well versed in Latin and Greek and a brilliant horseman, whom Federico loved deeply and considered his heir.

URBINO

During the relatively short periods between campaigns that the count spent in Urbino, he resided in the ancestral home built for his grandfather, Count Antonio. It was there that, in 1460, he brought his new bride, the fourteen-year-old Battista Sforza (1446–1472), daughter of Alessandro Sforza, lord of Pesaro. It was with this exceptionally cultivated and gifted young woman that Federico planned a new life, destined to make of Urbino one of the most brilliant Italian courts of his day.

The first step in this program was to build next to the old residence of the counts of Urbino a much larger and beautiful palace in the Renaissance style—an enterprise for which he could afford to secure the services of the best artists and craftsmen from all of Italy. In 1465, as the project grew, he invited the Dalmatian architect Luciano Laurana (d. 1479), then variously employed by the lords of Mantua and Pesaro, to create a model for a larger and more complex palace. Three years later, in 1468, after work had started on the palace's foundations, the count granted Laurana a letters patent that confirmed him as the primary architect and engineer of the building and put him in charge of its design and construction, with supervisory power over all craftsmen working on it.

For the next four years construction continued uninterrupted on the impressive edifice being erected on top



Fig. 3. Facade of the ducal palace at Urbino. Designed by Luciano Laurana (d. 1479), completed ca. 1472



Fig. 4. Courtyard of the ducal palace at Urbino. Designed by Luciano Laurana

of and over the high ridge of the city, its dramatic southern front plunging deep into the valley. The now-familiar look of this famous facade (fig. 3), flanked by two slender towers and pierced by three arched loggias opening onto the expanse of the Montefeltro lands, seemed to announce to the approaching visitor the quasi-royal splendor of the count of Urbino. The creation of this facade and the design of the palace's courtyard, one of the noblest in Renaissance architecture (fig. 4), were Laurana's contributions to Federico's enterprise.

Construction was eventually interrupted by the tragic events of 1472. At first, the year seemed to have started auspiciously. On January 24 Battista, after bearing eight daughters, finally gave birth, in Gubbio, to a much awaited son. The boy was named Guidobaldo, in gratitude to Saint Ubaldo, the patron of Gubbio, whom Battista had implored in her prayers for a boy. Guidobaldo's birth was celebrated by weeks of festivities throughout the state of Montefeltro, and especially at Gubbio, where the court had relocated. Little could one foresee that six months later, on July 6, and also at Gubbio, the young countess would suddenly die, carried away by pneumonia.

Federico's grief was immense. After the funeral ceremony at Urbino, which was attended by thirty-three delegations from nearly all the Italian states, he remained in mourning for several months, all work having stopped on the half-finished palace. In April another sadness came with the news of the death of a close friend, the great humanist and architect Leon Battista Alberti (1404–1472), who in recent years had often come up from Rome to spend the month of October in Urbino and whose advice in many matters, but especially in architecture, must have played a crucial role for the count. Then, before the end of the year, Laurana, lured by other commissions, decided to leave Urbino.

Although Federico's personal life was devastated, his political prestige continued to grow, reaching even as far as the French and English courts. In 1474, as the recently elected Pope Sixtus IV (r. 1471–84) and his close ally, the king of Naples and Sicily, decided once more to bolster the effectiveness of the Italic League, a number of honors were conferred upon Federico as the league's commander in chief.

First came Federico's induction into the chivalric Order of the Ermine, recently created by Ferdinand I (1423–1494), king of Naples. Federico, who was in Naples at the beginning of the summer as a guest of the king, received the collar of the order in a glittering ceremony.

Later, on August 21, he went to Rome, entering the Eternal City with an escort of two thousand knights on horseback. Sixtus IV welcomed him in St. Peter's, where he conferred upon him the title of duke of Urbino, as well as the mantle, ducal hat, sword, and golden spurs of his dignity, and the silver scepter and banner of gonfalonier of the Holy Roman Church. Shortly thereafter news came that he had been elected a member of the prestigious English Order of the Garter and confirmed by King Edward IV (r. 1461–83). The insignia of the order, the jeweled garter, the mantle, and the statutes were presented to him by the English ambassador in a solemn ceremony held at the abbey of Grottaferrata, near Rome.

All the pomp and splendor of these honors are reflected in an unforgettable double portrait of the new duke of Urbino and his son, Guidobaldo, painted in oils on fir panel about 1475 by the Netherlandish artist Joos van Wassenhove (fl. 1460–75) and probably reworked by the Spaniard Pedro Berruguete (fl. 1450–1505). The picture (fig. 5) is not only a state portrait but also and even more a symbol of Federico's dynastic pride and an expression of his most profound ambitions and ideals. Seated on a tall armchair in a narrow, cell-like room and facing an invisible window in front of him, he is immersed in reading. Leaning against his knee is the little Guidobaldo, dressed in a pearl-studded robe and holding the scepter of command that one day he would inherit. Although the duke is attired in all the trappings of his office, it is his now-balding pate, his profile, and his deep concentration that claim our attention, as we see him absorbed in a heavy volume that he holds against a high bookshelf: a symbol of the importance that intellectual life held for him, and also of an indispensable balance to the responsibilities of his military career.

The impact of Federico's ducal title was felt throughout his lands, and it soon affected the organization and routine of his house, which took on the character of a true princely court. Laurana's sudden departure had forced Federico to look for another architect. He needed a man of many talents: an engineer who specialized in hydraulics, an expert in fortifications, and an artist and architect capable of translating his many wishes into several constructions. All of these qualifications and many more he found in the Sienese painter, sculptor, architect, and engineer Francesco di Giorgio Martini (1439–1501).

About 1476, if not earlier, Francesco di Giorgio moved from Siena to Urbino. His first task was to complete the side of the palace facing the city by skillfully



Fig. 5. *Federico da Montefeltro (1422–1482), Duke of Urbino, and His Son, Guidobaldo (b. 1472)*. Painted ca. 1475 by Joos van Wassenhove (fl. 1460–75) and probably reworked by Pedro Berruguete (fl. 1450–1505) ca. 1476. Oil on panel, 53 x 29¾ in. (134.5 x 75.5 cm). Galleria Nazionale delle Marche, Urbino



Figs. 6, 7. The studiolo in the ducal palace at Urbino, completed in 1476. Above the paneling is a series of portraits of Famous Men, painted ca. 1473–75 by Joos van Wassenhove and reworked after 1475 by Pedro Berruguete. At right is a detail of the intarsia.

combining and unifying the twin facades of the old and the new buildings. Inside the palace Francesco proceeded to perfect the parts started by Laurana, articulating the sequence of rooms on the *piano nobile*, creating a hanging garden, and devising an unprecedented complex of kitchen, baths, and stables on the lower level. Public and private rooms were enriched by delicately carved marble mantelpieces and door and window frames enlivened by blue and gold polychromy. Leading into the rooms were wooden doors inlaid with mythological and allegorical subjects, still lifes, and cityscapes, all of them executed in Florence and transported to Urbino. The duke's renewed energy expressed itself in a staggering construction program in which his personal involvement made immense demands on the talents of Francesco di Giorgio, and he also enlisted the services of artists from far afield to work not only at the Urbino palace but also at new residences throughout the duchy, at Castel Durante, Fossombrone, and especially Gubbio.

In the palace at Urbino two different but interrelated projects were now especially close to the duke's heart. One was the creation of a large room on the ground floor to house, as a library, the several hundred manuscripts he had been collecting for many years. The other was the com-

pletion of a small study retreat, the celebrated *studiolo* that to this day can be admired at Urbino (figs. 6, 7). Conceived as a tiny chamber, totally enclosed by a continuous wooden illusionistic wainscoting executed in Florence in the intarsia technique, the Urbino studiolo displayed above its paneling a series of twenty-eight portraits of Famous Men painted in oils on poplar panels about 1473–75 by Joos van Wassenhove and reworked after 1475 by Pedro Berruguete. Finished probably at the end of 1476, the studiolo was immediately celebrated as one of the marvels of the ducal palace. Its success undoubtedly encouraged the duke to envisage the construction of another one in his new palace at Gubbio—a decision that reflected a family tradition, since we know that as early as 1419 Guidantonio had had a studiolo in his residence in Gubbio.

THE GUBBIO STUDIOLO

Unlike at Urbino, Federico at first did not own his new palace at Gubbio. A much stronger commune than Urbino, the city of Gubbio had, at the beginning of his rule, only allowed him to use and remodel a fourteenth-century building erected against one of the mountains rising behind the city, along its fortified enclosure, and once occupied by the city's guards (fig. 8). This building, together



Fig. 8. Ducal palace at Gubbio. Originally built in the 14th century and redesigned by Francesco di Giorgio Martini, ca. 1476–1480

with a tower, the old palace of the commune, and a small square in front of the cathedral, had been Gubbio's civic center until it was replaced, in 1349, by the consuls' and the mayor's palaces, whose tall Gothic silhouettes can still be seen, rising high above Gubbio's characteristic clusters of medieval houses. It was only in 1480 that the city fathers formally granted Federico ownership of his new residence, in recognition of "the great expense and magnificent, splendid and sumptuous works of construction and decoration" he had lavished upon it.

In 1476 Francesco di Giorgio began to redesign the building and its surrounding space in order to transform them into a Renaissance palace and appropriate environs. The task was difficult, given the need to preserve the building's Gothic facade and to take into account the irregular outlines of the small square and of some medieval structures behind it. The result was one that only an architect with the imagination of Francesco di Giorgio could have achieved. The square was transformed into a Renaissance courtyard

of trapezoidal shape, with columns on three sides and a plain wall on the fourth to disguise the medieval structures against the mountain (fig. 9). Here he added a picturesque note with a string of ornamental brackets that recalls the crenellated profile of many of the fortresses he was designing throughout the land of Montefeltro. Two main entrances were provided on the shorter sides of the courtyard, one toward the road to Urbino, the other in front of the cathedral (fig. 10); the spaces inside the main Gothic building were remodeled into two reception halls and a private apartment.

To gain further room, Francesco added two narrow wings to this building. The wing on the southeast was designed to house a small chapel, a spiral staircase, and the duke's private studiolo, accessible from a narrow gallery perhaps intended as a library. Here, too, as we have seen before, Francesco had to come to grips with the structural limitations of the site. This time it was the need to preserve the width of the street leading up to the cathedral



Fig. 9. Courtyard of the ducal palace at Gubbio

that forced him to give a trapezoidal shape to the studio-
lo, echoing that of the courtyard. The studiolo door still
shows its gray stone frame, with the Order of the Garter
carved in its frieze (fig. 11). The space itself (fig. 13), with
its stone walls well preserved in spite of the loss of all dec-
orative fittings except its tile floor, is flanked by two nich-
es: one on the southwest, functioning as an entrance, and
the other on the southeast, housing the main window,
which opens onto the street. Higher up, at the extreme
ends of the same wall, are two small oblique windows that
direct light toward the upper part of the room (the room
measures 5.13 x 3.81 meters, and its ceiling height is 5.3
meters). The remains of their original pigmentation show
that the windows were painted dark brown on the right
side and off-white on the left; a remarkably rare example
of directional lighting.

The exposed masonry shell, which has been recently
stripped of most of its plaster coating, clearly shows traces
of its original revetment: a wood paneling rising to a
height of 2.68 meters that surrounded the room on all
sides and, above the paneling, a series of paintings installed
on the long side facing the windows and on the two short
ends. A coffered polychrome ceiling and another small
ceiling hung high in the window niche completed the
installation.

As at Urbino, the wainscoting of the Gubbio studiolo
was made of a series of illusionistic intarsia panels depicting

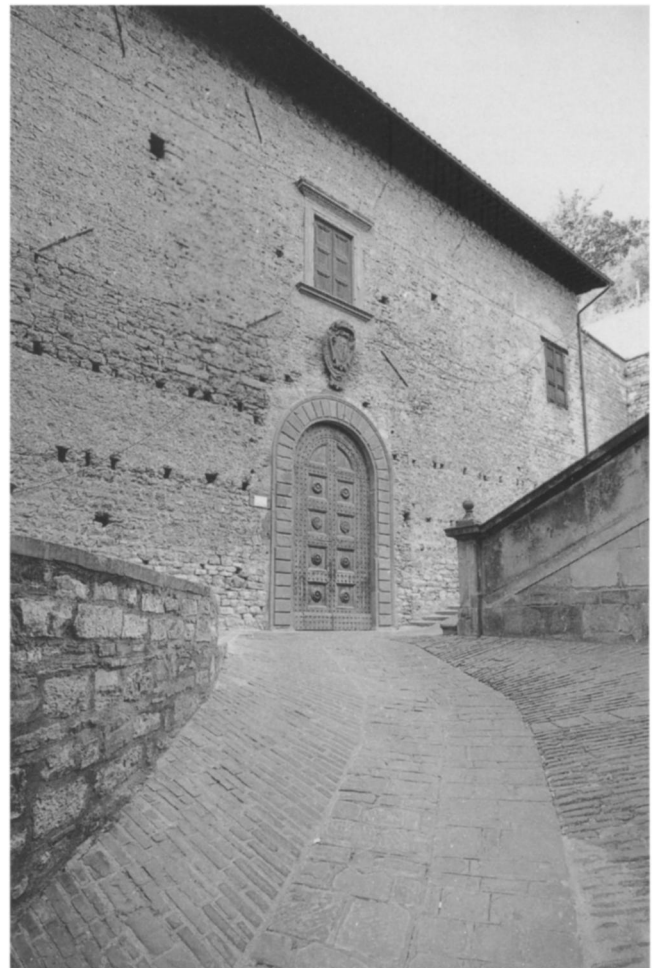
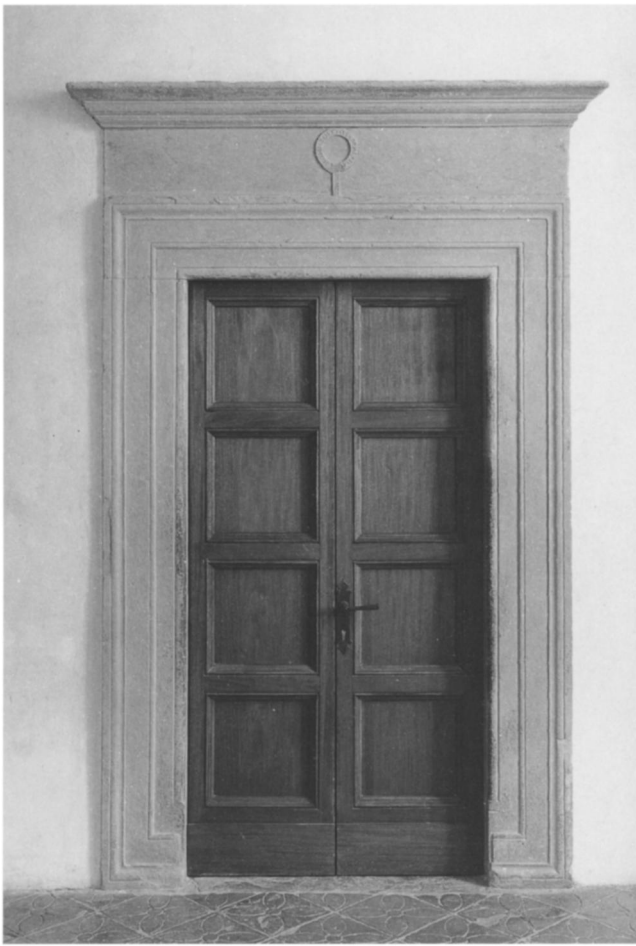


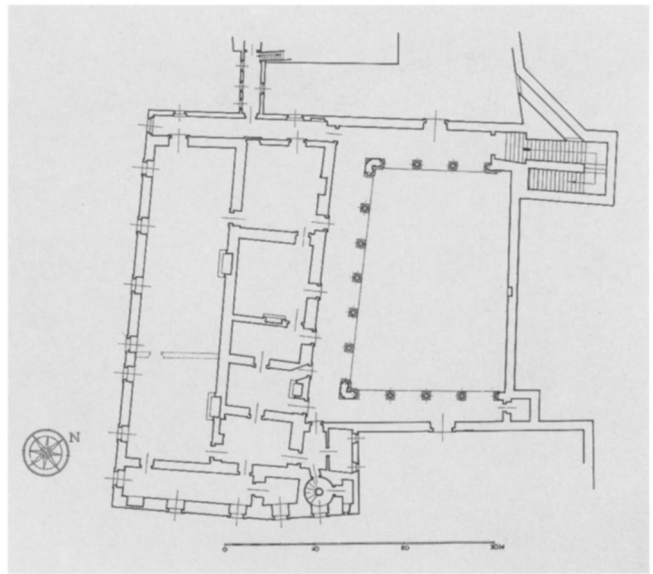
Fig. 10. Doorway and facade of the ducal palace facing the cathedral



11

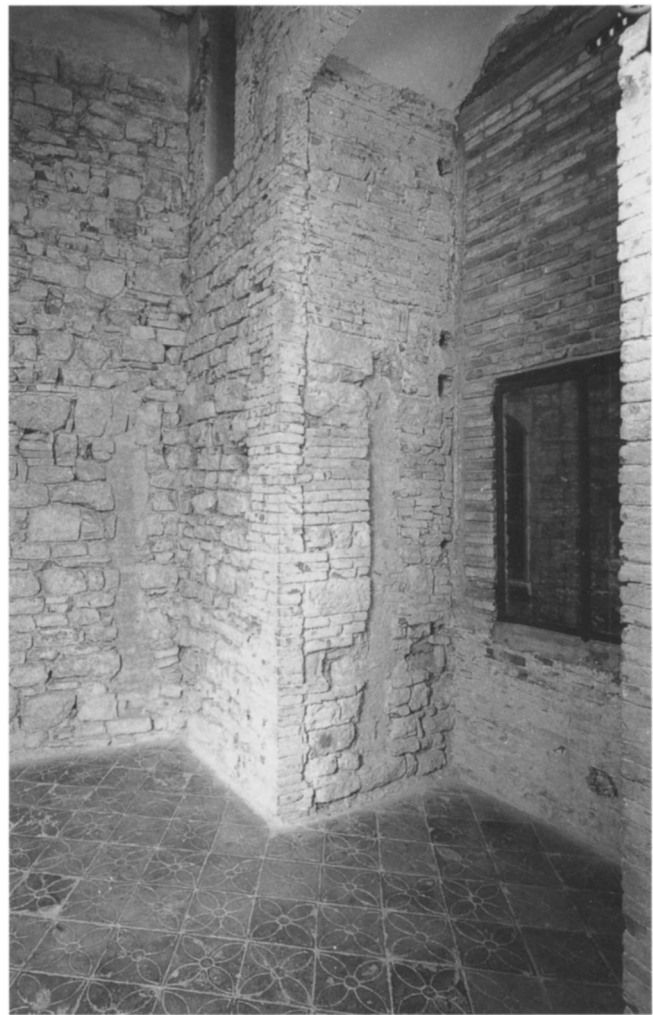
lattice cupboards holding a variety of books, scientific and musical instruments, and other objects. The whole, made out of twelve consecutive sections, surrounded the room on all sides, including the inner face of the door and probably also wooden panels used to cover the main window.

Although the Gubbio studiolo had lost its paintings in 1673, when they were pried off their wooden surround and removed to Florence, the coffered ceilings and the wainscoting remained undisturbed for the next two hundred years. In 1874 all the wooden parts were bought by Prince Filippo Massimo Lancellotti (1843–1915), removed to his villa at Frascati, near Rome, and from 1874 to 1877 restored with a view to reinstalling them in one of the rooms of his villa. This, however, did not happen, and the panels remained disassembled until 1937, when the Lancellotti heirs sold them to the German dealer Adolph Loewi, who removed them to his gallery in Venice and restored them once again before shipping them to New York in the care of Arnold Seligman, Rey, and Co. In 1939 they were purchased by the Metropolitan Museum and in

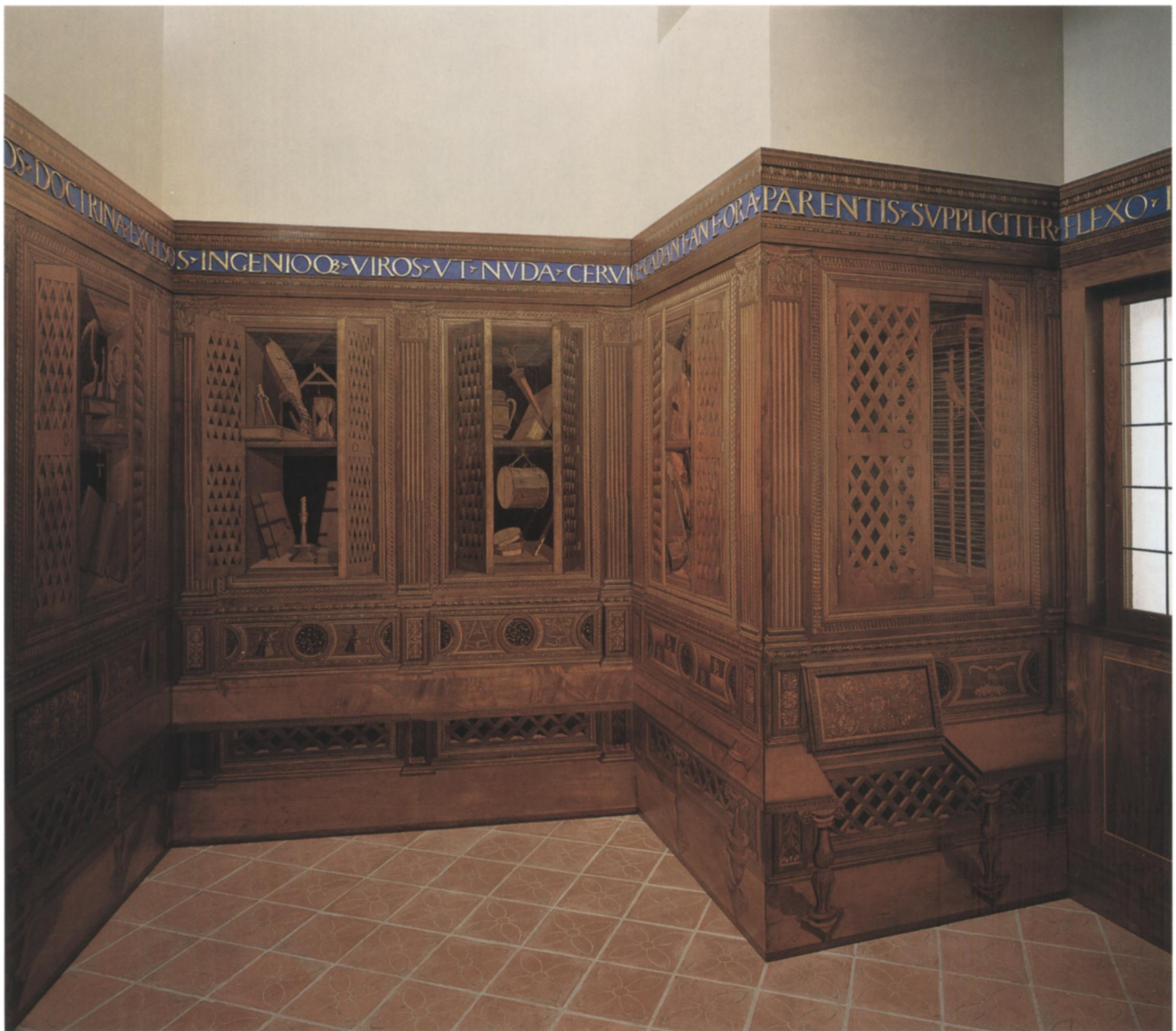


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13



Figs. 11–13. Door to the studiolo, with Order of the Garter in its frieze. Plan of the palace showing the trapezoidal studiolo near the stairwell (from Roberto Papini, *Francesco di Giorgio, Architetto*, pl. no. xxiv, 1946). Studiolo space as it is today, with original floor in place



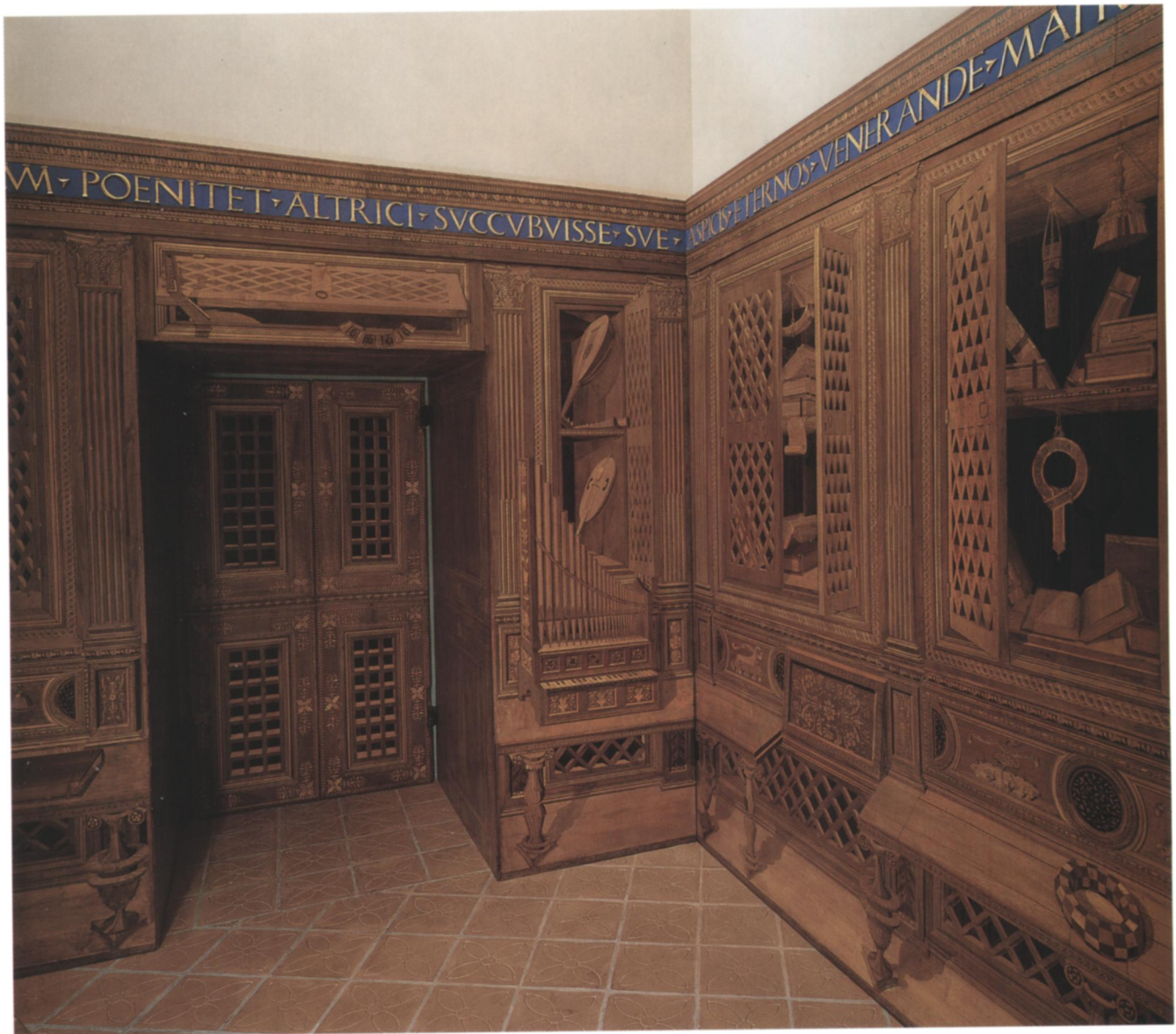
14a

1941 installed as a separate room, in the context of its Italian Renaissance galleries (fig. 15). Recently a long campaign of study and conservation, during which the Museum's curators and conservators had liberal access to the ducal palace at Gubbio and could profit from the results of its recent thorough architectural restoration, has allowed us to carry out a new and much improved presentation (figs. 14a, b), based on the structural evidence gathered at the ducal palace itself.



15

Figs. 14a, b–15. The Gubbio studiolo as reinstalled in 1996. View of the Gubbio studiolo in the Museum in 1941.



14b

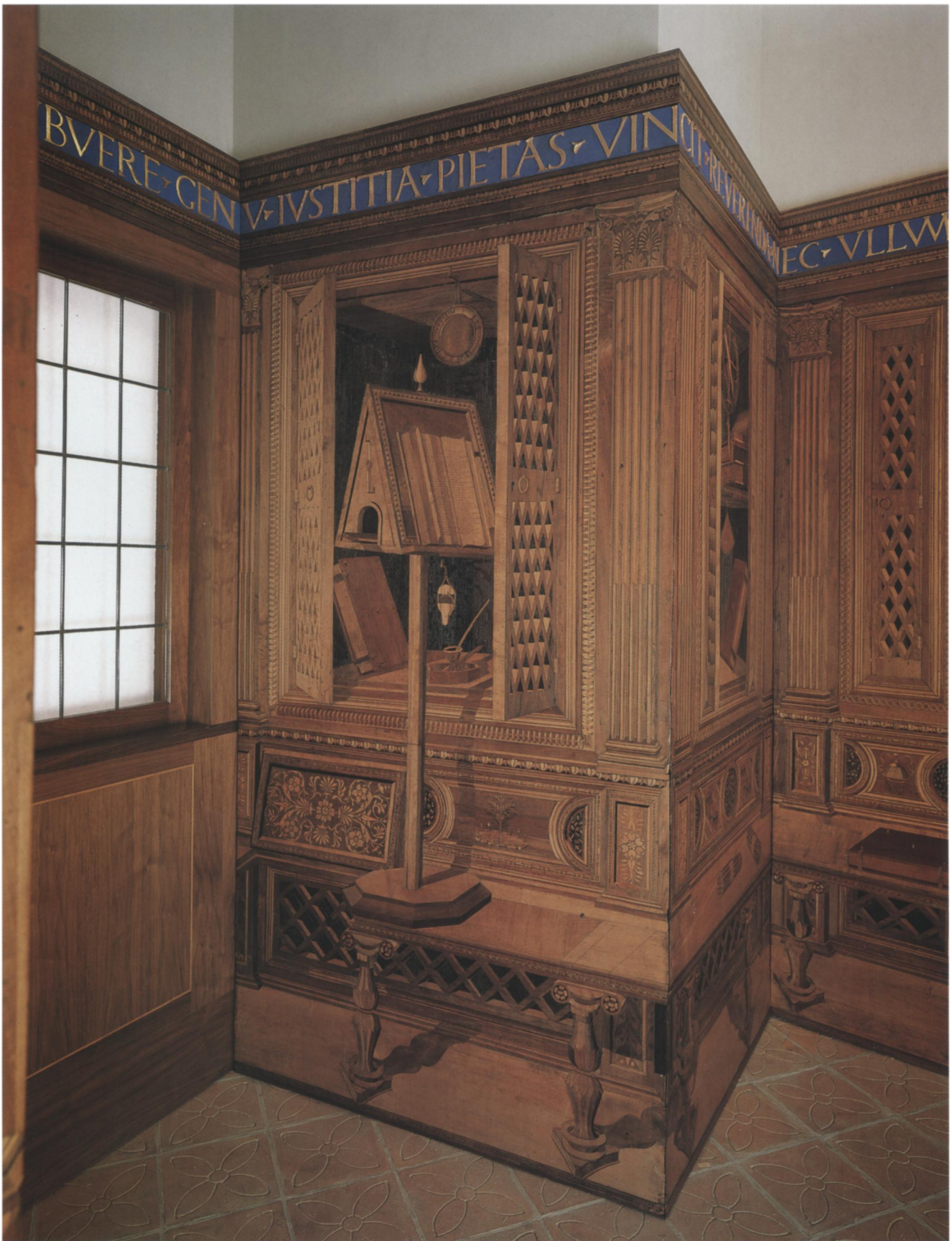


Fig. 16. Right panel of the window niche with lectern on bench, round mirror above, and books, folded eyeglasses in their case, and inkwell in cabinet

THE PANELING

The first impression of the Gubbio studiolo experienced by the Museum visitor is that of having entered a total environment: a space unified by the warm tone of the woods, the aggressive geometry of its intricately designed panels, and the subtly controlled lighting streaming from its three windows.

Around all four sides of the room the panels are divided by illusionistic fluted pilasters capped by composite capitals that support an entablature and flank cabinets with latticed doors variously ajar. Each cabinet is surrounded by a flat guilloche frame, except for the two on the sides of the main window whose borders display an intriguing design of wooden disks shown in perspective (fig. 18). Below the cabinets and separated from them by a frieze of emblems and devices, we see a continuous fictive bench supported by balusters; some of the seats are raised to reveal their underside decoration of flat ornamental inlay; behind the balusters simulated latticed panels run along the bottom of the wall (fig. 17).

To achieve the variety of effects called for by the complexity of this design, two different techniques were employed. One was a traditional type of wood inlay, which—with some variants—was used for realizing decorative borders, ornamental panels, and flat designs such as emblems and devices. The other was the celebrated



Fig. 18. Border design of wooden disks from lectern panel



Fig. 17. Detail of lectern panel with raised bench seat showing lattice below

Florentine Renaissance technique of perspective intarsia, which in the paneling of the Gubbio studiolo reaches one of its most perfect expressions.

Perspective intarsia was developed by Florentine master woodworkers in the wake of the excitement created by Filippo Brunelleschi's early-fifteenth-century rediscovery of linear perspective through his observations of the optical principles of space representation. The earliest examples of the translation of these principles into the medium of wood inlay are found in the paneling of the north vestry of Florence Cathedral. Executed in two stages, first, in 1436–45, by Antonio Manetti and Agnolo di Lazzaro, and later on, in 1460–65, by Giuliano da Maiano (1432–1490), this extraordinary ensemble (fig. 20) quickly became the most famous and admired example of a perspectival illusionistic environment carried out in the new intarsia technique, unique in the modernity of its design and in the technical sophistication and perfection of its execution.

Among the most arresting motifs included in the Florentine sacristy's paneling are illusionistic cabinets with

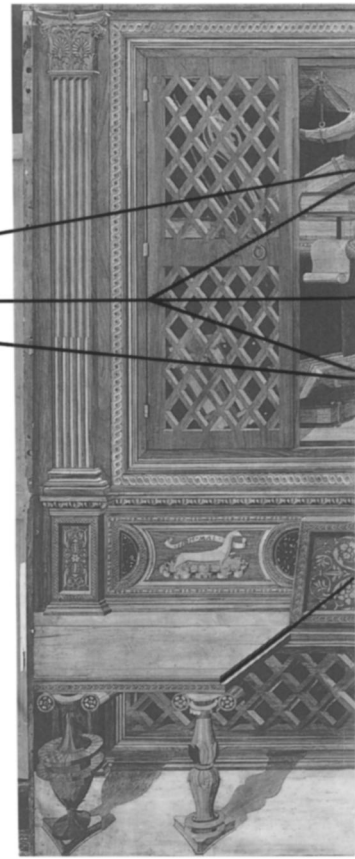


Fig. 19. Intarsia cabinet with candlesticks and books in the north vestry of Florence Cathedral



Fig. 20. North vestry of Florence Cathedral. Executed by Antonio Manetti and Agnolo di Lazzaro, 1436–45, and by Giuliano da Maiano, 1460–65

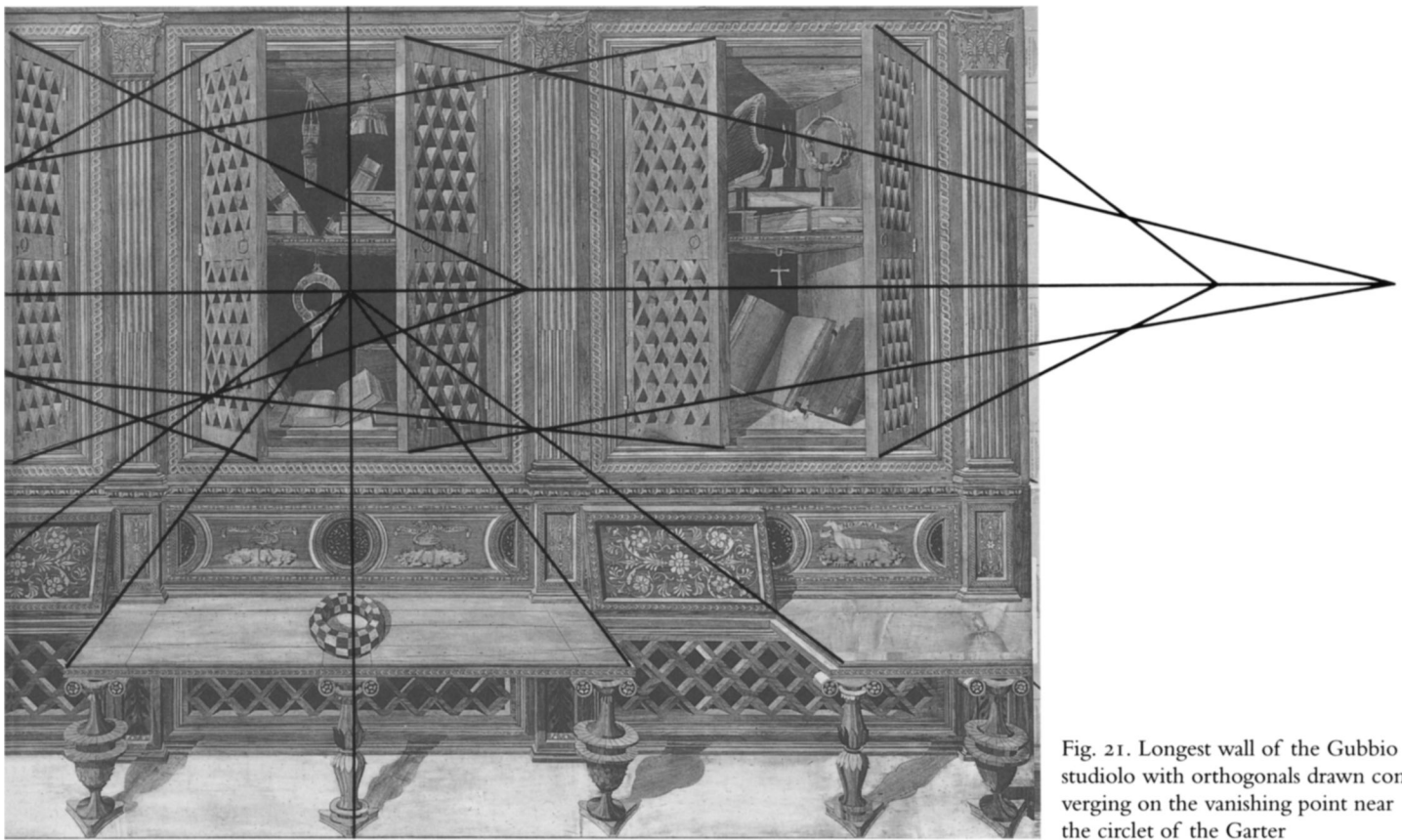


Fig. 21. Longest wall of the Gubbio studiolo with orthogonals drawn converging on the vanishing point near the circlet of the Garter

lattice doors variously ajar displaying a medley of religious objects (fig. 19). Their design may have been due to an invention of the most gifted of the early masters, Antonio Manetti, or perhaps to a design by Paolo Uccello, whose enthusiasm for the magic of perspective and whose working connections with the cathedral are well documented.

As the intarsia panels of the Florentine vestry became famous, awareness of the new art of perspective intarsia soon spread from the religious to the secular sphere. The marvelous possibilities offered by the use of perspectival motifs seemed especially suitable for the wood panelings that, traditionally, had become a component of the small private studies often commissioned by Italian humanist rulers.

Pope Nicholas V (r. 1447–55) had just such a small study in the Vatican Palace, for which a Florentine woodworker named Niccolò da Firenze had executed intarsias in 1454, probably in the form of a wainscoting running below frescoes (now lost) by Fra Angelico. At Florence, in 1459, in the Medici Palace, intarsias “in perspective” were described as one of the finest adornments of the celebrated *studietto* of Piero de’ Medici. Not surprisingly, therefore, Federico da Montefeltro, who all his life maintained close ties with Florence, chose to follow these famous precedents

for the paneling of his two studioli at Urbino and Gubbio.

For the viewer who stands in the center of the Gubbio studiolo, the coherent perspectival design of its paneling is immediately graspable. As the eye is drawn to the side facing the window, the wall’s overall design appears clearly focused on the Order of the Garter hanging in the middle of the central cabinet. The vanishing point where the orthogonals established by the right and left benches converge (fig. 21) is close to the garter’s circlet. A vertical axis, established by the quill case hanging above the garter and by the central baluster of the bench below, and a horizontal line, which can be drawn across the three cabinets from the bottom of the scrolling paper in the left one to the tuning key in the right one, complete the overall linear perspective design of this wall in terms that faithfully reflect the principles described by Alberti in his famous treatise *On Painting* (1435). The design is calculated to work for a viewer whose height (1.75 meters) coincides with the garter. Further on, we notice that the angles of the lattice shutters also play a clearly definable perspectival role. Those of the central cabinet would coincide, if closed, with the vertical axis, while those of the side cabinets determine the distant points of the overall design.

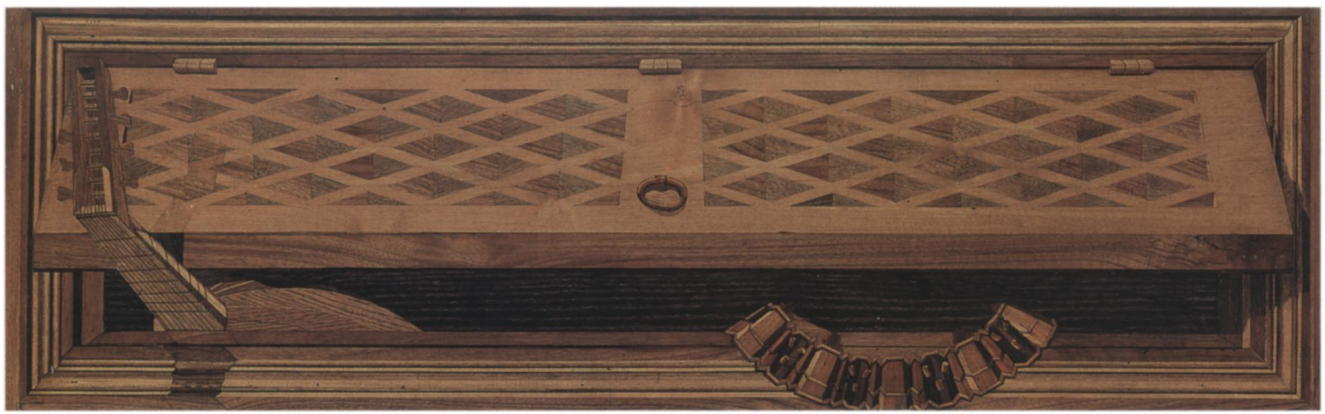


Fig. 22. Horizontal cabinet above the door of the studiolo showing the neck of a lute and the collar of the Ermine

A similar analysis of the other walls yields comparable observations. Although the horizon line is maintained throughout the panels, always a little below the central shelf of the cabinet, the vanishing point appears near the center of each panel, in the middle of the window and the middle of the door, being always determined by the converging orthogonals of the cabinets or of the objects on the benches. In the end the viewer has the impression of being surrounded by four converging perspectives, a system that, when both the studiolo's door and its main window are closed, creates a perfectly coherent illusionary space.

This impression is reinforced by the carefully calculated arrangement of objects and books inside the cabinets. The books especially, which appear everywhere, function as pure geometrical forms, their abstract blocks stacked or propped at an angle to establish secondary planes inside the cabinets. Unlike the intarsia paneling at Urbino, where the design stresses optical tricks and virtuoso illusionistic effects, at Gubbio one senses the presence of a mind chiefly preoccupied with the geometrical nature of objects. Even when, as in the horizontal cabinet on top of the door (fig. 22), the designer indulges in visual tricks, such as the neck of the lute sticking out into our space or the collar of the Ermine spilling out of the cabinet, the image remains sober and offers the viewer a geometric rather than a sensorial perception.

Astonishing as is the perspectival treatment of both walls and cabinets, perhaps even more impressive is the importance given to the play of light and shadow that the viewer notices everywhere, the homogeneity of which is governed by its correspondence with the sources of real light in the room. Nowhere is this clearer than in the oblique shadows thrown by the balusters supporting the bench represented along all sides of the room. Strongly

delineated, these shadows presuppose a light coming either from the central window or from the door of the studiolo, depending on the baluster's location (see pp. 14–15).

Similar shadows are also thrown by some of the large objects placed on the bench, such as the lectern, whose shadow travels along the moldings and inside the cabinet, cleverly stressing the changing direction of the planes it encounters (fig. 16). Inside the cabinets the play of light and shadow makes the objects literally come to life. On the wall facing the windows and receiving the greatest amount of light, both from the front and from above, the central panel stands out for the mastery of its treatment. The garter hangs from a brass hook, and the light picks up its metal glint and captures the gold thread, the buckle, the contour of the bluish silky circlet, the embroidered lettering, and the pearl hanging from the garter's tip. As the hook's shadow recedes beneath the shelf, lighted from below, the garter's own shadow is projected against the dark back of the cabinet, where the intarsist's ability to manipulate the black bog-oak wood and to control the direction of its fibers and the nuances of its color produces an uncanny effect of aerial depth (fig. 23).

On the shelf above the garter the light caressingly defines the compact book blocks, the carved wooden contours of the quill case and its accompanying inkwell, as well as the roundness of the nearby brush, with its shiny bristles and its silver-gilt mount embellished with a row of pearls that catches the reflections of the light (see inside front cover). Similar observations can be made about the objects in the other cabinets. For example, in the next cabinet to the right, the light picks up the metal of the hanging tuning key, projects its shadow against the wall on the right, and brings to life the harp, the brass candlestick, and the jingle ring on the shelf above (fig. 24).



Fig. 23. Garter hanging from shelf (see front cover)

It is light again that draws our eye toward the round multifaceted object that lies on the bench beneath the garter: the then-familiar wooden ring of the *mazzocchio* (in the fifteenth century the cloth of a fashionable male headgear was wrapped around it), often chosen by such painters as Paolo Uccello and Piero della Francesca as a favorite exercise in perspective (figs. 25, 26). Seen from above, in plunging per-

spective, a ray of sun creating a pool of light in its center and a shadow on its right side, the *mazzocchio* seems to be endowed with an almost magical presence. Shown at the very center of the main wall, on its principal vertical axis and directly beneath the Order of the Garter, it clearly conveys a message about the importance that pertains to the sciences of mathematics and geometry in the studiolo.



Fig. 24. Harp, brass candlestick, jingle ring, and tuning key

Federico's high regard for these two disciplines is well known. In a famous passage of the letters patent he issued to Laurana, he stated that in his view mathematics and geometry, being based on scientific truth, are "the most important of the Liberal Arts, as well as the very foundation of architecture." This statement is a key to our understanding of the special climate of "mathematical humanism" that characterized the court of Urbino and is

reflected in the details of the decorative program of the Gubbio studiolo.

Among the objects portrayed in the cabinets and next to the books—about thirty in number—that remind us everywhere of the importance of learning from the ancient texts, pride of place is taken by scientific and musical instruments. Among the first, we recognize an armillary sphere (p. 3), hanging from a hook by its ivory

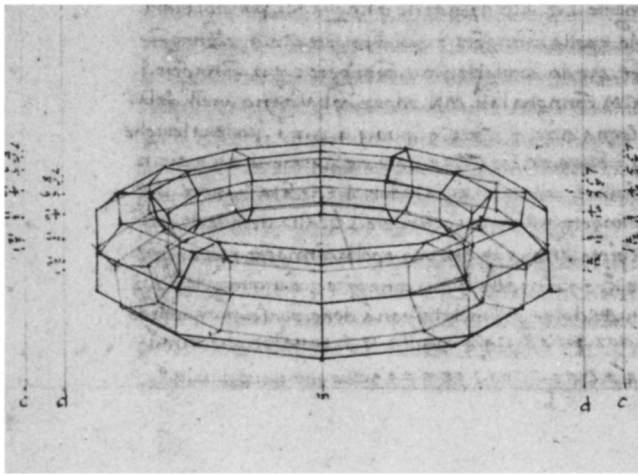


Fig. 25. Perspectival study of a *mazzocchio*. By Piero della Francesca (ca. 1420–1492). Pen and ink from an original manuscript of *De prospectiva pingendi*, ca. 1470–74. Mss. 1576, f. 40v. Biblioteca Palatina, Parma. Reproduced by permission of Ministero per i Beni Culturali e Ambientali, Rome

or wooden handle, similar to the small portable brass spheres used in the fifteenth century for teaching elementary astronomy. We see in it, accurately depicted according to the Ptolemaic geocentric system, a small terrestrial globe, surrounded by its celestial coordinates: the meridians, the equator, and arctic and antarctic rings, as well as the wider, oblique band of the ecliptic, which sometimes carried the signs of the zodiac. On the lower shelf, hanging from its apex, is a horary quadrant, needed to measure unequal hours. The scale on its lower curve is used to determine the altitude of the sun, and that on its straight edge is apparently used to show the latitudes in which the instrument could be employed.

Since the beginning of the fifteenth century Italian humanists had been fascinated by the text of Ptolemy's *Geographia* (newly translated from a Greek manuscript into Latin) and the theories, instruments, and maps it contained. The influence of this book, added to that of such other texts known throughout the Middle Ages as Euclid's and Archimedes' *Elements*—all of them represented in Federico's library—goes a long way toward explaining the presence at his court of famous astrologers and astronomers. Chief among them were the German Jakob von Speyer and the Fleming Paul of Middleburg, with whom, as reported by Federico's biographer Vespasiano da Bisticci, the duke, "who was a skilled geometrician and mathematician, read books in mathematics, discoursing thereon like one learned in them."



Fig. 26. *Mazzocchio* from the Gubbio studiolo

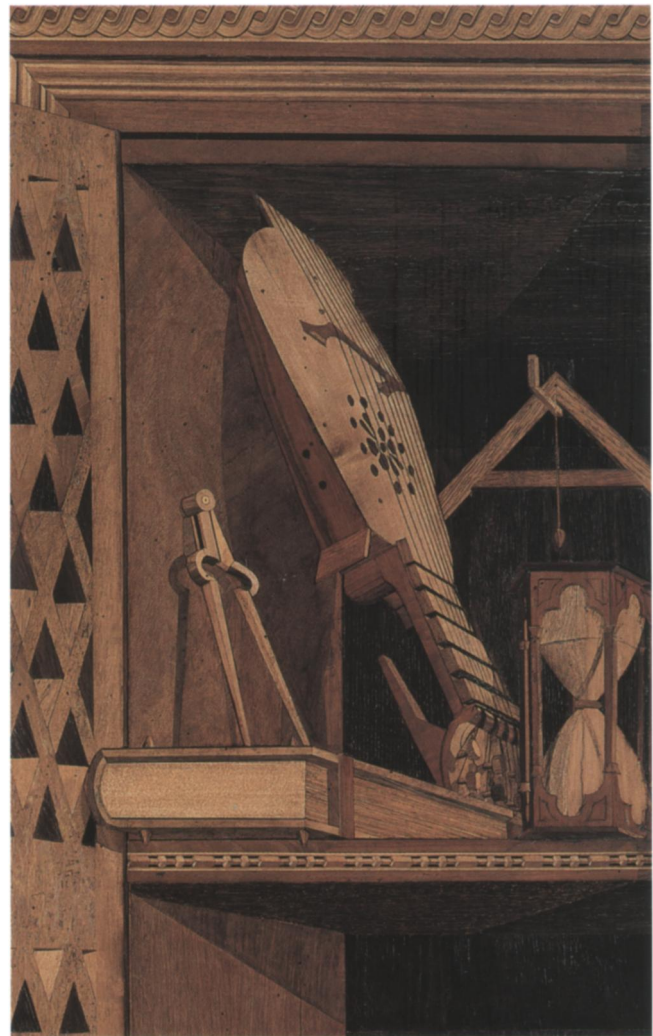


Fig. 27. Dividers, citrern, sandglass, and, behind them, a plumb bob and set square (see inside back cover)

In another cabinet we see a combination of plumb bob and set square hanging from a peg next to a sandglass, a cittern, and a pair of dividers (fig. 27). The grouping of these objects may at first seem puzzling, but it becomes clear once we realize that all four, including the cittern, are concerned with measurement and proportion. The set with the plumb line was used as a level by builders and architects; the dividers were employed to measure distances on a chart or to determine the scale of a design; and the sandglass, an instrument popular in the late Middle Ages, was needed to indicate the equal hours, which came into general usage in the last third of the fourteenth century.

The cittern, accurately depicted with its nine strings, bridge, and pegbox, must be understood as an allusion to the theory of music's harmonic proportions. Following Pythagorean teaching, according to which musical intervals correspond to the arithmetic ratios of length of a string, music was considered a science in antiquity and included among the liberal arts in the medieval era.

Because during the fifteenth century the theory of musical proportions and the studies of linear perspective and architectural proportions came to be seen as expressions of the same mathematical truth, a renewed sense of the interrelationships among the various sciences resulted—interrelationships admirably expressed here in the meaningful choice and concreteness of the objects surrounding us.

More musical instruments are depicted in other cabinets as well, their number and variety vying with those of the books. Four such instruments occupy the panel to the right of the door: a splendid portative organ on the bench and inside, a fiddle, a lute, and two *cornetti* (fig. 28). Behind a latticed door in the first cabinet of the main wall, we notice a rebec with its bow and in the last one a harp propped up by two books. A passage from Vespasiano da Bisticci's biography recalls that Federico "delighted greatly in music, understanding vocal and instrumental music alike, and maintained a fine choir with skilled musicians and many singing boys. He had every sort of instrument in his palace and delighted in their sound, also the most skillful players. He preferred delicate to loud instruments, caring little for trombones and the like." Nevertheless, in spite of the duke's preference for stringed instruments, we see here a hunting horn embellished with silver-gilt mounts (fig. 29), a jingle ring, a tabor, and a pipe—all probably used in the festivals often held at Urbino and Gubbio.

The five pieces of armor in the left cabinet on the window side are other implements that evoke the pageantry of

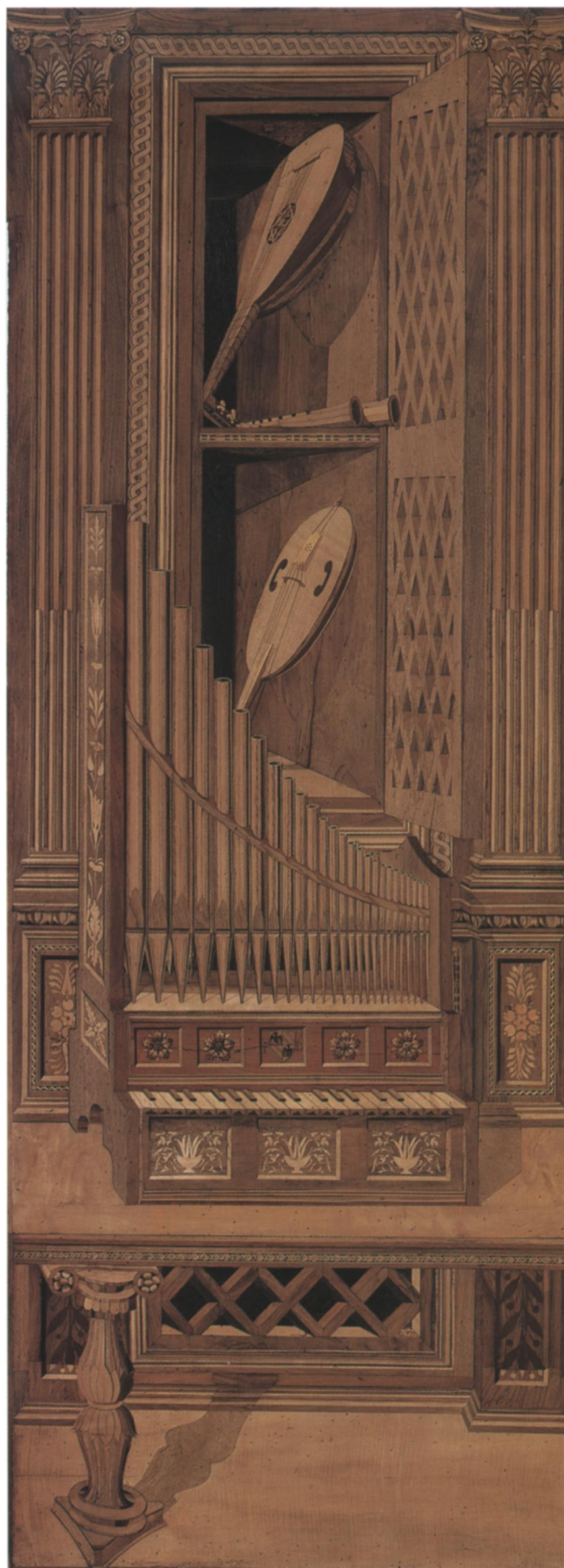


Fig. 28. Portative organ, fiddle, lute, and *cornetti*



Fig. 29. Rebec (behind door), hunting horn, and books



courtly tournaments: a pair of greaves, a pair of roweled spurs, a mace, a pair of gauntlets, and a helmet with the Montefeltro eagle holding an armorial shield as a crest (p. 4 and fig. 30). The open-faced sallet depicted here was a favorite type of fifteenth-century parade headgear: covered with velvet and embellished with jeweled gilt-metal mounts, it reminds us of the helmets given in Florence as prizes at jousts or other ceremonies. Its crowning eagle, standing in the center of a sunburst of golden “tongues of fire,” recalls another great image—the Montefeltro eagle surrounded by a sunburst in the vault of the library in the ducal palace at Urbino.

If the books and instruments depicted around us and the perspective structure of the studiolo’s space reflect Federico da Montefeltro’s humanistic aspirations, another essential side of his personality, that of feudal lord and military leader, is conveyed by the heraldic and symbolic fig-

ures on the panels that run like a frieze beneath the cabinets and all around the room.

An inlaid armorial panel in the soffit of the door (see title page) carries Federico’s personal coat of arms: a horse-face shield surmounted by a coronet and flanked by the initials *FE DUX*, the whole encircled by a wreath of oak leaves. The shield is composed of three alternating diagonal gold bands and blue stripes, with a small black eagle in its “honor point” signifying the 1228 investiture by the Holy Roman emperor of the counts of Montefeltro, quartered by the large crowned black eagle in a gold field of the city of Urbino, all augmented by a vertical stripe with the insignia of Federico’s position as gonfalonier of the church—the crossed and tied gold and silver keys of Saint Peter surmounted by the papal triple tiara.

As did many noblemen of his time, Federico had several personal emblems or devices that alluded to significant

opposite

Fig. 30. Helmet with Montefeltro eagle

Figs. 31, 32. Personal emblems of Federico da Montefeltro: an ostrich and an ermine





33



34



35

Figs. 33–35. Horse bit, brush, and crane



Fig. 36. Tongues of fire and monogram *fd*



Fig. 37. Exploding grenade

events, virtues, or aspirations. Along the main wall two such emblems are symmetrically repeated: at the center an ostrich (fig. 31) holding a spearhead in its beak, accompanied by a banderole inscribed *I·HC·ANVO R DAI·T·N GROSSO*, a garbled version of the German *ICH KANN VERDAUEN EIN GROSSES EISEN* (“I can swallow a big iron”). The oldest of the emblems used by Federico, it had belonged to his grandfather, Count Antonio (d. 1404), on whose tomb it appears, and it was evidently meant as a symbol of the bearer’s resistance to adversity. Flanking it is an ermine surrounded by a circle of mud with the motto *NON MAI* (“never”), a well-known symbol of innocence and purity, suggested by the immaculate whiteness of this animal, which was thought to prefer death rather than soil its coat (fig. 32). For Federico, who adopted this emblem quite early, it probably hinted at his innocence in the assassination of his half brother Oddantonio.

Two more emblems, along the short wall of the study, are complementary devices that Federico inherited from the duke of Milan, Francesco Sforza, whom he had always admired. One is a bit (fig. 33) and the other a brush (fig. 34)—both implements used in the care of horses: the first to restrain the difficult ones, the second to clean and stroke the obedient ones. They are an obvious allusion to a program of skillful governance.

Other emblems allude to Federico’s virtues as a military leader. An exploding grenade (fig. 37) represents the most modern among fifteenth-century weapons and as such is a symbol of the preparedness and effectiveness of the duke’s artillery in case of enemy attack. The crane (fig. 35), with a leg held up and a stone in its claw, is a time-honored symbol of watchfulness against unexpected enemy raids and an allusion to one of Federico’s most celebrated virtues, that of being “always vigilant and awake.”



Fig. 38. Parrot in a cage



Fig. 39. Round mirror above the lectern

Finally, the olive tree, a traditional representation of peace, symbolizes the accord brought about by wisdom in government and by effectiveness and vigilance in war.

Another image is one of the most personal of Federico's symbols: a row of tongues of fire combined with the monogram *fd* in Gothic script (fig. 36). Often mistaken for a heraldic device, the tongues stand for the "flames of love," worn as a livery by a group of young Venetian men called the *Accesi* ("the Inflamed Ones"), members of a famous *Compagnia della Calza*, of which Federico had become a member during the period he lived in Venice in his early teens. A memory of his youth, spent in a society still governed by chivalresque ideals, the "flames of love" livery was a favorite with Federico. Together with the Order of the Garter and the Collar of the Ermine, it occurs countless times as a decorative motif on the walls of the Urbino and Gubbio palaces and on the illuminated borders and frontispieces of many of his manuscripts. The garter was undoubtedly the most prominent of the three, a symbol identified with the very presence of the prince, and it was displayed throughout his private apartments and on the door of his studiolo. Here it appeared twice: once, as we have seen, at the very center of the main wall, and a second time, with a black eagle in

its center, in a panel (now unfortunately lost) beneath the window (see p. 54).

The duke's symbolic presence in the studiolo is evoked by the "emblematic border" of its paneling, and nowhere is this truer than in the images conveyed by the intarsia flanking the window. On the left a half-opened cabinet discloses a large octagonal cage with a parrot and a seed box inside (fig. 38). The presence of this familiar bird, carefully rendered with its green feathers and its red beak, may strike us at first as a charmingly quaint detail. But as we recall that in the fifteenth century such exotic birds were extremely rare and prized possessions, owned only by popes, kings, princes, and the wealthiest of merchants, this parrot's depiction assumes the character of a status symbol—even perhaps referring to the *Camera pappagalli* ("Room of the Parrot") in the Vatican Palace. It was there in 1474 that Sixtus IV bestowed upon Federico the rare and quasi-princely distinction of the Golden Rose, and where, as the pope's closest political adviser, the duke was often admitted to an audience.

The friendship between Sixtus IV and Federico was put to a severe test when the intrigues of several of the pope's nephews brought about the Pazzi conspiracy in Florence at Easter 1478 and the duke found himself, quite unwillingly, on the side of Rome against Florence. Thanks to the diplomacy of Lorenzo de' Medici, peace was restored in 1480, but the tensions among the Italian powers continued. When the Venetians, with the support of the pope, decided to claim a territory that belonged to the duke of Ferrara, war broke out in 1482. On this occasion Federico felt it was his duty to forgo his obligations to Rome and come to the rescue of isolated and helpless Ferrara. Although he had been for some time in failing health, he left Urbino in April 1482, stopped briefly in Florence, and continued northward to join his troops in the Po Valley. It was to be a difficult summer campaign, with malaria raging in the swamps, and on September 10, Federico unexpectedly died in the castle of Ferrara at the age of sixty.

In the intarsia panel to the right of the window, which must have been the last to be completed, we find a reflection of these events. The frame of the round mirror hanging above the lectern (fig. 39) carries the letters *G.B.A.LDO DUX* next to Federico's "tongues of fire," a clear reference to the young Guidobaldo's inheritance of the ducal title upon his father's death.

On the lectern a manuscript volume of Virgil's *Aeneid* is open at the passage in book 10:635–84 describing the



Figs. 40, 41. *Music and Rhetoric*. Probably begun by Joos van Wassenhove and completed by Pedro Berruguete. Oil on panel. *Music*: 61¼ x 38¼ in. (156.3 x 97.4 cm); *Rhetoric*: 61¼ x 41½ in. (157.2 x 105.2 cm). The National Gallery, London

battle between Turnus, the fierce leader of the Rutulians, and the young Pallas, the Arcadian fighting on the Trojans' side—a bloody encounter in which Pallas was killed, as forecast by Jupiter:

*Every man's last day is fixed.
Lifetimes are brief and not to be regained,
For all mankind. But by their deeds to make
Their fame last: that is labor for the brave.*

It is difficult not to see in this passage an allusion to Federico's death in the war of Ferrara.

THE PAINTINGS

The unity of the studiolo, so impressively established by the perspectival design of its paneling, is further emphasized by the Latin inscription in carved and gilded letters against a blue ground in the frieze that runs along all sides of the room. Couched in classical hexameters and pentameters, its text reads:

ASPICIS.ETERNOS.VENERANDE.MATRIS.ALUMNOS.
DOCTRINA.EXCELSOS.INGENIOQUE.VIROS.
UT.NUDA.CERVICE.CADANT.ANTE [ORA PARENTIS]
SUPPLIC.ITER.FLEXO.PROCUBUERE.GENU.
IUSTITIA.PIETAS.VINCIT. REVERENDA.NEC.ULLUM.
POENITET.ALTRICI.SUCCUBUISSE.SUE

("See how the eternal students of the venerable mother, men exalted in learning and in genius, fall forward, suppliantly with bared neck and flexed knee, before the face of their parent. Their reverend piety prevails over justice and none repents for having yielded to his foster mother.")

It was first observed by Martin Davies (in 1945) that this text may well apply to a series of paintings representing the Liberal Arts formerly in the studiolo, two of which are now in the National Gallery, London (figs. 40, 41), and two more of which were, before World War II, in the Berlin Museums (figs. 42, 43). Painted in oils on poplar and



Figs. 42, 43. *Astronomy* and *Dialectic*. Formerly in the Kaiser Friedrich Museum, Berlin. Destroyed in World War II. Reproduced courtesy of the Staatliche Museen Preussischer Kulturbesitz, Berlin

showing Flemish as well as Italian characteristics of technique and style, these allegorical paintings have been variously attributed to Joos van Wassenhove and to Pedro Berruguete, culminating in the recent suggestion by Mark Evans that, like the preceding paintings in Urbino, the Gubbio panels were begun by the Netherlandish master and completed by his Spanish successor.

As far as the Gubbio studiolo is concerned, Davies's observations have been the subject of extensive scholarly discussion, accompanied by various suggestions about the possible choice and original arrangement of the Liberal Arts cycle. Our recent reevaluation of all the evidence, especially that provided by the measurements of the studiolo space at Gubbio and by the direction of the light coming from the two small oblique windows facing the upper section of the room, suggests a new reconstruction of the paintings' original arrangement along three of the four walls (fig. 44). The long wall was occupied by the trivium: Rhetoric in the center, flanked by Grammar and Dialectic. The two short walls exhibited the arts of the quadrivium: above the entrance, Astronomy next to Geometry, and, on the short wall, Music next to Arithmetic. These fairly large panels were set into a wooden surround, and reached up to the frieze running below the coffered ceiling (see back cover).

However problematic the authorship of these allegorical paintings may be, there is no doubt that the panels must have immeasurably enhanced the visual unity of the studiolo. We must only imagine the effect of the continuous line of the rich green-velvet carpet laid over the stepped platforms of the Arts, on each of the three walls they occupied, and the rhythm of their high marble thrones, with elaborate designs varied yet coordinated. The saturated colors, the play of reflected light, and the mysterious shadows must have captivated the eye. And the viewer must have recognized in the eclectic details recollections of works admired in Florence and at Urbino: such as the monumental thrones of the Virtues painted by Botticelli and the Pollaiuolo brothers for the Hall of the Mercanzia (1469–70), or the jewels and pearls worn by the angels in Piero della Francesca's Montefeltro altarpiece (1469–72, fig. 46).

The presence of the attributes of several of the Arts, such as the portative organ for Music and the armillary sphere for Astronomy, allows us to identify the liberal art in at least two cases. Somewhat less certain, however, is the identity of the figures kneeling in front of them. The most evident is Federico da Montefeltro in the panel of Dialectic, and the boy kneeling before Rhetoric could well

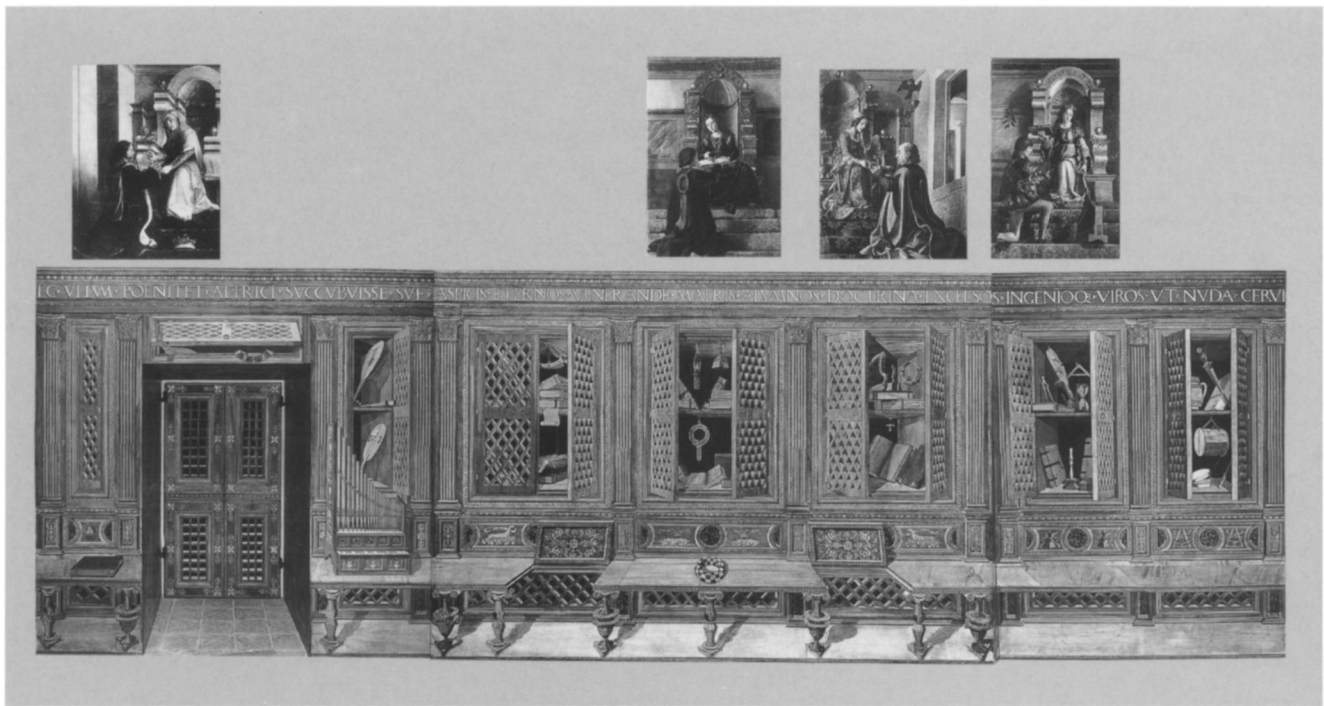


Fig. 44. Reconstruction of the placement of the Liberal Arts paintings in the Gubbio studiolo. From left: *Astronomy*, *Rhetoric*, *Dialectic*, and *Music*

be Guidobaldo. The young man in the panel of Music has been convincingly identified as Costanzo Sforza, and the king who has removed his crown to kneel in front of Astronomy should probably be understood as the Alexandrian astronomer and geographer Ptolemy, who in the fifteenth century mistakenly was believed to have been a king of Egypt.

The sudden death of the duke of Urbino left many architectural projects unfinished. Since, in 1482, Guidobaldo was not yet eleven years old, the administration of the state fell upon the count Ottaviano Ubaldini della Carda (ca. 1423–1498). A close relative, a friend, and a lifelong adviser to Federico, especially in cultural and artistic matters, Ubaldini oversaw the completion of these projects and of the Gubbio studiolo. Aided undoubtedly by Francesco di Giorgio, who remained at Urbino until 1488, Ubaldini made certain that the decoration of the Gubbio studiolo would be finished as Federico had first conceived it. The theme of the liberal arts, represented in the paintings and developed in the intarsia paneling, had certainly been foremost in Federico's mind. The exhortatory tone of the inscription, addressed to a viewer who could well be his son, suggests that the studiolo itself may have been conceived for Guidobaldo in order to stress the importance that a liberal arts curriculum was to have in his education.



Fig. 45. One of the two original "funnel" windows at Gubbio in the wall opposite the paintings

FRANCESCO DI GIORGIO
AND GIULIANO DA MAIANO

Our discussion of the paneling and the paintings of the studiolo shows the crucial influence that Federico exercised on the formulation of its iconographic program. But in trying to understand so complex an ensemble, we must also ask ourselves why it was done in this manner and who actually carried it out. Francesco di Giorgio's role in controlling the execution of the overall decoration of the studiolo is securely established by his being the architect of the palace and thus responsible for the structure of the masonry shell of the room. The coincidence that we have observed between the directional lighting coming from the windows (fig. 45) and the light represented in the intarsia panels and in the paintings reveals the unity of conception between the architectural space and its revetment.

The emphasis on the unifying role of the light and the overriding interest in geometry and perspective that is so characteristic of the Gubbio studiolo points us also to another source. When Francesco di Giorgio moved from Siena to Urbino in 1476, he found not only the architectural work of his predecessor, Francesco Laurana, but also the paintings that Piero della Francesca (ca. 1415–1492) had executed for Federico da Montefeltro in 1469–72. We can easily imagine that the sight of Piero's *Flagellation* and especially of his Montefeltro altarpiece (fig. 46) must have been a stirring revelation for the Sienese artist. The degree of complexity and refinement of Piero's use of perspective and light in these masterpieces must have deeply impressed Francesco in theoretical as well as in pictorial terms. To this was added Francesco di Giorgio's acquaintance with the manuscript of the *De prospectiva pingendi* ("On the Perspective of Painting"), composed by the great painter-mathematician in the same years and dedicated to Federico. Kept in the ducal library at Urbino, this precious treatise, illustrated with Piero's drawings, was surely carefully studied by Francesco as he immersed himself in the compilation of his own architectural notebooks. It is undoubtedly the knowledge gained from this encounter with Piero della Francesca that is reflected in the conception of the studiolo. Perspective, which earlier had not played an important role in Francesco's works, suddenly had become an expressive principle of composition.

We know that in attending to the immense number of architectural tasks required by the duke, Francesco di Giorgio often relied on the help of assistants, some of whom he had brought from Siena. Nevertheless, his practical duties extended to the drafting of contracts with the

specialized craftsmen who were to carry out his projects. A Gubbio notary act of 1477, for instance, drawn in Francesco di Giorgio's name, stipulated that a local painter was to execute a blue-and-gold frieze for one of the duke's rooms in the palace, following a drawing supplied by the architect. We must assume that a similar procedure was followed for the decoration of the studiolo, and it is most likely, therefore, that it was Francesco di Giorgio who entrusted the execution of the paneling and the ceiling of the studiolo to the prominent Florentine master woodworker and architect Giuliano da Maiano (1432–1490). This artist's reputation as a specialist in intarsia derived from the success of his work in the 1460s for the vestry of Florence Cathedral. Since then he had developed a large workshop on Via de' Servi, which he directed together with his younger brother, Benedetto da Maiano (1441–1497). On his own, Giuliano had become increasingly busy with



Fig. 46. The Montefeltro altarpiece. By Piero della Francesca (ca. 1415–1492), 1469–72. Oil on panel, 98¾ x 67¾ in. (251 x 172 cm). The Virgin and Child appear with saints, angels, and Federico da Montefeltro kneeling at the right. Pinacoteca di Brera, Milan



Fig. 47. Door to the audience chamber of the ducal palace at Urbino. Executed by the workshop of Giuliano and Benedetto da Maiano, ca. 1475–80



Fig. 48. Detail of intarsia paneling from the sacristy of Saint John in the Basilica of Loreto. Completed by the da Maiano workshop in 1480

architectural commissions, often traveling out of Florence, as when he visited Siena in 1473 to plan a palace for the banker Ambrogio Spannocchi, or to Faenza, where in 1474 he became the architect of the new cathedral.

As was customary, the contract with Giuliano da Maiano must have been accompanied by a model of the work to be done, which would have established an overall design. The detail of the cartoons to be followed by the intarsia specialists in the Florentine workshop may have been left to one or more draftsmen or painters employed either by Francesco di Giorgio or, more probably, by Giuliano da Maiano. The motif of the latticed cabinets, for instance, had become part of a repertory used by the da Maiano brothers in other commissions as well. Examples include the intarsia door leading into the audience chamber at Urbino, certainly executed in their workshop (fig. 47), and the intarsia paneling completed in 1480 for the sacristy of Saint John at the Basilica of Loreto, where Giuliano was active as an architect (fig. 48).

The da Maiano brothers and their workshop had become renowned for several of the great pieces of intarsia furniture they had delivered in the 1470s to the Florentine banker Filippo Strozzi and especially to the king of Naples and his son the duke of Calabria. The prestige of a commission from the duke of Urbino was such that only the highest standards of execution could be applied to it. If work on the Gubbio paneling was started about 1478, before the Pazzi conspiracy, it would be logical to assume that it was nearly finished at the time of Federico's sudden death in 1482.

Only today, when, thanks to a thorough process of conservation and a careful historical analysis, we have succeeded in recapturing the original aspect and the many facets of the Gubbio liberal arts studiolo, are we able to enjoy it as one of the most perfect creations of the Italian Renaissance.

THE CONSERVATION TREATMENT OF THE GUBBIO STUDIOLO

ANTOINE M. WILMERING

INTRODUCTION

When conservation of the studiolo began about ten years ago, few people working on it realized the complexity of the project. The tentative examination and treatment of the early stages turned into an in-depth study of Italian Renaissance intarsia. Numerous trips were made to Italy in order to examine and document materials and techniques commonly used by fifteenth-century woodworkers. This research proved truly fruitful and has been of great benefit to the practical aspects of the conservation treatment and has contributed to the deeper intellectual understanding of the studiolo. The ducal palace in Gubbio was visited on several occasions, and these led to discoveries such as the original heights for both ceilings. We were also able to establish that the two upper windows, a marvelous example of fifteenth-century lighting engineering, were indeed part of the original studiolo. They were intended to funnel and mix a stream of soft light directed to the paintings of the Liberal Arts hanging on the opposite wall.

Our research into the conservation history of the studiolo from Gubbio uncovered extremely important written and photographic documents. Correspondence with Mrs. William J. Robertson, daughter of the antiques dealer who became the room's third owner, brought to light a series of photographs taken in 1938, just after the

studiolo had been restored. One of these revealed a previously unknown intarsia panel (fig. 41), one of two that would have been mounted below the window. So far we

have not discovered an image of the other panel that would have filled the gap. Both are still missing, and it is our sincere hope that they will be found and rejoined to the studiolo.

The intarsia wall panels and polychrome ceiling elements of the Gubbio studiolo have survived remarkably well, given that this five-hundred-year-old room changed ownership at least four times (fig. 1). Naturally, the panels and ceiling show signs of aging and bear the marks of human intervention. The first damage to the studiolo occurred soon after it was installed in the ducal palace in Gubbio. Some time toward the end of the sixteenth century the Latin inscription that surmounts the room suffered deterioration near the window, very likely because of poor protection from the weather. The Liberal Arts paintings were removed

in 1673. There is not much known about repairs that may have been necessary during the nearly four hundred years that the studiolo was part of the palace, but we can assume that at least some maintenance was carried out. According to various nineteenth-century accounts, the palace was neglected, and, among other enterprises, it temporarily housed a candle factory.

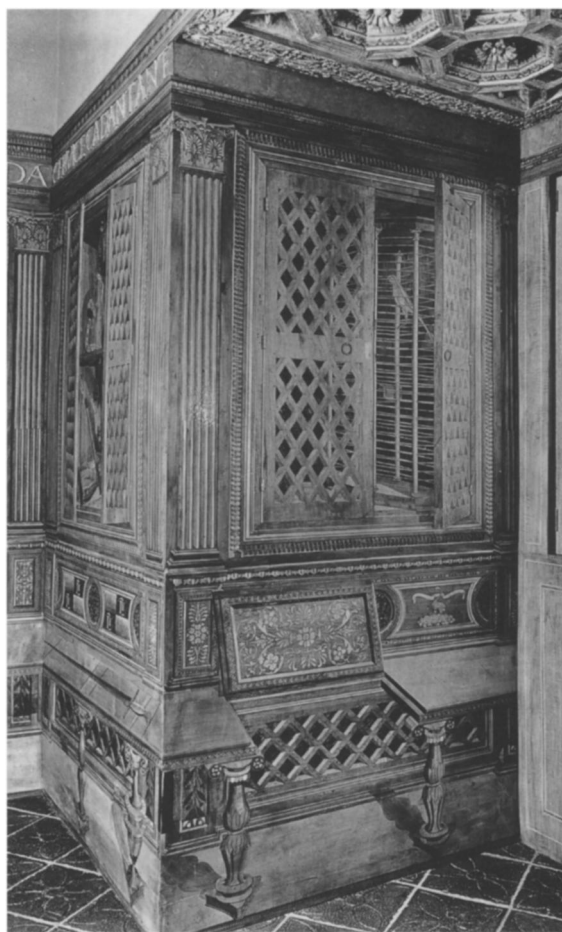


Fig. 1. Window niche of the Gubbio studiolo as installed in the Metropolitan from 1941 to 1967



Fig. 2. Part of the brick-and-stone wall of the studiolo space at Gubbio showing the metal spikes on which the intarsia panels were mounted

In 1851 the first fairly extensive description of the studiolo was published by James Dennistoun in *Memoirs of the Dukes of Urbino*. It was taken from the notebooks of F. C. Brooke, a British visitor to Gubbio (probably in the 1840s), who asserted that the studiolo was in good condition: “The small cabinet has shared a better fate than that of the remainder of the apartments, and requires little else than cleaning up to restore it to its original state.” Brooke was perhaps not very familiar with Italian intarsia, as his assessment of the condition of the wall panels was quite optimistic. It was contradicted some thirty years later by the German architect Paul Laspeyres, who had traveled through Italy measuring, describing, and, ultimately, publishing (in *Zeitschrift für Bauwesen*, 1881–83) significant architecture. He commented on the room: “I saw it in a severe state of deterioration in 1873.” A certain amount of damage could have occurred during that thirty-year period, but it is more probable that Laspeyres had a better understanding of the studiolo’s condition.

During the last quarter of the nineteenth century, when collecting Renaissance art became fashionable, many of the architectural elements of the ducal palace were sold to dealers and collectors. The studiolo was bought by Prince Filippo Lancellotti of Rome in 1874. It must have been fairly easy to remove the intarsia panels. They had originally been installed following the recommendations of the influential fifteenth-century architect Leon Battista Alberti (1404–1472), who wrote in his *De re aedificatoria* (“On the Art of Building”) that metal nails, or spikes, should be fixed with mortar into the wall for attaching various kinds of panels. The battens of the Gubbio intarsia

panels had been mounted onto spikes secured in the brick-and-stone walls, and thus they could be pulled off without much difficulty (fig. 2).

The main ceiling, made in three sections, was probably more complicated to remove, as the two principal beams, which had been cemented into the brick structure, may have had to have been cut. It is very likely that both the intarsia panels and the polychrome ceiling components sustained damage during their removal and transport, which must have been by horse cart and train. In Rome a fair amount of restoration was evidently needed, because by 1877 Lancellotti had paid the large sum of at least Lit 10,000 for the work, which apparently had not yet been completed. One of the principal restorers was Luigi Rizzo, who identified himself through a note he left in a pocket in one of the doors (fig. 3). It reads in translation:

*Luigi Rizzo restored this
room in the villa of the
Prince Angelotti [sic] Sanmichele
Frascati [sic] 15 September 1877
Whoever wins 1.2.3. 47. 80. when
there is no more of it one sings*

(The last two lines, written in a local dialect, may refer to an Italian game of numbers.)

Restoration was carried out under the direction of Giacomo Mammola, a Roman woodworker, who submitted a number of bills to Lancellotti between August 1874 and March 1877. Mammola must have had a large shop equipped to undertake the complicated repair, as he also built, for example, the choir stalls for the church of Santa Maria in Trastevere. Mammola and two or three craftsmen did extensive restoration, and for the most part, where they had surviving fragments, closely followed the fifteenth-century examples. The panel with the musical instruments to the left of the entrance, for instance, shows

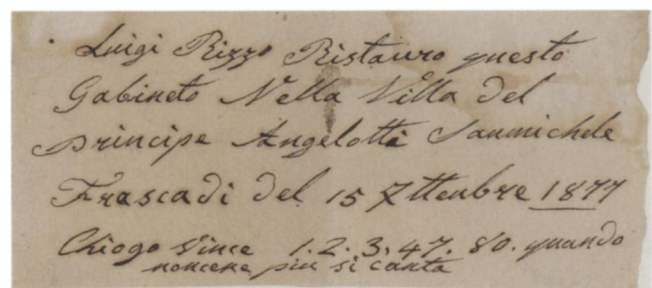


Fig. 3. Note left in one of the doors by Luigi Rizzo, a restorer who worked on the room in 1877

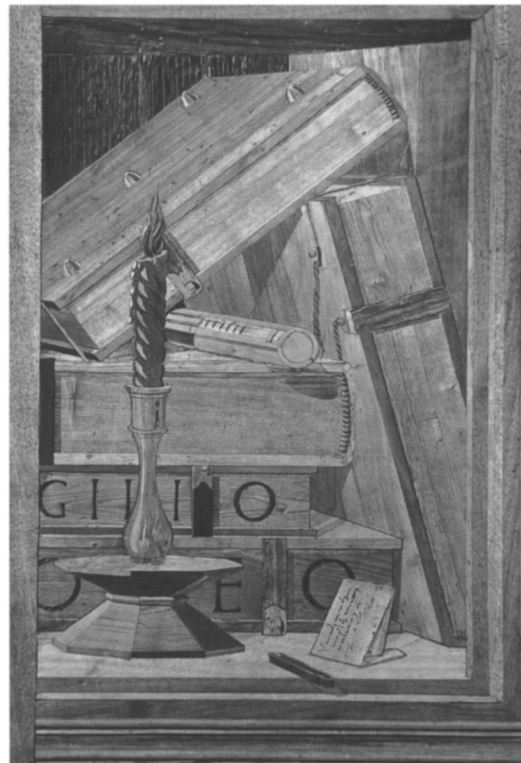


Fig. 4. The studiolo in Venice after restoration in 1938, when it was owned by Adolph Loewi, a German dealer.

a lute in virtually its original state in the upper compartment, while the *lira da braccio* (a type of fiddle) below retains only its fifteenth-century sides and has a replaced top, which fits precisely the original outline. The organ has been almost completely restored. Mammola's shop replaced many of the inlaid bench seats and illusionistic wooden floors, as well as many of the *toppo* intarsia designs, particularly in the lettered frieze. The repainting of both the large and small ceilings was also done by these craftsmen.

Apparently, it had been the intention to reconfigure the room, probably for an existing space in the Lancellotti villa. The main ceiling was expanded along one side by approximately fourteen centimeters, and one additional intarsia panel and two inlaid pilasters were fabricated, but it is not clear whether Lancellotti actually had the room installed.

In 1937 Adolph Loewi, a German antiques dealer, wrote to his daughter that he was very excited to have discovered the panels of the studiolo stacked in the attic of the villa. Evidently, they had never been reassembled, and the surface of the panels had not been refinished. Loewi purchased the panels and ceiling and in 1938 had them restored in Venice (fig. 4). According to his daughter, the room required little treatment, but one large intarsia section was missing and needed to be replaced, for which elements from the Urbino studiolo were copied (figs. 5, 6).



Figs. 5, 6. The 1938 restoration of the Gubbio studiolo included making a replacement panel (right) adapted from a panel of the studiolo in the ducal palace at Urbino (left).

In addition, Loewi's craftsmen reconstructed the Latin text of the frieze and added a wax coating to the intarsia surfaces. Thus, when the Museum acquired the panels and ceiling in 1939, they had been restored at least twice. The studiolo received some further treatment at the Museum after it had entered the collection. On January 21, 1941, the *New York Herald Tribune* announced that the studiolo would open to the public the following day after "several months of work by museum technicians." Its installation, based on information then available, was later discovered to have incorporated some inaccuracies. The studiolo was on display until 1967, when the galleries were closed for remodeling. The scheduled reinstallation did not take place, however, because plans for the new Italian Renaissance galleries were postponed.

FIFTEENTH-CENTURY TECHNIQUES AND PRECONSERVATION CONDITION

The exceptional beauty of the studiolo's intarsia panels results from their convincingly rendered perspective, wrought by the interplay of light and shadow executed according to the placement of the windows and, to a certain extent, to light coming through the entrance. The special attention given to the inlaid details, which are executed with confidence and bravado, further enhances the studiolo's exquisite illusionistic quality.

The wall panels were created at the height of the Florentine intarsia tradition, about 150 years after the first *tarsia à toppo* decorations appeared in Tuscany. Toppo inlay consists of strips composed of hundreds of tiny, regularly shaped pieces of wood forming a geometric design. The strips were often inlaid in a symmetrical pattern in the substrate wood (fig. 7). The technique arrived in Europe through the Islamic world, where skilled craftsmen had produced inlay of astounding quality as early as the tenth century. It was probably introduced into Spain and Italy during the late thirteenth or early fourteenth century. As woodworking skills further developed in Italy, intarsia decorations and toppo designs became more complicated. Painters started to provide cartoons for the craftsmen, and the first figurative intarsia images emerged in Orvieto and Siena during the middle of the fourteenth century.

Brunelleschi's rediscovery of linear perspective in the first quarter of the fifteenth century greatly influenced a whole generation of craftsmen, including painters, sculptors, architects, and especially intarsia cutters, to whom the application of the rules of perspective may have come naturally. Their work, which made use of predominantly



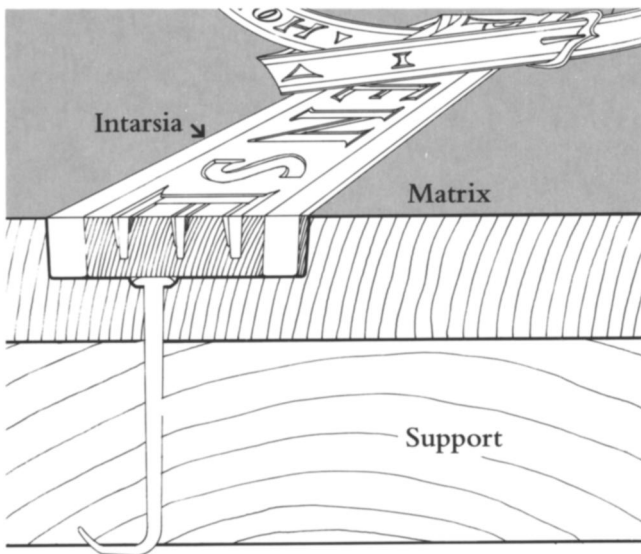
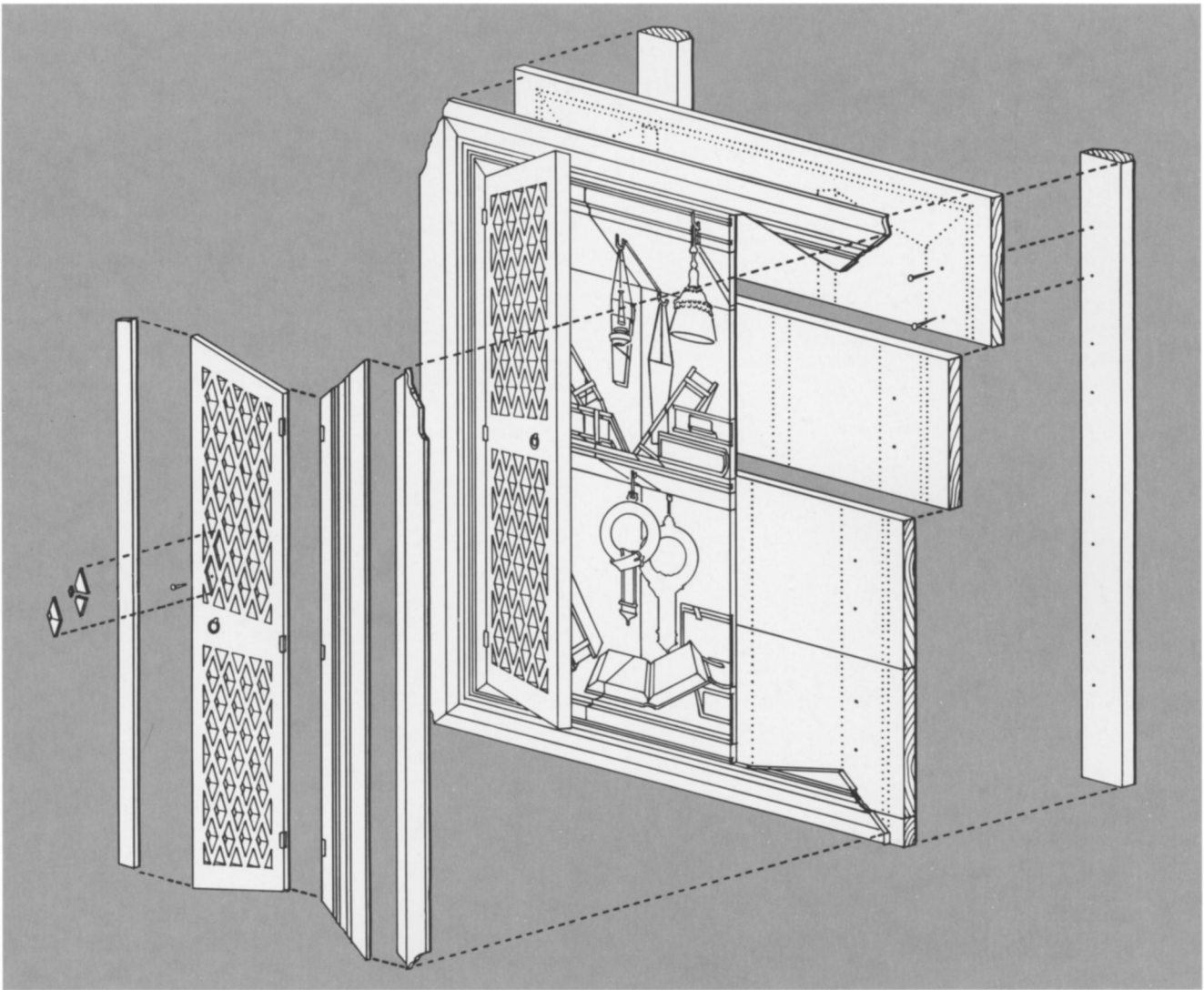
Fig. 7. Detail of *toppo* intarsia from the letter frieze



Fig. 8. Perspective drawing of a *mazzocchio*. Attributed to Paolo Uccello (1397–1475). Pen and wash. Cabinet des Designs, Louvre, Paris

large, plain-toned matrix sections inlaid with contrasting woods, was extremely well suited to achieving intricate three-dimensional effects. Intarsia cutters were already familiar with the instruments for drawing linear perspective—straightedges, compasses, squares, and triangles—using them in their daily work primarily for laying out and sizing wood. Because of their often celebrated accomplishments, they received such honorary titles from their contemporaries as *i maestri di prospettiva*, or "the masters of perspective." The painter Paolo Uccello (1397–1475) seems to have been especially fascinated by linear perspective, so much so that he went to great lengths to perfect it. The *mazzocchio* was a device often used by the intarsia cutters to demonstrate their knowledge of perspective, and the drawing reproduced here (fig. 8) is attributed to Uccello and closely resembles the example in the Gubbio studiolo (see p. 23).

The intarsia wall panels of the Gubbio studiolo typically consist of irregularly shaped, mainly walnut, inlaid



Figs. 9, 10. Assembly of intarsia panels. Each panel is constructed from matrix sections nailed to a poplar support. Nails were often hidden behind intarsia sections. The cross section shows part of the Garter (see p. 21).

matrix sections, which follow the basic outline of the design. They are nailed to a support of poplar boards, with the nails hidden by intarsia or small wooden plugs and invisible from the front. The holes were predrilled because the handwrought nails were relatively soft. The nails were then hammered through the matrices and boards, clinched over, and their tips driven back into the boards. This type of assembly contributed greatly to the stability and preservation of the panels (fig. 9).

The different steps that must have been necessary to make the Gubbio panels are not known to have been recorded; however, upon examination it was possible to reconstruct them. Before any work was started, drawings and cartoons were prepared from the artist's design. The overall concept of the studiolo must have come from Francesco di Giorgio (see pp. 34–35), but it is very likely that he subcontracted the specific drawings for the scheme to a draftsman. Giuliano da Maiano, who was an accom-



Fig. 11. Self-portrait of the wood carver and intarsia cutter Antonio Barili (1453–1516) using the shoulder knife. Originally made in 1502 as part of a series for the chapel of Saint John the Baptist in the Cathedral of Siena, the panel entered the collection of the Österreichisches Museum für Angewandte Kunst, Vienna, in the 19th century; it was destroyed in World War II. Reproduced courtesy of Museum für Angewandte Kunst

plished master woodworker, intarsia cutter, and architect, must have had some control over the design and cartoons as well. Based on the drawings, the amount of wood was calculated, and it was roughly selected for color, texture, and grain. This practical part of the project was the responsibility of da Maiano, or was assigned to the *capo* of his workshop. Since Giuliano had a large establishment, most of his wood was probably in stock and would have been continuously replenished with fresh-cut timber. Sawed into boards, the wood needed a minimum of three years to season before it could be used.

Once the boards were sized, the intarsia cutters would prepare the sections to be inlaid according to the design. Saws, planes, adzes, chisels, and knives were the tools available to shape the approximately five-millimeter-thick sections, or *tesserae*. The next step was to outline, cut, and excavate the matrix wood to receive the *tesserae*. A shoulder knife (fig. 11), typically used by intarsia cutters, carved the outline of the areas to be recessed, and then the wood was removed with gouges within the outline to the depth of the first knife cuts. Next, a new series of knife cuts was set along the same outline, followed by further removal of the wood until the required depth of about five millimeters was reached. Now the previously cut *tesserae* could be inlaid. They were secured in the matrix with hot protein or cold casein glue. After this initial round of inlay, the surface was planed smooth, and the basic design could be recognized. The intarsia panel was completed in several rounds of inlay, all adding further detail until a satisfactory final image was reached.

Each succeeding round was cut slightly shallower than the previous one, and every time the surface of the wood was smoothed. The action of the shoulder knife caused the walls of the excavated wood matrix to taper slightly. This taper created a very tight-fitting inlay, much tighter than was possible to achieve with later marquetry techniques. The matrix often formed part of the image and therefore, in many instances, remained partly visible after the work was completed, as is the case, for example, in the latticed cupboard doors. Cartoons for the intarsia designs do not seem to have survived; possibly they were cut and used as patterns during the intarsia-making process.

Wood-species analyses and examination of the original manufacturing techniques, combined with an in-depth study of comparable intarsia works, were essential to us in distinguishing the original work from later restorations. The palette of the fifteenth-century Florentine intarsia cutter typically consisted of local woods, such as walnut (*Juglans* sp.) in various shades; pear (*Pyrus* sp.); cherry (*Prunus* sp.); maple (*Acer* sp.); and oak (*Quercus* sp.). Some lesser-known species were also used, such as spindle tree (*Euonymus* sp.); mulberry (*Morus* sp.); wig tree (*Cotinus* sp.); bog oak, naturally stained black by being submerged for many years; and a type of poplar wood (*Populus* sp.) stained green by fungal infestation (fig. 12). The craftsmen also made use of variations within a single species, carefully choosing the wood for color, texture, and grain to obtain certain desired effects. The inkwell in the center panel, for example, appears rounded because of the shading pro-



Fig. 12. Modern samples of woods similar to those that formed part of the palette of 15th-century intarsia cutters. From top to bottom, left to right: mulberry, cherry, brown oak, robinia, fungus-stained birch, poplar, light walnut, plum, dark Tuscan walnut, bog oak, spindle tree, and pear



Fig. 13. Detail of side of restored organ (see p. 24). The 19th-century restorers used a fret saw to cut the design. At low magnification the track left by the saw is clearly visible between each element.

duced by the natural color shift in the oak (see inside cover). The nineteenth-century restorations were done mostly in rosewood (*Dalbergia* sp.), maple, artificially stained oak, sycamore (*Platanus* sp.), and fir (*Abies* sp.).

Traces left by the shoulder knife also enabled us to determine whether the inlay was original or a restoration (fig. 14). Pulled perpendicularly across the grain, the knife left a characteristic pattern in the matrix wood, as it compressed the wood fibers sideways. This phenomenon can easily be identified under low, 10 x magnification at the matrix edges adjacent to the inlay. Wherever we observed such compressed wood fibers combined with tight-fitting inlay, we could be certain of having identified original intarsia.

Many of the restorations were executed with a fine-bladed fret saw, which was developed in the second quarter of the sixteenth century for cutting marquetry. The fret saw cuts through the wood at almost a perpendicular angle and does not compress the wood fibers. It is often used to cut through a design glued to a stack of two or more layers of contrasting woods. After the cutting has been completed, the layers are interchanged, and a design of contrasting woods appears. Commonly, the fret saw is moved from one design element to the next while cutting through the wood layers, and therefore it leaves a gap, or track, equal to the width of the blade between each ele-



Fig. 14. Detail of entrance ceiling. The original inlay, once light blond but today dark yellow, fits tightly in the walnut matrix. The lighter colored, coarser grained maple restorations have an irregular fit. In certain areas, particularly under the leaves, fragments of spindle wood are visible.

ment. In most marquetry techniques the thickness of the saw blade remains visible after the layers have been interchanged, and it is easily detectable under low magnification. When we observed the characteristics of the fret saw

in the intarsia panels, we knew we had encountered a restoration (fig. 13).

Our visual observations of the panels were compared with X-radiographs, which revealed fifteenth-century handwrought nails as well as some modern hardware. They also provided evidence of original hardware having been removed. This additional information on the interior structure of the panels increased our knowledge about the level of intervention during previous restorations. X-radiographs also showed hidden anomalies, such as plaster applied by restorers to fill losses caused by woodworm infestation (fig. 23) and the pocket in the door that contained Luigi Rizzo's note.

The polychrome ceilings, cornice, and lettered frieze were examined visually in order to separate the original elements from later restorations. X-radiography was used to analyze the construction of the small ceiling over the window niche. The fifteenth-century components were made of poplar, while the nineteenth-century restorations and additions were done in fir. An abundance of nails was used in the original construction of the ceilings, and very little evidence of joinery was found (fig. 15). Both ceilings are decorated with carved, gilded flowers set into azurite octagons and squares with white borders, surrounded by painted imitations of carved lotus ornaments and gilded moldings. Rectangles and trapezoids with gilded mold-

ings and triangles, all simulating hard stones such as green porphyry as well as unidentified red and purple stones, frame the octagon.

The ceilings display a beautiful range of colors, once bright and vivid but now dulled by age, still clearly identifiable as blue, white, green, two shades of red, and a very unusual shade of purple (fig. 16). The paint layers were examined under low magnification to establish their condition and locate areas suitable for further scientific investigation. Small samples were obtained for analyses of strata, pigments, binding media, and any remaining glazes. Stratification was analyzed under a microscope in regular and ultraviolet (UV) light (fig. 17). X-ray diffraction, energy-dispersive spectrometry (EDS) in a scanning electron microscope (SEM), and polarized-light microscopy were used to identify the pigments, which were painted on top of a gesso layer of calcium sulfate. The pigments were azurite, lead white, copper resinate (glaze), verdigris, vermilion, red madder lake, yellow ocher, and carbon black. The gold leaf of the water gilding had very few impurities and can be compared to what we today classify as 24 karat. The fifteenth-century painters used various stencils to lay out the basic pattern of the repeating ornament, which was then finished by freehand painting. Figure 18 illustrates a reconstruction of the steps necessary to complete the gilding and polychrome decoration of the

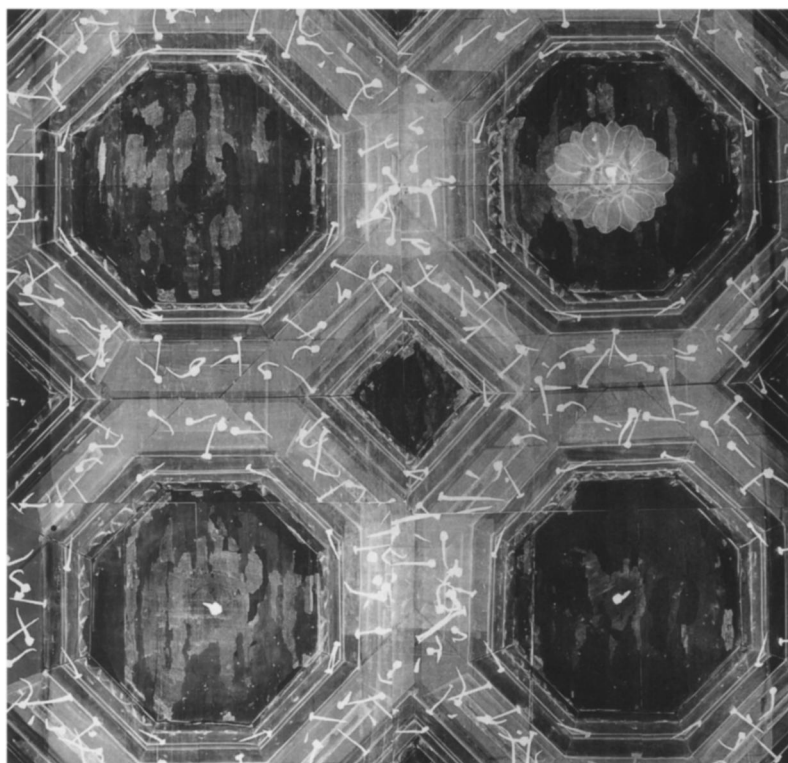


Fig. 15. X-radiograph of the small ceiling showing the many nails used in its construction. Fragments of 15th-century paint show up as light patches because of their greater X-ray density; they are particularly apparent in the octagons. Compare with figs. 33 and 34 on p. 51.

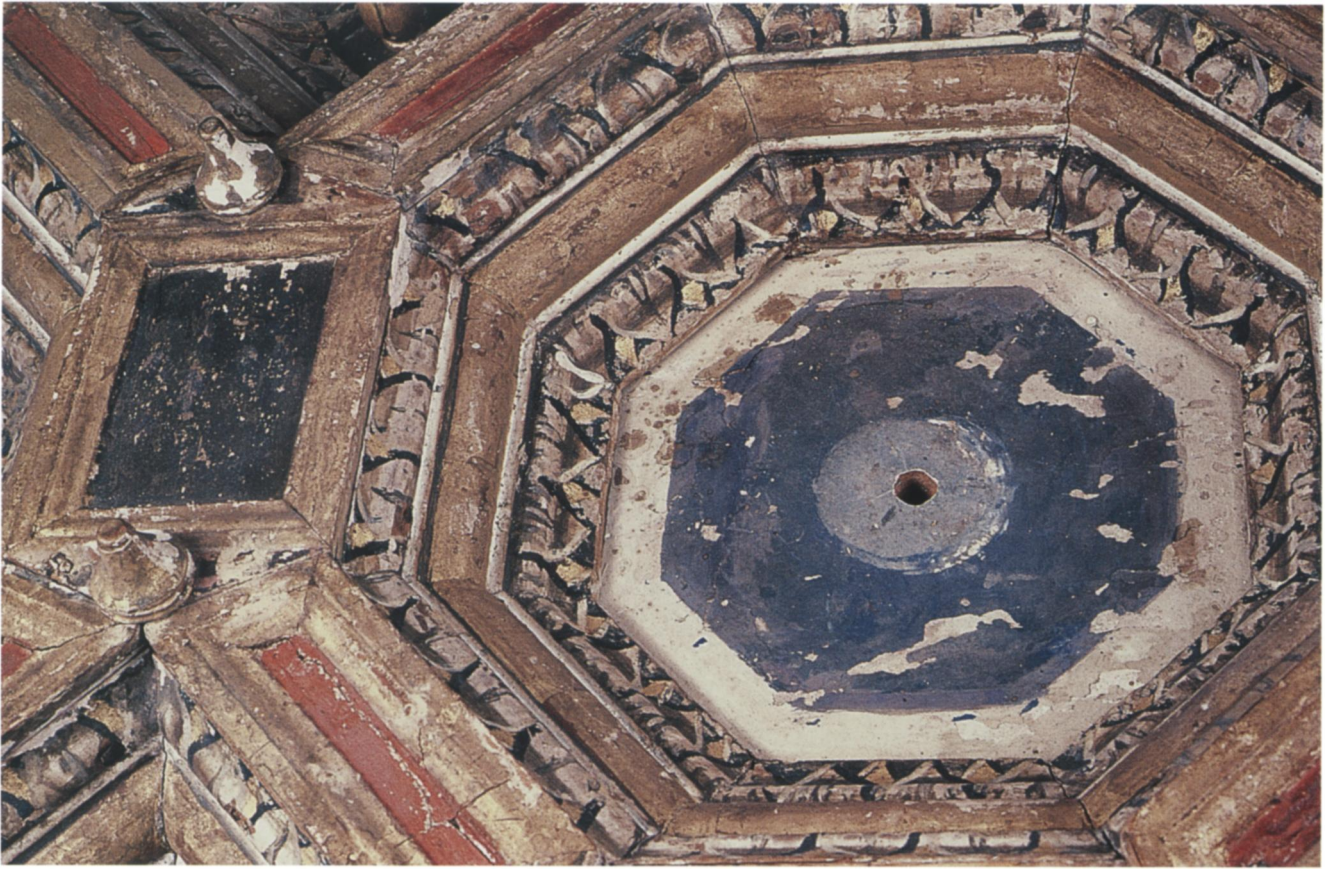


Fig. 16. Detail of the main ceiling. The colors (blue, white, red, green and purple), framed by gilded moldings, were once bright and vivid. This is particularly evident in the center of the octagon in a small area between the gray underpaint and the discolored azurite, which had been protected by a gilded flower. The photograph also illustrates the severe flaking of the paint.

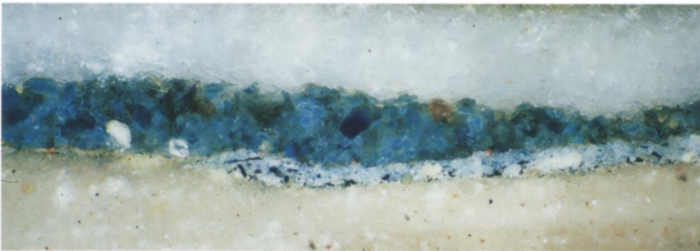


Fig. 17. Microscopic cross section of paint sample from the main ceiling. It shows, from the bottom up: original gesso layer, grayish underpaint, and azurite blue. The thick 19th-century restoration gesso and paint layers lie on top of the original layers.



Fig. 18. Reconstruction of cornice section in which the working methods of 15th-century craftsmen have been re-created. From left to right: poplar base, gesso layers, bole and gilding, underpaint, and, from middle to right edge, as completed

cornice. The nineteenth-century restorers used crude pencil drawings instead of stencils to reconstruct the ornament, loosely following the original design. They painted on top of a layer of calcium sulfate gesso, employing mostly modern pigments, including synthetic ultramarine, zinc white, titanium white, and yellow ocher. Their gilding had many impurities and was of poor quality compared to the original. Some parts of the ceiling were severely deteriorated due to heavy but localized woodworm infestation.

CONSERVATION TREATMENT

Our conservation treatment was aimed at fulfilling two objectives. The structural integrity of every element of the studiolo had to be preserved and, where necessary, restored to minimize further deterioration and ensure safe display. While the first objective was straightforward, the second was more difficult and challenging, involving aesthetic evaluation of both intarsia panels and ceiling components and decisions about the degree of intervention. A full report of our conservation campaign is not possible in this publication, and therefore what follows will describe only briefly some aspects of our work.

The spirit of the Italian Renaissance is overwhelmingly present in the studiolo, despite its extensive restorations. Our treatment concentrated on integrating those restorations that impeded a proper reading of the fifteenth-century intention. The tonality of many of the previous repairs of both intarsia and paint had shifted or were badly discolored. In some areas the original intarsia images and polychrome decoration had been misunderstood. The panel with the armillary sphere, for example, shows three stacked books, with the uppermost book open and resting partly against the back of the cabinet interior. The restoration of this book was plain and flat, whereas the outline in the matrix suggests a curved book page. Clearly, the restorers had not understood what the image was supposed to look like (fig. 20).

Other mistakes, however, were very subtle, as is demonstrated by the following example. The light in the studiolo is directed in part from above to the intarsia wall panels, and, naturally, the lighter woods of the block-on-stick *toppo* design in the middle shelves of the cupboards face up while the darker shadow areas face down. If the light direction had been properly understood when the *toppo* was restored in the panel with the musical instruments, it would not have been rendered upside down—dark above and light below (figs. 21, 22). This relatively



Fig. 19. The author gluing an intarsia section

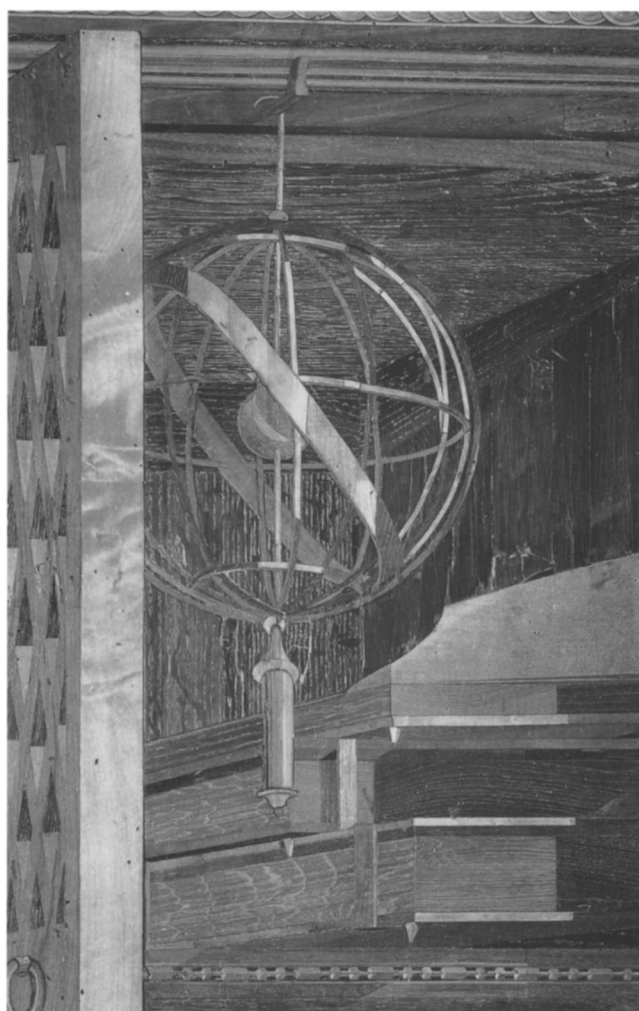
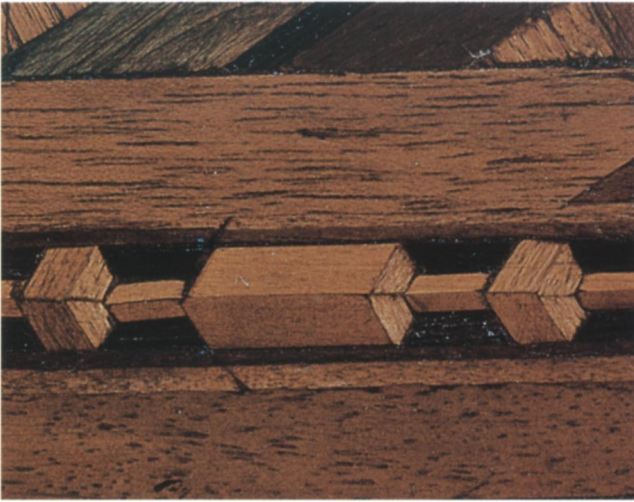


Fig. 20. Upper compartment of panel with armillary sphere and books before restoration (see pp. 3, 48)



Figs. 21, 22. Original section of block-on-stick toppo intarsia (left) and a 19th-century replacement in which the light and shadow have been reversed (right)



Fig. 23. Panel from opposite the entrance lying face down with deteriorated support board removed. The large amount of plaster fills and rubble from the previous restoration can be seen in this photograph, the insert, and in white areas of the X-radiograph of the panel in the background.



Fig. 24. Original nails were die cut and fitted with washers and nuts to fasten the replacement boards. Their sharp tips are protected by wooden caps.



Fig. 25. A new support board, fabricated from cottonwood, in place

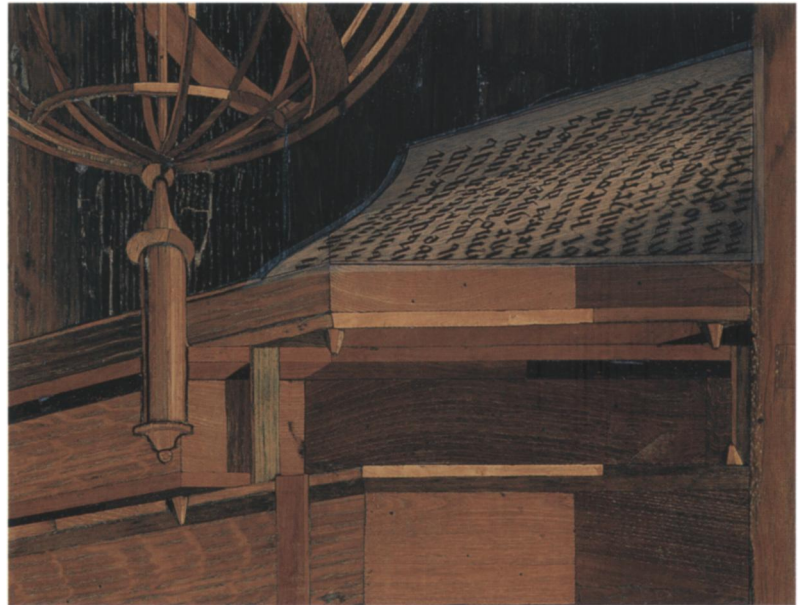
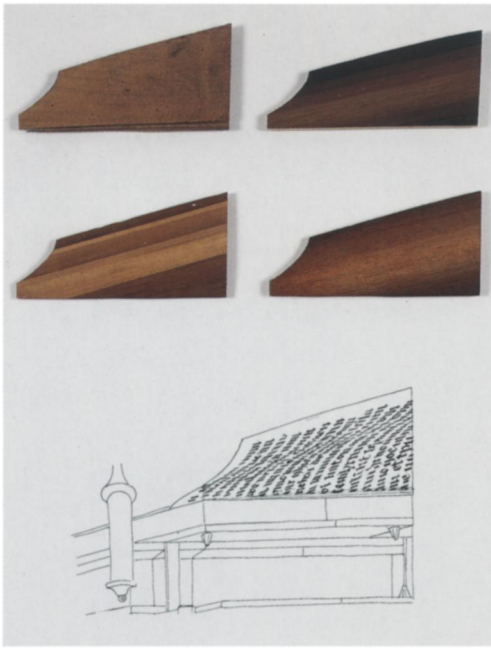
minor detail illustrates how important it was during our conservation work to thoroughly understand the interplay of light and shadow in the studiolo. New errors could easily have been introduced, especially since the logic of the light direction seems sometimes to have been sacrificed to intensify the overall illusionistic impression.

Because the paint on the ceilings had aged and the colors of some elements had shifted, they were misinterpreted during the Lancellotti restoration. For instance, the unusual purple in the small triangles in the main ceiling had been restored as dull green. Furthermore, there were areas in the decorative motif that were carelessly repainted and were incompatible with the original scheme.

The structural damage to the intarsia panels and the ceiling elements had occurred in isolated areas. Gubbio, situated in the foothills of the Apennine mountains, has a humid climate that increased the risk of the wood's biological degradation. Moreover, the ducal palace incorporated an elaborate water-distribution system, which may have produced even higher humidity levels. Much of the damage to the studiolo had been caused by insect infestation. The support boards of the intarsia wall opposite the entrance, for example, had suffered from a combination of wood-destroying insects. Most of the woodworm infestation occurred in Gubbio, while termites apparently damaged the panels in Rome. The worm-eaten areas had been filled during the nineteenth and twentieth centuries with what we call "stucco," a plasterlike material mixed with protein glue to reinforce the damaged panels. The stucco fills applied during the Loewi restoration had become very hygroscopic, and they had softened and expanded, pushing the matrix sections out of alignment. The local elevated moisture levels inside the panel needed to be reduced to an acceptable range to minimize the risk of further deterioration.

X-radiography revealed a large amount of damage, and it was decided to replace one of the middle support boards and remove the moist plaster (fig. 23). The damaged board, which had been detached once before, was carefully lifted from the matrix elements after the remaining hand-wrought nails had been straightened. Since the wood was too deteriorated to be restored, a new board was fabricated from cottonwood, the closest American species to Italian poplar (fig. 25). For greater stability, the two planks were butt-joined to the required width of the old board. They were shaped at the front to meet the irregularities at the back of the matrix sections, thus ensuring a level front surface on the intarsia side of the panel.

The original construction of the intarsia panels employed a system of handwrought nails placed at regular intervals to attach the matrix sections to the backboards. This method incorporated a certain flexibility that allowed for expansion and contraction of all wooden elements without causing major splits or warps in the intarsia. For the new board, we used an elaborate attachment system, which approximated as much as possible the original forces of the fifteenth-century nailing scheme. Since the few remaining old handwrought nails, which protruded from the backs of the matrix sections, had become too brittle to be bent over again, they were kept straight and die-cut with a machine thread on the lower parts of their shanks



Figs. 26–28. Above: Varied wooden test pieces, drawings, and a three-dimensional mock-up (not shown) were used to determine the proper amount of light and shade necessary to integrate the book page with the surrounding intarsia of the armillary-sphere panel. Top right: Upper section of panel after treatment. Bottom right: The original book page was probably inlaid with simulated text. Imaginary lettering on a piece of Mylar helped us to understand the curve and flow of the page.

(fig. 24). In this way the old nails and their original pulling forces could be reused by securing the board with washers and nuts.

In areas where the nails had been removed during previous restorations, a different solution was devised. Small round wooden plugs were glued to the matrix sections with their grain directions matching. Since they were to be used to screw through to the backboard, the plugs received a plastic or brass collar to prevent splitting. This system proved to be an adequate alternative to the old nailing scheme. The new board could be easily attached to provide the necessary structural support. New battens were shaped to the irregularities of the backboards and

were fixed with screws. The battens were used, in turn, to mount the panels to the installation structure.

The surfaces of all the panels were cleaned and received a very thin coat of retouching varnish to saturate the wood tones. This layer also acted as a barrier during the consolidation of the intarsia. Numerous loose and lifting intarsia sections were reglued with dilute, traditional protein glue. Many exit holes and woodworm tunnels were filled with a gessolike material and retouched to match the surrounding wood color. This treatment concealed disturbing damage and helped to achieve an even, balanced image. Further treatment was given to those intarsia sections that had been restored and were properly fitting but discolored.

The shapes of these restorations were kept, but the wood tone was adjusted with a thin layer of paint to match the original aged intarsia.

As stated earlier, our goal was to restore the fifteenth-century character of the Gubbio studiolo, at least as much as realistically could be achieved. We decided to replace those repairs that compromised the fifteenth-century intention, but only if we could determine the original design. In the case of the book page illustrated in figure 20, the nineteenth-century restorers had ignored the curved matrix, producing discord in the original inlay. We therefore decided that the repair should be superseded by a more sympathetic restoration. Sketches and wooden test pieces were made to determine the proper amount of light and shadow on the top side of the page. Light tests on a three-dimensional mock-up model were compared to the “light setting” in the panels. The new book page was made of three pieces of walnut laminated to simulate shadows on the top edge and near the spine of the book. Careful wood selection integrated the repair with the color and texture of the surrounding wood. Both shadows created a certain volume to suggest the natural flow of the pages against the side of the cabinet (figs. 26–28). We speculated that the page may have displayed an actual text or an abstract representation of text. Figure 28 demonstrates that with an added abstract text—which was often found in fifteenth-century intarsia panels—the complete image falls into place. Although it was impossible to accurately reconstruct the book page with text (such a text would have been purely conjectural), the new wood section restores coherence to the panel.

Some of the toppo intarsia of the Gubbio studiolo was missing or had been damaged. The designs were composed of hundreds, perhaps thousands of pieces, meticulously cut across the grain into squares, rectangles, trapezoids, and triangles about five centimeters long and a few millimeters wide. The restoration techniques we employed were quite similar to fifteenth-century woodworking methods. Planes and jigs were used to shape each individual piece of wood. This was a very precise operation, as cutting the slightest uneven shape or applying glue unevenly would have jeopardized the alignment of all the other pieces. Our restoration woods were close to those used in the fifteenth century. Some sections were restored to match acceptable nineteenth-century repairs using maple, rosewood, and walnut. After the small bits of wood had been shaped, they were glued together with traditional protein glue, to create a “loaf,” or block, of toppo. A loaf made in

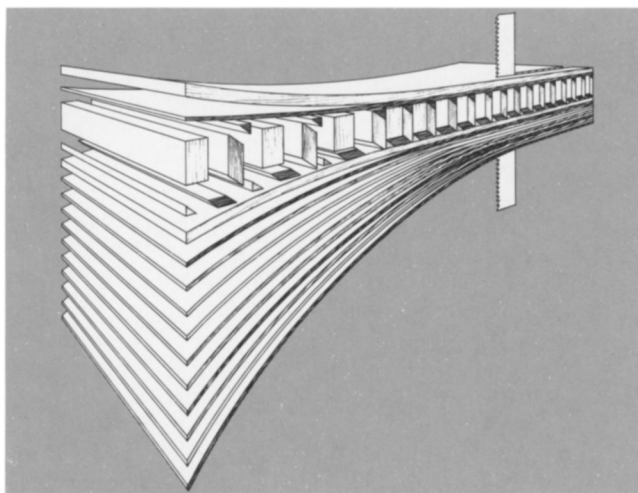


Fig. 29. Schematic of block of toppo intarsia showing the design used to complete missing part of the letter frieze.



Fig. 30. Sawing a block of toppo intarsia into slices approximately $\frac{1}{8}$ inch thick



Fig. 31. A block of toppo intarsia about two inches thick and one foot long can produce about twelve feet of the same design.

the fifteenth century would have measured approximately 25 centimeters long and about 5 centimeters deep. The height of the loaf depended upon the design, and the various toppo



Fig. 32. Small ceiling of the window niche before conservation. Clearly visible are the numerous areas with damaged and flaking pigment and the heavy-handed, discolored 19th-century restoration paint.

sections that we reproduced were 1 centimeter, 1.5 centimeters, and 4.5 centimeters high. The block of toppo was then cut to the thickness of the inlay. One loaf provided from 10 to 12 slices, about 4 meters of the same design (figs. 29–31). The toppo of the frieze with the Latin inscription was particularly complicated (see fig. 7). Originally, its basic design had been enhanced by inlay after the slices had been cut, and this additional inlay created such details as the lotus-leaf, egg-and-dart, and rope patterns. Our restoration followed the same design, but the last details were added by stencil rather than in inlay.

The small coffered ceiling over the window niche had a badly damaged paint surface and had been extensively restored in the nineteenth century (fig. 32). The ceiling was originally assembled from small sections of poplar in brick-

like fashion, incorporating hundreds of handwrought nails (see fig. 15). The flexibility inherent in this method contributed to the preservation of the ceiling structure. Although weather may have played a role in the amount of deterioration of the paint layer, it seemed that human intervention had been responsible for most of the damage. X-radiography revealed only small, fragmentary sections of the fifteenth-century paint scheme under the nineteenth-century layer. The loss was extreme compared to that of the main ceiling and cornice, where, despite many restorations, much of the original paint was still extant. As with the other polychrome elements in the studiolo, much, if not all, of the restoration paint was flaking. We therefore decided that, after consolidation of the original paint fragments, all overpainting was to be removed.

The X-radiographs proved an excellent guide in locating original and restoration paints because of differences in the densities of the fifteenth- and nineteenth-century materials. Since both layers were water soluble, the removal of the overpainting was tedious work, and most of it had to be done under a microscope. During this process, it became clear that the nineteenth-century restorers had used some kind of burning apparatus when they removed the fifteenth-century paint layer, as was indicated by numerous scorch marks on the bare wood. This practice of rigorous “cleaning” of the substrate was perhaps common among house painters of that time. Both sides of the window-niche ceiling adjacent to the intarsia panels had been either restored or expanded with fir. It is not clear when or why these fir pieces were added, however, but the ceiling in its current configuration fits precisely in the niche at a height of approximately 3.6 meters. Once the overpainting had been removed, all exposed wood received a coat of protein-glue sizing. This sizing was necessary to increase adhesion between the wood surface and gesso layers. The ground was built up to the level of the remaining paint fragments in three to four gesso layers, which, in turn, were smoothed to form the base for the reconstruction paint. The areas to be gilded received an extra layer of red clay, or bole, on top of which the gold leaf was laid. The reconstruction painting was carried out with traditional and synthetic pigments in a modern binding medium. The pattern was copied from the existing original fragments of both ceilings.

The frieze with the Latin inscription was evidently damaged soon after its installation in the Gubbio palace. A late sixteenth-century transcription in the *Codice Gabrielli*, published in 1987 by Piero Luigi Menichetti, a local historian in Gubbio, records an incomplete Latin phrase. We have also learned from this transcription that the text had apparently been executed in common fifteenth-century Latin, similar to that in the studiolo at Urbino. The Gubbio inscription, however, was brought up to proper classical Latin sometime before the studiolo was removed from the ducal palace, and we have been able to establish from published documents and physical evidence that it was restored each time the studiolo changed hands. Since the Gabrielli transcription was the one closest in time to when the studiolo was built, we used it as a guide in restoring the Latin phrase.

Wood-species identification and pigment analyses combined with the assessment of the quality of the individually carved letters proved that the original letters were poplar and that the restorations had been executed in

poplar, walnut, and lime. Because of the many previous restorations and the presence of marks made by a machine planer, none of the back supports of the letters was believed to be original. In addition, all of the supports displayed



Fig. 33. Center section of the small ceiling during conservation. Fragments of original paint on the left octagon have been uncovered using the X-radiograph as guide (see p. 43). The bricklike construction is visible in areas where some of the surface panels have been removed.



Fig. 34. Same section of small ceiling as in fig. 33 after conservation. The values of the colors have been balanced between the original paint fragments and the tonality of the main ceiling.



Fig. 35. Final retouching in the conservation studio of the two sections of the main ceiling



Figs. 36–38. Top: Section of the letter frieze from the entrance wall before conservation. Left: After letters were removed from their backboards, they were labeled and carefully layed out to ensure proper spacing of the text. Above: POENITET (“Repents”) during treatment. Original letters were restored and missing fragments replaced. Poorly carved 19th-century letters were replaced with ones (light wood) modeled after original examples.

considerable flaking of the background paint layer. In order to undertake the extensive repairs of the text, the letters needed to be removed from their supports, but not before any remaining original gilding was consolidated. The letters were then carefully labeled to identify their place in each word. Missing letters were carved in cottonwood, reproducing the style of the fifteenth-century examples. Broken letters or ones with small losses were restored (fig. 38). Previously replaced letters were reused where possible, depending upon how well they matched the quality of the original ones. Subsequent to the restoration of the letters, the complete text was laid out on the new back supports to ensure proper spacing. A point was added between each word, following examples in our studiolo and of the Latin texts in the Urbino studiolo and courtyard. Because of the new spacing, some words con-

tinued around corners, but this configuration seemed in keeping with fifteenth-century practice, as can be seen in the Urbino studiolo. After they had been glued to their supports, the letters were no longer fragile and could be further treated. They were cleaned and all overpainting and regilding were removed. As we observed on the small ceiling, the nineteenth-century restorers had also used burning devices to remove the fifteenth-century gilding from the letters. Both the supports and letters received a coat of sizing and two layers of gesso, except in those areas where there were original fragments. The gesso provided the ground for the bole and gilding of the letters and for the blue background paint, which was mixed to match aged azurite (fig. 39). After the light patination of the gold, the sections with the text were mounted from the back to the frieze with the toppo decoration. The complete frieze was attached by metal brackets to the installation structure.

Even after our extensive conservation work, the studiolo’s intarsia panels and ceiling remained delicate. Therefore for its reinstallation a special metal framework was engineered, upon which each element could be separately mounted. Based on the results of our research, we were able to accurately position both ceilings and the two *finestre strombate*, or coned windows, which had been left out of the old Museum installation (see p. 33). The plaster walls between the ceiling and intarsia panels imitate fifteenth-century *intonaco*, fragments of which remain in the



Fig. 39. Section of the entrance-wall frieze, with added punctuation points, after treatment

studiolo's fifteenth-century shell. However, this plaster would have been concealed by the Liberal Arts paintings. The new walls are slightly recessed and hung in such a way that no pressure is exerted on any of the studiolo's components (fig. 40). The ceiling is suspended from two steel beams running parallel to the long walls, and a combination of nineteenth-century and new crossbeams has been used. Simulating the old fastening system, the carved cornice is mounted to the framework with small metal strips, which in the fifteenth century were fixed in the stone wall to carry the cornice. The intarsia wall panels are attached with special brackets, which can be shifted in any direction to allow precise alignment. The studiolo has its own, separately operated climate-control equipment to maintain proper temperature and humidity levels.

The simple but elegant design of the terracotta floor tiles and their arrangement are copied from the original floor still in situ. The *pietra serena* door surround, too, has been copied from the fifteenth-century surround still in situ.

The problem of the Mammola–Rizzo expansion of the ceiling and the addition of a panel and two pilasters needed to be resolved before installation. Since our aim had always been to restore the studiolo as much as possible to its fifteenth-century character, these nineteenth-century intarsia components were not used. However, when the expanded ceiling (approximately fourteen centimeters had been added on its long side) was carefully measured, we found that its current size almost precisely matched the floor plan. One probable explanation, which seems to contradict the drawings that accompanied Laspeyres's publications, is that the ceiling had not been expanded, as we had thought, but was restored on this side. It is also plausible that one or both of the two long cornice sections pro-

truded farther from the walls during the fifteenth century than they do today, which would have caused the ceiling to be slightly narrower.

At some point—we are not exactly certain when—the entrance had been widened, and the swing of the doors was changed to open outward. We adjusted the width by removing approximately five centimeters of a previously added fifteen centimeters, following the measurements taken from the original *pietra serena* doorway. The doors, which in the old Museum installation also opened outward, were rehung and now swing inward as they did in the fifteenth century.

The height of the small window-niche ceiling in the 1941 Museum installation was too low, and we raised it by approximately one meter to 3.6 meters, based upon new evidence gathered from examination of the studiolo's orig-



Fig. 40. Each element of the studiolo is separately mounted on an adjustable metal framework.



Fig. 41. Detail of a 1938 photograph of one of two missing panels originally mounted below the window. The Order of the Garter with an eagle in its center is depicted in the dado. On the bench is a drawing device with a cord and wooden "butterfly" possibly used for projecting perspective.

inal stone shell. At the same time another error was corrected: the lettered frieze, which had only partly entered the window niche, was made a complete unit with the additions described earlier (opposite).

Our work on the Gubbio studiolo provoked our imaginations, presented us with many surprises, and continuously challenged our judgment and skills. We have been tremendously rewarded by seeing this room regain some of its former glory, as the studiolo is indeed an extraordinary masterpiece created by men "exalted in learning and genius" of the Italian Renaissance.

RAGGIO NOTES

Quotations are from the following sources: Vespasiano da Bisticci, *The Vespasiano Memoirs: Lives of Illustrious Men of the XVth Century*, trans. by W. George and E. Waters, New York, 1926, pp. 100, 101. Virgil, *The Aeneid*, trans. by R. Fitzgerald, New York, 1990, p. 310 (vv. 650–53).

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premises accessible and extend as much help as needed for our study and reinstallation of the studiolo.

For the documents concerning the history of the paneling, I should like to acknowledge the courtesies I received from Dr. Piero Luigi Menichetti in Gubbio and Prince Pietro Lancellotti and Prince Paolo Emilio Massimo Lancellotti in Rome. My thanks go also to Mrs. William J. Robertson, in Los Angeles, who kindly reviewed for us the archives of her father, Adolph Loewi, and to Professor Gino Corti for helping me to read fifteenth-century manuscript sources from the State Archives in Florence and from the Vatican Library.

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Opposite: Window niche of the studiolo in the new installation. The small ceiling has been brought up to its proper height, and the letter frieze now enters the niche as a complete unit (compare fig. 1, p. 36).



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WILMERING NOTES

XRD, or X-ray diffraction, is a technique by which the spacings between the atoms of small crystalline samples are diffracted and recorded on X-ray sensitive film. It leaves a very specific pattern on the film, unique for each crystalline structure, which is used for identification. EDS, or energy-dispersive spectrometry, is used in the SEM, or scanning electron microscope. Scanning electron microscopy can be used in addition to regular light microscopy and allows for powerful magnification up to 200,000 x. It is very useful in examining tiny particles in small samples, because of its tremendous magnification ability. EDS analyses can identify the elements of which these tiny particles are composed by measuring their X-ray fluorescence.

The transcription of the Latin inscription in the *Codice Gabrielli* appears in Piero Luigi Menichetti’s *Storia di Gubbio*, 2 vols., Città di Castello (Perugia), 1987, vol. 1, p. 487. I am indebted to John Marincola, associate professor, Union College, Schenectady, New York, for his research, translation, and advice about the missing section from the Gabrielli transcription.

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PHOTO SOURCES

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Drawings by Daniel Kershaw.



