

THE ROUTLEDGE
COMPANION TO
SCENOGRAPHY

Edited by Arnold Aronson

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Pictorial and illusionistic design

The true stage-illusion . . . consists – not in the mind's judging it to be a forest, but, in its remission of the judgment that it is not a forest.

(Samuel Taylor Coleridge, *Progress of the Drama* [1818])

The invention of mathematically precise perspective painting is generally attributed to Filippo Brunelleschi and Leon Battista Alberti. In his 1436 treatise, *Della Pittura* (On Painting), Alberti described his process. "First of all, on the surface on which I am going to paint, I draw a rectangle of whatever size I want, which I regard as an open window through which the subject painted is seen" (Alberti 1991: 54). The image of the open window, of course, has become a classic metaphor for pictorial realism in all the arts. Not only does it propose a separation of viewer on one side and subject on the other, but it establishes the notion of the frame through which the subject is seen. The development of perspective painting, and the concomitant development of the frame, was quickly adopted in the Renaissance and Baroque theatre of Europe to create pictorial illusionistic scenery.

The illusion created in the Baroque era was often for the fantastic worlds of allegorical intermezzi, so it was not "real" in the sense of recreating an experiential reality. But it employed perspective technique to create a realistic sense of distance and scale to whatever was depicted – whether phantasmagorical landscapes or urban streets. Though the specific content and style changed over the next centuries, pictorial illusionism continued to be a major scenographic strategy of much Western theatre and opera well into the twentieth century. The flickering light of candles and oil lamps aided the illusionistic project, but the increasing brightness of gas led to highly talented scene painters whose technical skill could fool the eye of spectators beyond the footlights. Particularly through the seventeenth and eighteenth centuries, the perspective vistas painted on parallel rows of flats, often set in grooves on raked stage floors, meant that actors could not enter into the scenic stage. Actors were relegated to the apron stage in front of the proscenium, with scenery trapped upstage. Although the scenic stage had physical depth, the use of forced perspective excluded the presence of the actor, and scenery thus functioned analogously

to projected scenery of later eras – an image that provided semiotic information to the audience, but remained inaccessible to the performer. In other words, an illusion.

One way of understanding the history of Western theatre from the seventeenth through nineteenth centuries is to observe the changes to lighting technology coupled with the increased use of three-dimensional scenery, along with a shrinking forestage, so that ultimately the actor moved behind the proscenium and into a three-dimensional – if still illusionistic – environment. As the actor moved into the scenic space, the relationship of costume to the physical environment became ever-more significant. Actors could no longer incongruously wear the latest fashions regardless of the ostensible time and place of the play. The identification of the actor with the character, and the character with the locale, mandated historically accurate costumes as well as sets.

One aspect of pictorial illusion that is applicable to painting and stage alike is the implication that the world seen within the frame continues beyond the frame. As Rudolph Arnheim explained in relation to painting, the world inside the frame “came to be conceived of as boundless – not only in depth, but also laterally – so that the edges of the picture designated the end of the composition, but not the end of represented space” (Arnheim 1974: 239). This applies equally well to the image within the proscenium.

The naturalist movement, spearheaded by Émile Zola, believed that the theatre should address the ills of society and that in order to do so the stage needed to depict an absolutely accurate – a scientific or clinical – rendering of the external world. Thus, it became the ultimate illusionism. But the invention of photography in 1839, and film at the end of the century, created new ways of capturing reality (or at least convincing an audience that it was observing reality) that rendered the techniques of the stage seemingly quaint and inadequate. Declaring that truth lay within the soul of the individual and could not be depicted through superficial means, the Symbolists in the 1880s and 1890s called for the “detheatricalization” of the theatre, by which they meant a rejection of the detailed clutter of the naturalist stage. In the late twentieth and early twenty-first centuries, naturalist illusion, particularly in the depiction of domestic interiors, sometimes re-emerged as a scenographic trope – naturalism in quotes, as it were. Audiences often greeted the revelation of such decor with applause, taking delight in the theatricality of illusionism. It also resurfaced in the highly detailed scenographic environments of much immersive theatre. In an event such as *Sleep No More*, spectators move through fully constructed rooms which are, in essence, Baudrillard-like simulacra: every element within each room is “real,” and yet the room is a carefully constructed theatrical space.

In the same essay quoted in the epigraph, Coleridge describes his young son seeing an engraving of a storm at sea. As Coleridge relates,

He instantly started, stood silent and motionless, with the strongest expression, first of wonder and then of grief in his eyes and countenance, and at length said, ‘And where is the ship? But that is sunk, and the men are all drowned!’ still keeping his eyes fixed on the print.

(In Clark 1965: 412–13)

Coleridge then concludes, “What pictures are to little children, stage illusion is to men, provided that they retain any part of the child’s sensibility.” Despite centuries of technological change and the welter of “isms” of the modernist movement, there

is still a child-like delight and emotional appeal to what Coleridge called “the willing suspension of disbelief.”

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SCENOGRAPHY IN THE FIRST DECADES OF OPERA¹

Evan Baker

Stage design as an independent component of operatic production began in the first decades of the seventeenth century. The festivals of the preceding era in the great towns of Florence and Rome as well as in smaller towns presented splendid opportunities for great artists – particularly Bernardo Buontalenti and the father/son team of Alfonso and Giulio Parigi – to create designs for grand spectacles of horse ballets, naval battles, celestial scenes, appearances of deities, and especially devils and demons, many set to voice and music as precursors to opera.

Even a lesser ruler of a province to the north was inspired to create his own grand theatre. In 1618 Ranuccio I Farnese of Parma was ready to present his own spectacles for the visit of the Medici prince Cosimo and commissioned Giovanni Battista Aleotti to create a new theatre. Aleotti designed a huge space, the Teatro Farnese, which is of seminal importance to opera and theatre history.²

Situated above the ground on the second floor of the Palazzo della Pilotta, the large theatre measures over 285 feet in length and is 105 feet in width. The auditorium, shaped in the form of an elongated U, is capable of seating over 4,000 spectators.³ One architectural plan of the theatre reveals a clear delineation of an orchestra “pit,” one of the earliest of its kind, albeit placed at the same level as the auditorium floor. The stage measures 140 feet deep with the proscenium opening 39 feet wide.⁴ Pumps brought in water from nearby wells to flood the auditorium floor for sea battles. The stage space included flying machines, traps, and other complicated machinery. Unfortunately, Cosimo’s illness forced the cancellation of the events, scheduled for 1619, and the theatre remained unused for 10 years.

More successful was Ranuccio’s heir, Odoardo, who in 1628 celebrated his marriage to Margherita of the Medici family with splendid festivals of his own. Among the entertainments was a play with *intermedi*, performed in the smaller court theatre near the Palazzo, while the primary event, a tournament entitled *Mercurio e Marte* (“Mercury and Mars”) was staged in the Teatro Farnese on 21 December 1628.⁵ Its realization required five orchestras: one in the pit, one each above the two side entrances before the pit, and two hidden behind the proscenium. Heavens and hell, deities of all kinds, and exotic animals appeared throughout the huge spectacle. Cities materialized and disappeared and, on command, water flooded the auditorium floor, providing the locale for

sea battles (Nagler 1964: 153–61). One witness nervously reported, “I was afraid to sit in such a large hall overloaded with thousands of spectators and many machines. Moreover, the [floor of the] same hall later had to sustain the weight of the water which rose to a height of more than [twelve inches]” (ibid.: 159).

Aleotti’s achievements with his design of the stage and its machinery in the Teatro Farnese proved fundamental to the development of operatic staging and theatre technology. His innovations included permanently separating the stage space from the audience using the proscenium arch. In addition to functioning as decoration, with a dedication to the Farnese family above its family crescent, the arch also masked the elaborate machinery above the stage.⁶ The notion of hiding all technical apparatus, however, did not take hold until the end of the nineteenth century.

Equally significant was Aleotti’s invention for moving stage sets by means of rolling wagons or wing chariots (*carozze*), situated on tracks beneath the stage (Figure 25.1). Upon the chariots were mounted frames extending through slots in the floor. Stagehands affixed the painted flats to these frames, set on the same line in the left and right sides of the stage, and rolled the contraption in and out of view of the audience. Although the mechanism for propelling the wagons would be refined in the following decades, this cardinal method of changing scenery remained constant for over 250 years.

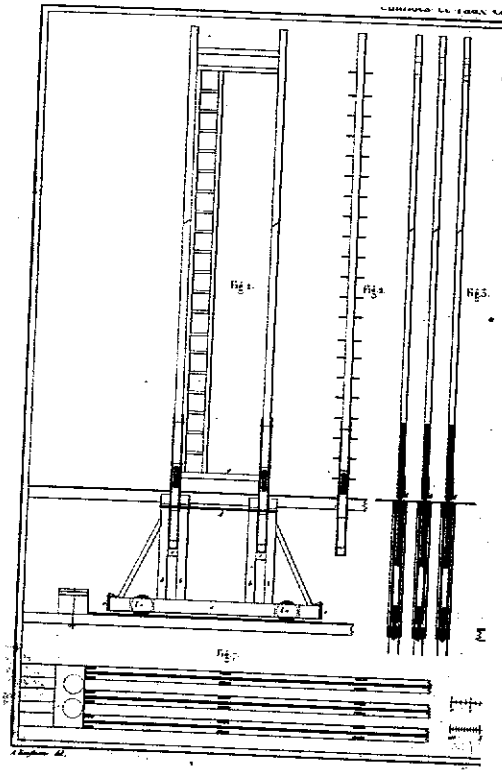


Figure 25.1 Chariot. A wood frame was inserted through a slot in the floor into a wagon beneath the stage and affixed to a single-rail rolling carriage. Detail from Giulio Ferrario, *Storia e descrizione de' principali teatri antichi e moderni corredata di tavole col saggio sull'architettura teatrale*. “Tavola B.” Milan, 1830. (Collection of the author.)

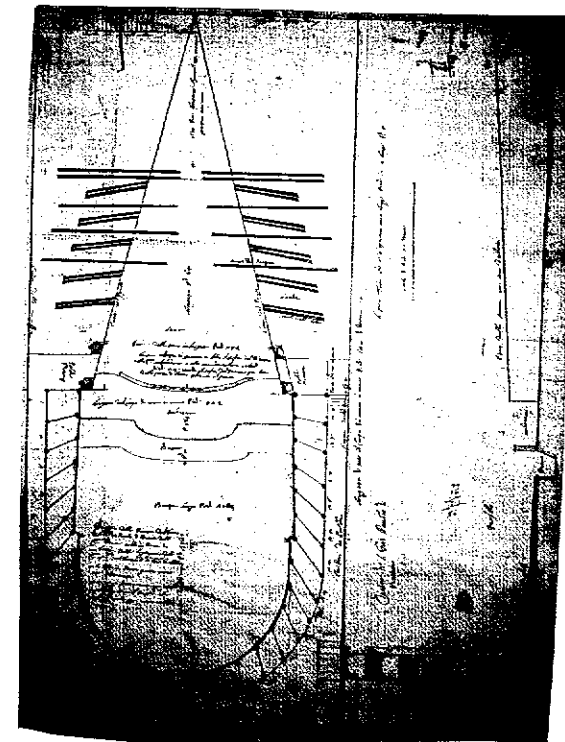


Figure 25.2 Plan (after 1692) of Teatro SS. Giovanni e Paolo, the earliest surviving architectural document of a Venetian public theatre. (Sir John Soane’s Museum [London], SM Vol. 117/34.)

When in 1637 the curtain opened to reveal the sea scene to the spectators attending the first performance of Francesco Manelli’s *Andromeda* at the Teatro San Cassiano in Venice – the first public opera house to charge an entry fee – the spectacle evoked gasps of wonder. Memoirs described “marvelous transformation scenes, the crowded stage, the ingenious mechanism, the flying figures, the scenery representing the heavens, Olympus, the ocean, royal palaces, forests, groves, and innumerable other enchanting spectacles” (Molmenti 1908: 158). The final scene of the opera paid homage to Venice with pictorial representations of the city-state.

Few documents detail the early workings of the San Cassiano theatre; the earliest eyewitness accounts date only from the 1680s. Thus the architectural layout – including the number of galleries, boxes, seating capacity, and the size of the stage – remains a mystery. Judging from earlier theatrical structures like those in Padua, Ferrara, Mantua, and Bologna, however, it is reasonable to assume that the auditorium took a U-shaped form (Figure 25.2). At least five galleries of boxes complemented the theatre with its total capacity of perhaps 900 seats. The parquet had a number of benches, with space for standing room at the rear (Mancini *et al.* 1988: 97). The only account of the theatre’s first production, *Andromeda*, comes from Benedetto Ferrari’s foreword to the libretto published two months after the premiere in 1637.⁷ That description has been confirmed by one of the first published histories of Venetian opera, Cristoforo Ivanovich’s *Memorie Teatrali di Venezia* (1687).

After the reconstruction of the San Cassiano, it is likely that the backstage areas were equipped with the newest machinery necessary to produce the marvelous changes of scenery outlined in the *Andromeda* libretto.⁸ This stage spectacle attracted audiences of not only aristocrats and members of the diplomatic community, but also of wealthy bourgeoisie, including the merchants. Indeed, anyone who could afford the price of a ticket now had the opportunity to witness the scenic marvels. The influence of the paying public has governed the business of public opera ever since.

In the portion of the libretto for *Andromeda* addressed to the reader, the production's description is laced with superlatives for the settings and costumes. Management spared no expense. All five of the opera's scenes took place on an "imaginary shore of Ethiopia" (scenario in Worsthorne 1968: 25–7). The view of a seascape with stars in the heavens filled the audience with amazement. Above the stage a cloud machine revealed Aurora circling, followed by the entrance of Juno in "a golden cart drawn by two peacocks." The cart could move and turn to the right or left sides of the stage, "to the wondering delight of the spectators." At the end of the prologue, Mercury "flew" across the stage by means of a flying apparatus.

As would remain typical for many decades, the change of setting from the prologue to the first act was performed in full view of the audience (*a vista*): "In an instant, one saw the scene change from a seascape to a wood so natural that it carried our eyes to real snowy heights, real flowering countryside, a regal spreading wood and unfeigned melting of water" (ibid.). After scenes with Andromeda and nymphs, the setting changed to the seashore for the appearance of Neptune, probably from below stage. He emerged "on a great silver shell drawn by four sea horses. A sky blue cloak covered him: a large beard descended down to his breast and a long shock of hair garlanded with seaweed hung down to his shoulders. His crown was made as a pyramid tossed with pearls."⁹ Prometheus appeared "from the bosom of the sea . . . Astrea appeared in the sky, and Venus in the sea; one in a silver cloud and the other in her seashell drawn by swans" (ibid.).

The second act changed into another woodland. After a highly praised dance by Andromeda and her retinue, "suddenly, from below [as if from the underworld] arose the magician Astarco as a ghost. This character was clad entirely in a long, gold coat with long hair and beard white as snow. He held in his right hand a sorcerer's scepter." Suddenly the sky opened up, and in a burst of light, "one saw sitting on a majestic throne Jove and Juno."

At the beginning of the third act with the representation of a seashore, a magnificent machine appeared from one side of the scene with Astrea and Venus upon it. It turned to the right and left as these goddesses most pleased. Opposite them Mercury came out and, as the sky opened, sat in the middle. This little scene had a most wonderful effect for the quantity of machines and for the successive arrangements of silent characters and movement [on the stage]. In a flash, the sea scene became a superb palace. It was a beautiful sight to see a well laid out and constructed building suddenly born out of rough stone and coarse sand. This represented the royal palace of Andromeda . . . ; suddenly the palace disappeared, and we saw the scene entirely consisting of the sea with Andromeda bound to a rock. The sea monster came out. This animal was made with such beautiful cunning that, although not real, he put people in terror. Except for the act of tearing to pieces and devouring he did everything as if alive

and breathing. From the sky Perseus arrived on Pegasus, and with three blows of a lance and five with a rapier, he overthrew the monster and killed it . . . The sky opened and one saw Jove and Juno in glory and other divinities. This great machine descended to the ground to the accompaniment of a concerto of voices and instruments truly from paradise. The two heroes, joined to each other, were raised to heaven. Here the royal and ever worthy occasion had an end.

(Worsthorne 1968: 26–7)

Such was the spectacle of the first production of an opera for a paying public. More than nine significant theatres opened and closed up to the end of the eighteenth century, in which more than 200 operas received their premieres (see Baker 2013: 10, note 7).

Until the final decades of the seventeenth century, productions in Venetian theatres did not place importance on stage design as a genuine element of the opera, relying instead on the music for inspiration. The surviving illustrations found in many frontispieces and title pages of Venetian librettos demonstrate that most early designers trained chiefly as architects and engineers. Technical elements, such as the development of machinery to effect the changes of décors, received much of the attention: machine-driven devices of gods descending from the heavens, demons appearing from hell (that is, from below the stage through traps), and oceans transforming into woodlands. What is interesting is how simply, by today's standards, these effects were created.

At the same time as public opera made its debut in 1637, a fundamental treatise appeared: *Pratica di Fabricar Scene e Macchine ne' Teatri*, or "The Practice of Building Scenery and Stage Machines for Theatres." Authored by Nicola Sabbattini (1574–1564), it imparted much practical information to theatre technicians and designers of the time, and it continues to be instructive today. A year later, a second volume together with a reprint of the first appeared in Ravenna, and this edition is the one best known today.¹⁰ *Pratica* detailed the design elements from the perspective of standing "behind the scenes." Sabbattini did not invent any of the effects or machines described; in fact, many of the machines had been around for decades, and some were outdated. Nonetheless, the treatise's value lies not in theories but in Sabbattini's clear, precise descriptions of the machines and scenic effects. Because of its simplicity, this book served as a guide for theatre practitioners throughout seventeenth-century Europe.

Book I of Sabbattini's treatise describes more than 40 items, chiefly involved in theatre construction, seating arrangements for the audience, construction and painting of scenery, and lighting in the auditorium. The most striking effects are described in Book II. Fifty-seven chapters discuss theatrical machinery, including dimming stage lights, using traps, special effects such as hellfire and water fountains, and raising the front drop at the beginning of the performance – all fundamental components of many productions of the period. Many effects described by Sabbattini are similar to those used today.

Book II discusses several methods of using the traps to allow people to enter the stage. Each chapter describes moving a segment of the stage floor attached to a downward swinging hinge. One suggests placing dancers in front of the trap to cover the appearance of the performer. Another outlines a method for quick entrances by having the person stand on a lever that, at the appropriate moment, is quickly raised after which the trap is closed. Sabbattini strongly recommended using "persons experienced in this business and trustworthy, so that movements go smoothly" (Hewitt 1958: 121).

Dimming illumination cast by candles appeared simple. Merely lowering or raising cylinders of soldered tin over each candle by a system of cords operated by several

stagehands will dim or illuminate the stage (ibid.: 111–12). Truly impressive lighting effects, such as hellfire, required considerable ingenuity. Sabbattini describes a trap opened at the center of the stage, and men waiting below with specially prepared pots filled with ground resin. They place a torch in a sealed pot, with the flame above the seal. The top of the pot has numerous small holes, and when the pot is shaken the resin comes out, causing a burst of flame. Performed by several persons and within the right stage decorations, the hellfire can be quite effective. The author cautions that “great care” must be taken, “since very often mishaps result, and fools and thick-witted persons should not be allowed to participate” (ibid.: 126–7).

Four chapters of *Pratica* contain instructions for displaying the sea, in either a calm or a tempestuous state, a vital element of staging, particularly if Neptune appears in the opera. Stagehands stood on each side of a wide cloth, gripped cords running under it, raised and lowered the lines at different speeds that caused the cloth to billow and thus created the illusion of a rolling sea. Another method involved several painted cylinders resembling waves across the width of the stage. A scale model of a ship rolled across the stage between the waves while stagehands cranked the cylinders at varying speeds. If the ship is to travel through a tempest, the model is set on a curved rail. When pulled by a rope, the ship bobs up and down, as if rocked about in a storm (ibid.: 130–43).

In Sabbattini’s day, gods and goddesses descended from the heavens in machines commonly known as *gloires*. These devices took the shape of a sun, a moon, or, most frequently, a cloud that could expand in size. Performers could appear either standing or seated. Theatre technicians perfected several methods for making the clouds grow as the machine descended from the heavens. In Chapter 46, Sabbattini recommends constructing an “elevator post” with a winch behind the backdrop. A beam, parallel to the stage floor with a small platform on which the performer could stand or sit, could then be lowered from above as if the gods were descending from the heavens, or raised from the underworld below the stage. Another method used a counterweighted pivoting crane with its neck also protruding through the backdrop. Painted cloth attached to a series of ribs expanded at the pull of the line by an operator below, using the same principle as that of a hand fan unfolding. In every effect he described, Sabbattini emphasized concealing the machinery to prevent spoiling the theatrical illusion (ibid.: 146–70).

In 1640 stage machinery for changing settings in the wings and borders was clumsy to operate and required a large work force. Shifting scenery – then and now – is not easy. The labor is physically demanding and frequently dangerous. Large and tall flats required at least two stagehands to move and affix them to the wing chariots.¹¹ Borders – wide strips of canvas that traversed between the wings above the stage and hid the upper spaces from view of the public – were hoisted up into place by several rope lines pulled by stagehands through pulleys mounted on wood crossbeams. Large canvas objects, tall flats, wide borders, or large drops, are very heavy, especially with the additional weight of the wood frames.

Hence it was a great step forward in operatic production when a stage machine was invented to allow a complete change of scenery in one smooth, flowing motion in full view of the audience. The opening of Venice’s Teatro Novissimo in 1641 with Giulio Strozzi’s musical setting of Francesco Saccati’s *La finta pazza* (“The feigned madwoman”) provided the opportunity to implement the new system.

The story of this opera revolves around the Greeks’ search for Achilles before he departs for the Trojan War. Amid the tumult of the search, the gods appear and utter

their support variously for the Greeks or the Trojans. Deidamia, in despair at the thought of the departure of her lover Achilles, feigns madness. After she is placed in chains, Achilles is touched and takes her hand in marriage. As the warriors (including Achilles) depart for Troy, a celestial chorus bears Deidamia’s chains up to the heavens.

La finta pazza was a phenomenon. The opera held 12 performances in 17 days – an extraordinary success. To satisfy public demand, two separate printings of the libretto followed. Descriptions of the production, accompanied by elaborate illustrations, showered praise on the marvels of rapid and effortless changes of scene at a level of sophistication not found in other theatres.¹² The libretto describes five distinct scenes in a prologue and three acts. The locales mandated rapid changes between a royal courtyard, a rich garden, a seaport, and a setting in hell, with the final scene being a royal garden.

What were these scenic “marvels,” and who created them? A copy of a sixteenth-century manuscript preserved in the archives of the Correr Museum in Venice offers a clue: “Giacomo Torelli of Fano invented the system of shifting scenery with winches, and was involved with the four famous theatres of Paris, Venice, Parma, and Fano.”¹³ Torelli (1608–1678) appears to have received his early training in the theatres of Ferrara and Pesaro where there was more theatrical activity than in his birthplace of Fano. By 1640, he was working in Venice, probably at first in the employ of the naval shipyards in the Arsenale. His talent with ropes, winches, pulleys, and rigging played a key role in his creations for the theatre.

Torelli’s newly installed machinery in the understage area of the new Teatro Novissimo allowed complete changes of scenery in one easy, continuous movement. Through an ingenious construction of rope lines and pulleys, clouds for gods transformed effortlessly into royal courtyards or woodland glades, thus amazing and astonishing the public. Several published writings detail Torelli’s productions, from which we can deduce the existence of the sophisticated stage machinery. Although no plans of the theatre exist, recent documents show it to have had four sets of wings. The auditorium probably had three galleries of boxes and seated about 500.¹⁴

Maiolino Bisaccioni’s *Il cannocchiale* is a 55-page booklet – issued after *La finta pazza* finished its run at the Novissimo – describing the production, the singers, and the public reactions.¹⁵ The title word “cannocchiale” is a pun on the Italian for “telescope” – the public looking closely at the specifics of theatrical production through a telescope from afar. This *Il cannocchiale* was both an examination of the magical elements of the production and publicity for Torelli, the technical team, and the performers, and it spread word of the marvels at the production at Teatro Novissimo.¹⁶

Torelli’s invention enabled a rapid transformation of scene with far less manpower. Below the stage, a series of rope lines were attached to the chariots, with their frames extending through parallel slots in the floor on both sides of the stage. The rope lines ran through a series of pulleys joined at a central winch. A single person cranking the winch could regulate the speed of the transformation from one scene into the next and pull the ropes attached to one set of chariots onto the stage while simultaneously pulling the other set of chariots into the wings and out of view. After the transformation, several stagehands immediately shifted flats off and placed different sets of flats onto the chariots. The mechanism was so simple that a “young boy of just fifteen years of age” can pull it into motion. It was hard to believe “that so many flats may be moved into their locations to vary a scene, all at the same time in one moment” (Bisaccioni 1987: 1032). Torelli was not so much a scenic designer as a master mechanical engineer; his invention fundamentally

changed the method of stage production for all genres of theatre everywhere. The visual aspects of operatic production became an integral part of the aesthetics of opera itself.

Il cannocchiale also showed that audiences delighted in the spectacle. Bisaccioni wrote of the “marvels” of the scenery changes, which repeatedly drew the public to the theatre. “[*La finta pazza*] closed, but the public’s desire to see [the opera] again never ended” and the theatre was so crowded that many “cursed their own laziness when they arrived and could not find a place to sit” (ibid.: 1052). The foreword to the libretto noted that 12 performances were required to satisfy the demands of the public and that it was necessary to reopen the Novissimo for several additional performances.

All we know of the production’s looks comes from prints of a later version in 1645, also staged by Torelli but in Paris at the behest of Cardinal Mazarin.¹⁷ These prints can only offer tantalizing clues to Torelli’s stage effects. Some of the imagery corresponds with the descriptions in the *Cannocchiale*, but for the Paris production important scenes were changed or cut. Views of Paris replaced all visual references to the Republic of Venice. The productions at the Teatro Novissimo were splendid but expensive, and the theatre lost money. Brilliant stagings continued, but after six years and only seven productions, the Novissimo closed its doors in 1646 and burned down soon after.

Still, these productions had great and lasting impact. Venetian opera had won acceptance by a public that hungered for even more vocal virtuosity and grand scenic presentations. Since Venice was the seat of a sovereign state and the site of many foreign embassies and businesses, the Venetian opera’s performance and production styles became known throughout Italy and the rest of Europe. Torelli’s achievements set a standard against which other operatic productions were measured, not only in Venice but elsewhere in Europe. Torelli himself became one of the first exports of Italian operatic productions. His successes in Venice and later in Paris earned him the sobriquet *Grand Sorcier* – the “Great Wizard.”

Although illustrations of the stage apparatus for the Teatro Novissimo have not survived, we can reconstruct the machinery based on the writings of Fabrizio Carini Motta (1627–1699), a theatre architect and scenographer at the court of the Duke of Mantua. In 1676 he published *Trattato sopra la Struttura de’ Teatri e Scene* (“Treatise on the Structures of Theatres and Scenes”), an important architectural monograph.¹⁸ It includes observations regarding sightlines, placement of the central perspective, the proscenium arch, and the stage area necessary to accommodate the machinery, wings, and drops.

Carini Motta prepared an even more significant document in 1688, *Costruzione de Teatri e Macchine Teatrali di Fabrizio Carini Motta Ingeg.º. Architetto del Ser.º. Duca di Mantua 1688* (“Construction of Theatres and Stage Machinery by Fabrizio Carini Motta, Engineer and Architect to His Most Serene Highness, Duke of Mantua”). The manuscript, however, remained unpublished until 1987, when it appeared in an English translation accompanied by facsimiles of the original illustrations.¹⁹ Carini Motta’s manual contains a series of drawings detailing theatrical machinery and dates from the latter part of the seventeenth century. The surviving manuscript, in a copyist’s hand from 1773, is based directly on Carini Motta’s work 85 years earlier. In 22 chapters, Carini Motta codifies Torelli’s mechanics of scene changing. He concentrates on the use of the slots traversing the width of the stage floor for freestanding objects, such as braziers, ships, or fountains. The spaces between the groups of slots were called *strade* (streets), or more commonly, wings. Carini Motta emphasizes maintaining enough space between the wings so that

the chariots carrying the [flats] will have sufficient space to move back and forth . . . without any concern that they will foul one another, as they often leap because of the change of speed, or because of the great force generated as they accelerate, causing them to rise out of plumb. When the circumstances prohibit sufficient space [for them] to travel smoothly, they jam into the chariots ahead causing great confusion and inconvenience.

(Larson in Carini Motta 1987: 70)

Borders, painted cloths hung above and between the wings that spanned the width of the stage, also figure in the manual. Not only did borders complete the scenic picture with skies, heavens, leafy branches, and ceilings, they also served to mask flies and machinery from public view.

The descriptions by Sabbattini and Carini Motta demonstrate that these scenic marvels were refinements of existing engineering techniques rather than innovations. Torelli previously utilized many existing pieces of theatre machinery to merge disparate scenic effects into one seamless whole. Hence, all ropes, pulleys, and wheels were incorporated into a theatrical machine that could be operated in many instances by a single person. Although theatres and their backstage spaces expanded as stage machinery evolved, the process of moving flats on and off stage, and of raising and lowering drops and borders in one single movement, remained constant for over 250 years.

One of the most dazzling theatrical productions outside of Italy took place in Vienna at the new Theater auf der Cortina on 12 and 14 July 1667 featuring Antonio Cesti’s *Il pomo d’oro* (“The golden apple”). For the wedding festivities of the Hapsburg Emperor, Leopold I, and Margaretha of Spain, which *Il pomo d’oro* was to celebrate, the architect Lodovico Burnacini (1636–1707) not only designed plans for a new theatre, but also

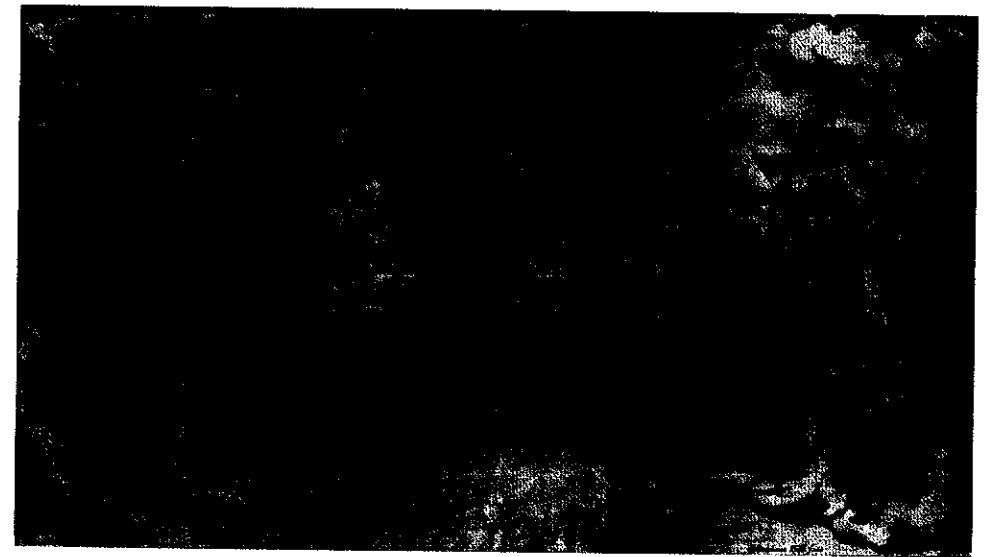


Figure 25.3 Ludovico Burnacini, *Il Pomo d’oro*, Act I, sc. 5: “Jupiter and His Court at Banquet . . . With Discord Floating in a Cloud above the Table” (1688). (Musiksammlung der Österreichischen Nationalbibliothek, Vienna.)

23 magnificent settings for the opera (Figure 25.3). Construction of the theatre, which was made entirely of wood, began early in 1666 in a space next to the royal palace now occupied by the Austrian National Library. Ensuing difficulties in building and financing the house forced the delay of the opera's premiere, originally planned for December 1666, until July 1667.

At the Theater auf der Cortina, a raised dais in the center in the first row of the auditorium provided the place of honor for the emperor and his family. The symbol of state, a huge double-headed eagle, topped off the elaborately decorated proscenium arch. Leopold's court sat on chairs behind the emperor's party, with the other officials in the three surrounding galleries. The auditorium's design meant that the emperor's seat in the first row center of the auditorium afforded the best view of the stage. Only members of the imperial court and visiting dignitaries attended performances; the public was not admitted.

The main acting area downstage, more than seven meters deep, was equipped with at least five sets of wings on wagons. The entire stage measured over an astounding 26 meters deep (Griffin 1972: 45). Machinery beneath the stage raised scenic pieces from below. The 14 meters of space from the stage floor to the ceiling allowed flying machines for the appearances of deities.

The story of *Pomo d'oro* revolves loosely around the legend of the judgment of Paris. At a banquet of the gods, the goddess Discord appears riding a dragon. From her perch she throws a golden apple, upon which is inscribed, "to the fairest." Harmony is shattered as Juno, Minerva, and Venus squabble for the honor. After elaborate scenes of betrayals, revenge, destruction, dragons, and hell, Leopold I, in the persona of Jupiter, restores calm by awarding the golden apple to the one he judges to be the noblest person on earth, that person whose wisdom will unite the virtues of love, honor, and beauty. In Burnacini's staging, the figure of Emperor Leopold appeared frequently as a godlike character on horseback at the center of the stage or descending as a *deus ex machina* from the heavens. Margaretha, Leopold's wife, embodied the figure of Wisdom. Burnacini exploited the large stage space and theatre machinery with elaborate scenery. The settings alternated between seven scenes of interiors and courtyards, with the remaining sixteen scenes using the deeper part of the stage for the perspective views of encampments, caverns, woodlands, seascapes, heavens, and hells.

Other operas for the Viennese court followed sporadically. Burnacini designed the productions of *Il fuoco eterno custodito delle vestale* performed on 23 October 1674, and *La monarchia latina trionfale* four years later on 10 October 1678. Most of the operas received only a single performance, leaving the theatre otherwise empty. When the Turks laid siege to Vienna in 1683, Leopold ordered the theatre razed to avoid any dangers of fire spreading to the royal residences.

Burnacini's designs for *Pomo d'oro* accompanied the publication of Francesco Sbarra's libretto, serving to publicize both the staging and the power and glory of Leopold I and the Austrian Empire. Twenty-three engravings depict the auditorium and scenes from the opera. In the foreword to the libretto, Sbarra regrets that the reader could not see either the original production or the magnificent theatre.²⁰ Nevertheless, the results of Burnacini's achievements were important for they sowed seeds that flourished a decade later in the creations of the Galli-Bibienas for their stage designs and plans of new theatres throughout Europe (see Sommer-Mathis *et al.* 2016).

By 1700 significant emphasis in the Italian opera libretto had shifted away from the dramatic action of the plot toward the visual aspects of opera production and staging.

Production practices at the time required that all changes of scenery be played in full view of the audience seated in a fully lit auditorium. While Torelli's invention for changing the scenes – ropes attached to wings, moved through a series of pulleys and powered by several men either working separately or rotating a single winch – continued to be refined, the mechanical principles remained the same. The paraphernalia of theatrical machinery remained visible to all until 1876, when Richard Wagner began the practice of lowering the curtain to mask all scenic transformations.

At the same time, librettists of Italian opera created increasingly convoluted plots demanding greater suspension of disbelief from the public. In late sixteenth and early seventeenth-century Italian operas gods intervened in human affairs constantly, providing a pretext for elaborate scenery changes and displays of theatrical machinery. Spectacle promoting elaborate musical settings became a *raison d'être* for staging new operas, at the expense of quality of the drama.

Numerous polemics, treatises, and even theatrical satires protested this trend. Critics lampooned excesses in singing, acting, and theatrical production. Sparing no aspect of operatic production, Benedetto Marcello's essay *Teatro alla Moda* (Venice, 1720) was the most pointed satire.²¹ Throughout the essay, pungent observations mock the mediocre librettos, the overindulgences of the singers, the dependence on scenic effects, and the fatuous behavior of all concerned. A taste of Marcello's style is apparent early on in a paragraph "advising" the librettist on how to include the maximum scenic display:

Before the librettist begins writing he should ask the impresario for a detailed list giving the number and kind of stage sets and decorations he wishes to see employed. He will then incorporate all these into his drama. He should always be on the lookout for elaborate scenes such as sacrifices, sumptuous banquets, apparitions, or other spectacles. When those are to occur in the opera the librettist will consult with the theatre engineer [machinist] in order to find out how many dialogues, monologues, and arias will be needed to stretch each scene of that type, so that all technical problems can be worked out without hurrying. The disintegration of the drama as an entity and the intense boredom of the audience are of no importance in connection with all this . . . For the finale of his opera he should write a magnificent scene with most elaborate effects, so that the audience won't run off before the work is half over.

The libretto's subject matter need not be historically true . . . the modern librettist is faced with the task of inventing a fable and adding to it all kinds of oracles, realistic shipwrecks scenes, ominous prophecies gathered by examining the flesh of a roasted animal, etc. All that is needed is to have an historical name or two . . . the rest can then be freely invented and the only further thing that matters is that the number of verses must not exceed twelve hundred, arias included.

(Pauly 1948, MQ 24: 375, *passim*)

To sustain the demand for opera, private business groups, municipalities, and royal courts of Europe constructed, extensively renovated, or expanded more than 35 theatres during the first half of the eighteenth century. While some theatres remained solely for the royal courts, others began admitting a paying public. Interior decorations in court theatres, along with financial standards for theatrical production, became an integral part of the opera aesthetic. Most of the larger theatres were similar, each stage being elaborately equipped with up-to-date machinery.

The most prominent German and Austrian theatres were the Kärntnertheater in Vienna (1709), the Opernhaus in the royal palace of Dresden (1719), and the court theatre in Mannheim and the Berlin Opernhaus opened in 1742. Smaller important court theatres included the Ludwigsburg Schlosstheater (1730) and the Margrave's Theater in Bayreuth (1748). France, with its monopoly of opera controlled by Lully's descendants in Paris, lagged behind in numbers with only three new, significant opera houses: Marseilles (1733), Bordeaux (1735), and Toulouse (1737).

Architectural exteriors and interiors of theatres reflected their local demographics. Italian theatres placed emphasis on the interior decorations but, with the exception of the court theatres in Turin and Naples, less on the exterior facades. The Regio Ducal Teatro, Milan (1717), despite its smaller and cramped stage, became the most important in northern Italy.²² Fire destroyed the edifice in February 1776 and two and a half years later it was replaced by the magnificent Teatro alla Scala. In Turin, the grand and elegant Teatro Regio opened its doors in 1740. Two years later Naples inaugurated the splendid Teatro San Carlo with its well-equipped enormous backstage.

While staged spectacles dominated the first two decades of the eighteenth century, conformity in scenic design became the rule. There was little experimentation with colors or architectural forms in the settings depicted on the stage. Generalized settings with military encampments, groves of trees, or rooms in royal apartments became common. This practice at times proved financially advantageous since the impresario recycled sets from one opera to another. If a performer needed to hide behind a tree at the center of the scene, a painted flat of a tree of the necessary width was positioned either on a wagon that traversed the stage through a track, or placed as a freestanding unit at the specified spot. Built units (called *praticabili* in Italian – literally, “practicals”), such as actual stairs, balconies, doors, or windows, generally were not yet part of a production.

Many productions, however, paid no heed to the continuity of settings as required by the plot of the libretto and drama. Before the Metastasian reforms transformed Italian opera, stagings often neglected the balance between the drama and the production. Marcello's *Teatro alla Moda* sheds light on the absurdity of the theatre, when productions, settings, lighting, and acting ran amok.

Instructions for Stage Machinists and Painters of Scenery

The modern stage designer or painter must avoid any familiarity with perspective, architecture, decorating, or lighting. For that reason he should see to it that all architectural sets are designed as if viewed from four or six different points at the same time, and that the horizon is assumed at a different level for each. This kind of variety will greatly please the eye of the spectator.

For the first two scenes he should provide rich cloth draperies which then can be used for all other scenes not requiring an outdoor setting. In fact, they are very nice to have around in a garden or forest scene, too, since they will protect the singers from the danger of catching cold in the open air . . .

Halls, prisons, small rooms, etc., need not have any doors or windows; the singers will climb on the stage directly out of [the proscenium] boxes anyway . . .

In scenes representing the seashore, the open country, sheer precipices or caves, the stage must be kept free from cliffs, rocks, grass, or tree stumps as those might restrict the virtuoso in his acting . . .

The modern stage technician or painter must take care to employ stronger colors on props or decorations towards the rear of the stage, the farther they are removed from the spectators' eyes. This is necessary since he must distinguish himself from the old school of stage painting which sought to use softer shades the larger the distance from the audience, thus creating the illusion of spaciousness. But the modern theatrical engineer or painter must strive to achieve the opposite effect . . .

The modern stage technicians and painters must outdo themselves when it comes to the set for the opera's finale. That scene will receive the greatest amount of applause since it will be judged by the crowds from the street who by this time have been let into the theatre without having to pay admission. Therefore this last scene should represent a summary of all previous scenes. Seashores, groves, dungeons, halls, smaller rooms, fountains, and fleets of ships should all be there, along with a bear hunt, large and beautiful tents, banquets, thunderstorms, and bolts of lightning.

(Pauly 1948/49: 89 *passim*)

Through the first decades of the eighteenth century, scenic designers continued to place the vanishing point of perspective at the center of the stage, with the staging and blocking of the singers concentrated at downstage center. Objects toward the rear of the stage were painted smaller than those downstage to maintain the central perspective upstage and center. At first, this scheme was intended to create settings primarily for the viewing pleasure of the ruling potentate seated both front and center in the auditorium or in his box centrally located in the first tier of boxes at the rear of the auditorium. An unobstructed view for the remainder of the audience was secondary. The concept of clear sightlines had yet to take hold and the location of this central perspective remained unchanged.

This approach to scenic perspective tended to limit entrances and exits for singers to the downstage areas. When performers remained downstage, their physical relationships to the perspective of the settings appeared normal. However, the upstage entrances of the soloists or chorus sometimes inadvertently destroyed the illusion. Francesco Algarotti, a noted critic and aesthete, acidly observed:

Another most important article, not so much attended to as it should, is in the not leaving convenient openings in the scenes, particularly of architecture, that the actors may come on, and go off the stage, in such a manner, as that their figures may appear, to an observer's eye, to be in a just proportion with the columns. We often see them obliged to advance from the bottom [rear] of the stage, because it is there that the only entrance is contrived for them, which makes their persons shew very incongruous and offensive to a discerning spectator. The apparent magnitude of an object depends on a judicious comparison made of the exhibited figure, with its distance from us. So . . . the performers, presenting themselves from the bottom of the stage, appear like so many towering giants, by the artificial magic of the scene, through the illusive power of perspective, inducing us to fancy them at a prodigious distance. Yet these imaginary giants dwindle by degrees, as they come forward, and are dwarfed down to their native size, as they approach nearer to us.

(Algarotti 1768: 75)

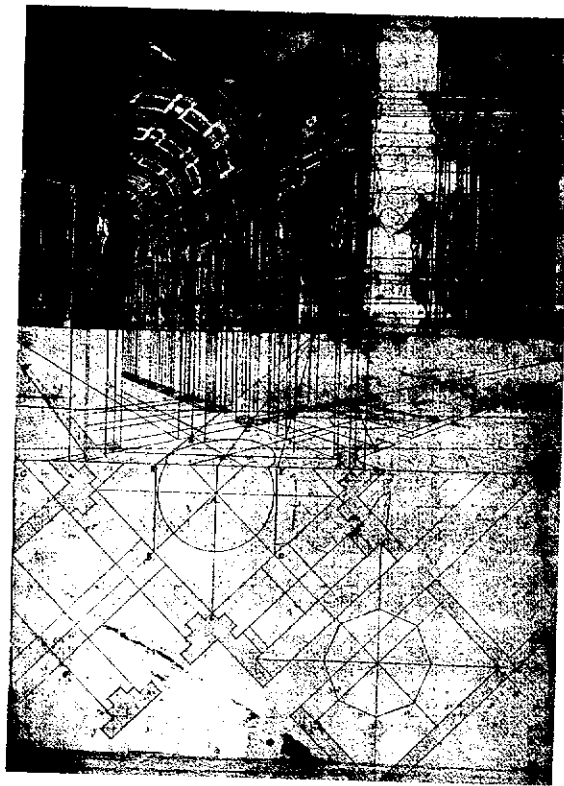


Figure 25.4 Ferdinando Galli-Bibiena, “Operation 68: Designing another scene viewed at an angle.” Pen and ink drawing from *L’Architettura civile*, published in Parma 1711. (©Staatliche Graphische Sammlung, Munich.)

In 1711 the publication of Ferdinando Galli-Bibiena’s *Architettura civile* presented unique methods that enabled designers to break from the strictures of the central perspective. These ideas profoundly influenced the evolution of the scenic arts in opera, spoken theatre, and dance, and remain tangible today (Figure 25.4).

A family dynasty led by the brothers Ferdinando (1657–1743) and Francesco (1659–1739) Galli added the name Bibiena to honor their father, Giovanni Maria Galli, who was a painter and the mayor of that Tuscan town. During the last two decades of the seventeenth century, the brothers worked as stage designers, scenic painters, and theatre architects in Parma, Piacenza, Reggio, Rome, Milan, Bologna, and Vienna.

In 1704 the Austrian imperial court summoned Francesco to Vienna, where he created magnificent designs for a new court theatre in the Hofburg. Francesco designed other theatres in France and Italy as well: Nancy (1709), Teatro Aliberti (Rome, 1719–22), and the Teatro Filarmonico (Verona, 1728). In 1714, Francesco returned to Italy and established his workshop in Bologna. With his students, he continued to create vast numbers of architectural plans and theatrical designs.²³ Ferdinando, following his brother’s path, moved to Vienna in 1712 and became the chief court architect five years later. Three of his sons became illustrious designers and architects in their own right: Alessandro, Giuseppe, and Antonio.

Ferdinando Galli-Bibiena’s *magnum opus* was his treatise *L’Architettura civile*, which consists of five parts: geometry, perspective, civic architecture, painting of perspective, and equipment for transporting heavy machinery.²⁴ Part Four, notwithstanding its lengthy title, revolutionized theatrical production: “A Short Discourse on Painting and the Perspective for Painters of Figure: With a new Perspective of Viewing Theatrical Scenes at an Angle, along with Practical Applications for Others.” Ferdinando’s key formulas gave designers the capability to create scenes viewed at angles, using the technique commonly known as *scena per angolo*.

Bibiena offered a method for skewing perspective at 45° angles left and right. The vanishing point in this case was no longer restricted to an area upstage and center; it could be placed anywhere within the stage. No longer were viewers forced to endure the effect of two lines seemingly retreating into the distance and joining together at a point of perspective fixed centrally at the rear of the stage like a railroad track. Portions of corridors, grand rooms, chambers, prisons, encampments, and gardens offered different opportunities to “peer around the corners” of doorways, arches, gates, and stairs, thereby engaging the viewer’s imagination. This sophisticated use of optical illusion delighted audiences and aided immensely in creating the appearance of stage depth through painted wings and backdrops.

The most important theories for the *scena per angolo* are in the sections “How to locate on wings and borders lines that converge toward the vanishing point” and “How to design scenes viewed at an angle” (Operations 62 and 67, respectively; Ogden 1978: 53, 60). The latter is accompanied by an illustrated example of a courtyard drawn both in perspective and with a detailed ground plan. Bibiena provided another illustrated example showing how to design another “scene viewed at an angle” in a large hall.²⁵ The floor should ramp upwards from the front edge of the stage to the rear, which aids greatly in creating the illusion of perspective. No longer was the axis for the vanishing point to be determined from the center of the first row of seats in the auditorium. Instead, the new viewpoint is pinpointed to the central box in the first gallery. This change acknowledges the new social hierarchy and its growing influence on the development of theatre architecture. Consequently, stage designs began emphasizing the importance of clear sightlines for the general audience instead of the ruler alone.

Before creating the settings, the scene designer must know the precise location of the wings. Bibiena provided instructions on “how to put theatrical scenes in perspective – first, how to find the positions of the wings and how to find scaled dimensions determined by their positions” (Ogden 1978: 49). This operation calculated the amount of space required between each set of wings for proper lighting and ease of access to the stage. The latter was especially important because of the practical difficulties encountered by singers of both sexes wearing the era’s wide costumes. Theatre architects and stage machinists strove to include more space between the individual wings, in the construction of new theatres and in the renovations of existing stages.

Bibiena’s theories of perspective were not new. Earlier artists and architects such as Sabbattini had used similar ideas; however, Bibiena’s methods of *applying* the ideas of *scena per angolo* were previously untried. However, his treatise elucidated applications for creating diverse perspectives clearly and simply. Illustrations in the *Architettura civile* enabled most scenic artists and designers to grasp these theories immediately and to apply them with relative ease. Bibiena’s techniques freed the designer’s eye and imagination and gave the audience a multitude of vistas within one stage picture.

The scenic and staging possibilities thereby offered were staggering. Performers were no longer restricted to a single area downstage center and parallel to the proscenium. Now they could move back as far as the first set of wings and in a diagonal pattern. Clever designers could create an illusion of seemingly limitless stage depth for larger and, even more critically, for smaller stages.

Algarotti called Bibiena the “Paul Veronese of the Theatre” and effusively praised his invention:

The introduction, especially, of accidental points, or rather the invention of viewing scenes by the angle, produces the finest effects imaginable; but that requires the nicest judgment to bring properly into practice. FERDINANDO BIBIENA was the inventor of those scenes, which, by the novelty of the manner, drew the eyes of all the curious upon him. They soon began to look upon, as unpleasing objects for a stage, these streets, and narrow passages, those galleries that were always made to tend to its center, there at once to limit the spectators imagination and sight.

(Algarotti 1768: 77–8)

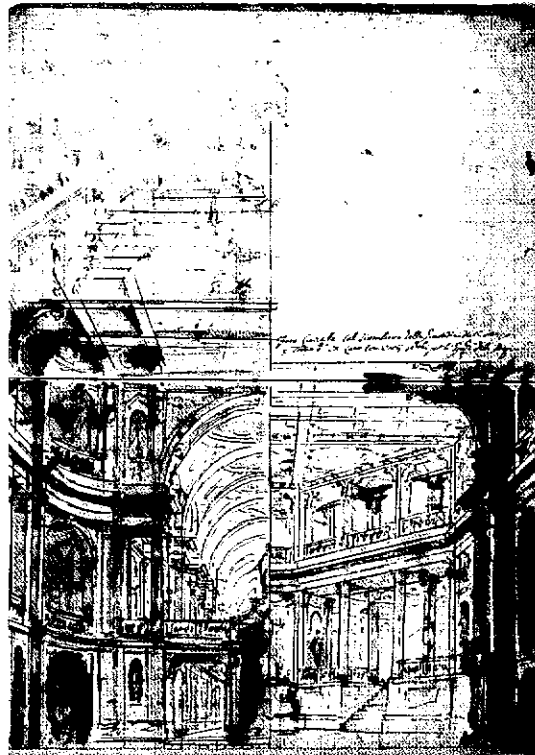


Figure 25.5 Fabrizio Galliari, design for Antonio Salieri's *Europa riconosciuta*, Act II, sc. 7: “A majestic hall for the meeting of the supreme council.” This was one of 28 settings Galliari created for the opening of the Teatro alla Scala in Milan, 1778. (Courtesy of Civico Gabinetto dei Disegni–Castello Sforzesco –

Bibiena's theories took years to make their impact. When they did, however, the results fundamentally changed the direction of scenic design for all of the theatrical arts.

A boom in construction of opera houses throughout the second half of the eighteenth century resulted in more than 140 new theatres, large and small, opening throughout Europe. The Bibiena family and their students were prolific; they designed more than 20 theatres.²⁶ Antonio alone designed eight, the most famous being the Teatro Comunale in Bologna (1763); Giuseppe Galli-Bibiena designed the Margrave's Theater in Bayreuth (1748). The latter theatres are prime examples of contemporary tastes and baroque styles running delightfully amok.

Italian designers and architects continued to dominate the stage and extended their influence throughout Europe. Ferdinando Bibiena's theories took root, and many smaller theatres were able to create grand settings previously seen only on larger stages. The three brothers Galliari (Bernardino, Fabrizio, and Ferdinando) were chief designers at the Teatro Regio in their hometown of Turin and the Regio Ducal Teatro and, later, the Teatro alla Scala in Milan (Figure 25.5). Production values in their work and that of others changed through constant evolution in scenic design and stage painting so that it began to incorporate simple “practicals,” that is, three-dimensional elements such as steps, stairs, and platforms within the settings. Designers gradually relied less on only painted wings and borders to create an optical illusion.

Spectacle, however, was still an important part of production. Then, as now, new productions were very expensive in material costs and also manpower. Even though most opera productions were far simpler than earlier in the century, impresarios and theatre directors could still concoct elaborate effects. Designs became more realistic but often generic: a room within a palace, a tented city, a garden, a grand gallery, or a mausoleum. The use of flying machines and traps continued, but more selectively.

Generic scenery and drops became standard because they saved money and needed only minor repainting or retouching to lull the public into believing they were seeing new settings. Stage designers and scenery painters were (and still are) exceedingly clever; they knew how to draw out the best effects in order to make the greatest impact on the public.

Effective stage lighting is vital to achieve optimum scenic effect. Given the relatively subdued illumination possible in the seventeenth and eighteenth centuries, various techniques improved its effect. For example, reflective material in both scenery and costumes made them more visible. Open flames from small pots of oil provided most of the lighting, supplemented by tallow candles placed primarily at two locations on the stage.²⁷ The most common placement was at the edge of the forestage, hence this area was known as the footlights. In many theatres raising the ramp of candles above or lowering it below the stage floor regulated the intensity of the illumination. More lamps were mounted behind each chariot, which slid on or off the stage as necessary. Another method placed a series of lamps affixed on a pole in each of the wings. To dim the illumination, the poles revolved away from the stage. Controlling the intensity of the light for illuminating the actors and settings was no easy task. The larger the stage, the more flames were required, and the greater the costs. Light sources could not be recycled as could scenery, backdrops, and costumes; consequently, illumination frequently was the largest expenditure for any production.

Candles needed daily replenishment and tending during a performance. Lamps frequently emitted clouds of smoke along with occasional foul odors. Tapers for each candle required constant trimming during the course of the opera to maintain a

scenic action. (In France, these *moucheurs* ("snuffers") were much loved by the public.) Despite these drawbacks, economics dictated that management of many theatres favor tallow candles over the more expensive, though brighter, wax candles.

Pre-twentieth-century stage lighting did not reach the same artistic level as scene design. Up to the end of the eighteenth century oil and candlepower continued to light the stages, providing sufficient illumination to make the settings and costumes visible. Attempts to control the intensity and color of the light remained crude. At the same time, lighting continued to be costly. Surviving eighteenth-century documents show that oil and candles for illumination were among the most expensive items of any production budget.

Three positions in the stage area provided sites for lighting: at the front edge of the forestage (footlights), behind both sides of the proscenium, and on the rear of the frames of the rolling wing chariots. Each lamp, backed by a reflective metal sheet, cast its light towards the stage and decors. Light spread only several feet from the wings, and gloom enveloped the large backdrops. The purity of the wax or tallow, together with the quality of the candlewicks, determined the brightness of the light. Consequently, controlled dimming of the light was difficult. Once a candle was lit, the only change easily effected was a greater degree of darkness, obtained either by covering the flame in varying degrees – as suggested by Sabbattini one hundred years earlier – or by extinguishing it altogether. To dim the lights at the Drottningholm court theatre, where eighteenth-century techniques are still used (along with electricity), stagehands gradually turn groups of candles mounted on poles away from the stage and toward the wings. Other attempts, such as lowering the footlights below the stage floor, remained clumsy and rudimentary.

Footlights created unique problems. If the singers came too far downstage, the extreme angle of the light distorted their facial features with shadows and exaggerated the hand gestures and body movements. Fire was an ever-present danger, especially if the performers came too close to the open flames of the footlights. Drafts of air passing over the flame caused unwanted variations of intensity and sometimes unexpected flickering. Smoke frequently rose from the flames, obscured the stage, and created health hazards. If the candle or the oil was of poor quality, a terrible stench assaulted the performers and the public. Stagehands continued to enter the stage to trim the footlight wicks, thus distracting from the performance.

Stage design and scenic painting compensated in some degree for the dimness of the stage. Artists prepared formulas that enabled colors to stand out in the shadows. New techniques in painting scenery increased optical illusions of perspectives, shadows, and highlights. Reflective material might be added or stronger colors painted on the canvas to emphasize scenic contrasts. For special effects, such as twinkling starlight or fireworks, small holes were punctured through the drop with large batches of candles lit behind a second upstage drop to hide the glowing flames. At the specified moment in the performance stagehands quickly raised the masking drop, which resulted in a marvelous display of starlight shining through the holes of the backdrop.

Candelabras and chandeliers, complete with their copious wax drippings, were the norm for illuminating the auditoriums. The main chandelier, which remained lit throughout the entire performance, required large quantities of candles. Sconces or candelabras affixed to the fronts of the boxes provided additional light. For gala or festive

events every available candelabra and sconce brilliantly lit the auditorium. Additional candelabras hung in front of the boxes, all of which required even greater expenditure for more candles and oil lamps. Lighting was an expensive commodity. When hundreds of lamps were required for both stage and auditorium, theatre administrations frequently requested the local government or court to underwrite the extra costs.²⁸

Despite all the difficulties, lighting technology continued to improve, gradually resulting in greater illumination with less expense. Wax candles that gave somewhat more light and less smoke began to replace tallow candles. In oil lamps flat, twisted, ribbon-like wicks generated twice the amount of illumination in contrast to older single-string wicks.

A great advance in theatre illumination occurred in 1783 when Emile Argand (1755–1803) received a patent for a lamp that emitted ten times greater light. It was soon dubbed the "Argand burner." A separate reservoir housed the oil for the flame. Attached by a feeding tube from the oil reservoir, two short concentric metal tubes housed a cylindrical wick that soaked up the oil, providing fuel for the flame located in the inside tube. A glass chimney-like tube increased the intake of air through the inside tube, thus burning the oil more efficiently and producing a cleaner, clearer flame with far less smoke. A metal reflector attached to the same mount as the glass cylinder bounced the light of the flame off the shiny surfaces towards the stage (see Pougin 1885: 318; Baker 2013: 91 and Plate 46).

The artistic advantages of the new invention quickly became evident. No longer would audiences view thick smoke emanating from the tallow lamps. Stacking the lamps on the scenery frames in the wings closest to the stage, as well as in the footlights, radiated bright light and produced dramatic improvements in illuminating the stage, the performers, and the stage decors. The primary drawback of Argand lamps was economic; the burner consumed more oil and tubes frequently shattered, particularly if the quality of the glass was poor, which required replacement.

Breakage costs notwithstanding, the Argand lamps proved extremely beneficial and quickly came to be widely used. Scenic artists resourcefully adapted to the new medium, which required changes in applications of color and shading during the painting of scenery and backdrops. New techniques included the application of sparkling material on canvases to create glittering effects. Controlling the flames for achieving a consistent light became more precise.

Notes

- 1 This essay is a condensed and edited extract from the first three chapters of Evan Baker (2013), *From the Score to the Stage: An Illustrated History of Continental Opera Production and Staging* (Chicago, IL: University of Chicago Press).
- 2 "Teatro Farnese" is a contemporary name; originally, it was known simply as *Teatro nel Salone*, a large room for theatrical events (Nagler 1964: 152).
- 3 Nagler's description of the Teatro Farnese is derived from Marcello Buttigli's report, *Descrizione dell'apparato fatto per honorare la prima e solenne entrata in Parma della serenissima principessa Margherita di Toscana, duchessa di Parma, Piacenza* (Parma, 1629). Buttigli claimed the theatre could seat 10,000, which Nagler rightfully called an "exaggeration" (Nagler 1964: 153 f.n. 63). Although this number is high, it must be remembered that in past centuries the human physiognomy was much smaller, thus allowing considerably more people into the space.
- 4 Marzio dall'Acqua provides a concise general overview with excellent illustrations, "Farnese Illusion" for the Italian periodical, *FMR* (English edition) 1 (June 1984): 77–98. A fuller account may be found in Luca Ronconi, Marzio dall'Acqua, et al., *Lo Spettacolo e la Meraviglia: Il Teatro Farnese di Parma e la Festa Barocca* (Turin, 1992).

- 5 Claudio Monteverdi composed the tournament music set to the libretto by Claudio Achillini.
- 6 The translation from Latin reads, "Ranuccio Farnese, fourth duke of Parma and Piacenza, fifth duke of Castro, opened this theatre to Bellona [goddess of war] and the Muses with august liberality in the year 1619." Dall'Acqua (Ronconi, Luca, Marzio Dall'Acqua *et al.* 1992: 81) also noted that the front curtain behind the proscenium arch was lowered during the preparations for the performance to hide the effects from the craftsmen in the auditorium so they would not be distracted by the wondrous scenic effects unfolding on the stage.
- 7 *Andromeda's* plot centers on the myth of Perseus and Andromeda. The goddess Juno, angered that Cassiopeia boasted that her beauty was greater than her own, orders Neptune to have a sea-monster devour Andromeda, the braggart's daughter. Perseus laments Andromeda's decision to accept her fate. After much fussing by the gods, Perseus arrives and slays the monster. Perseus asks for Andromeda's hand, and Juno's heart softens. Jupiter raises the two lovers to heaven.
- 8 Much of the production had its seeds in Felice Sanches and Pio Enea degli Obizzi's *Ermiona*, staged in Padua one year earlier with similar appearances of deities and monsters, such as a dragon and the sea monster. Cf. Pierluigi Petrobelli, "Francesco Manelli: Documentazione e Osservazioni" in *Chigiana*, 24 (1967): 43–66.
- 9 It is worth noting that Manelli, the composer of the opera, performed Neptune himself.
- 10 Nicola Sabbattini, "Pratica di Fabricar Scene e Machine ne' Teatri" (Ravenna, 1638). An English translation is provided by John H. McDowell as "Manual for Constructing Theatrical Scenes and Machines" in *The Renaissance Stage: Documents of Serlio, Sabbattini and Furtenbach* (Miami, 1958). All Sabbattini citations refer to this English translation. Several facsimiles of the original Italian editions have been published, the latest being Alberto Perrini (Ed.), *Nicola Sabbattini. Scene e Macchine Teatrali: Della Commedia dell'arte e Della Scenotecnica Barocca con i Disegni Originali* (Rome, 1989). An online edition is available at: <https://archive.org/details/praticadifabrica00sabb>.
- 11 No one standard terminology exists for this mechanism. "Wing wagon" is one description, whereas the French use "chariot," which is the same in English. Italian is *carretto* or *carrozza*, a carriage. German is *Kulissen*, also "Wing wagon." For consistency, the term "chariot" will be used throughout.
- 12 This is not a new phenomenon; earlier opera librettos such as Pio Enea degli Obizzi's *Ermiona* (Padua, 1636) also were published with illustrations.
- 13 "Giacomo Torelli da Fano inventò il moversi delle scene coll'argano, e fece quattro famosi teatri in Parigi, Parma, Venezia e Fano." Museo Correr Venice, Cod. Cicogna 2991, fasc. II, fol. 30. Cited by Molmenti, 3: 158. The standard works on Torelli are Per Bjurström's *Giacomo Torelli and Baroque Stage Design* (Stockholm, 1961) and the exhibition catalogue, *Giacomo Torelli: L'Invenzione Scenica nell'Europa Barocca* (Fano, 2005).
- 14 The size of the Teatro Novissimo and its spaces was recently extrapolated from several surviving documents. The complete area measured 14.70 meters wide and 29.50 meters long with the width of the proscenium opening measuring 9.00 meters and a height of 6.70 meters. When the first season at the Novissimo began in 1641, the depth of the stage from the proscenium to the furthest upstage wings measured 12.00 meters with another 4.10 meters added for the 1642 season (Mancini *et al.* 1985–95, Vol. 1: 323).
- 15 Only one copy survives at the Biblioteca Marciana, Venice. A complete transcription is printed in the program book of the Teatro la Fenice for the first modern production of *La finta pazza*, July 1987, pp. 1020–52. All references, unless otherwise noted, are to this edition. Extracts in English may be found in Bjurström 1961 and Rosand 1991, available online at: <http://ark.cdlib.org/ark:/13030/ft3199n7sm/>.
- 16 Torelli himself wrote two pamphlets with scenic descriptions that included engravings of stage designs for the subsequent operas: *Bellerofonte* (1642), and the *Apparati scenici per lo Teatro Novissimo di Venetia* (1644), the latter discussing the productions of *Venere gelosa* (1643) and *Deidamia* (1644). Both pamphlets are extremely rare, since they were separate, ephemeral publications with detailed descriptions of the production. They foreshadowed the staging manual, known as the *disposizione scenica*, or *Regiebuch*, or *livret de mise en scène*, common in nineteenth-century Italy, Germany, and France.
- 17 A low resolution digital reproduction of the designs is available on Gallica, beginning with page 62: <http://gallica.bnf.fr/ark:/12148/bpt6k111118c>.
- 18 Fabrizio Carini Motta, *Trattato sopra la struttura de' teatri e scene* (Guastalla, 1676). A facsimile of the original in the Bavarian State Library can be viewed at http://reader.digitale-sammlungen.de/de/fs1/object/display/bsb10862738_00003.html
- 19 The manuscript is located at the Biblioteca Estense in Modena. Orville K. Larson (Ed. and Trans.), *The Theatrical Writings of Fabrizio Carini Motta: Translations of "Trattato sopra la struttura de' Teatri e scene, 1676" and "Costruzione de teatri e machine teatrali, 1688"* (Carbondale, 1987).
- 20 Twenty-four prints reproducing each scene were published in 1668. A folio-sized and gloriously handcolored set of the prints are available in the music collections of the Austrian National Library and for online viewing at: <http://data.onb.ac.at/rec/AL00161749>. A facsimile of the libretto with the 24 designs in a German edition appeared in 1965 for the members of the Wiener Bibliophilen-Gesellschaft with an afterword by Margret Dietrich.
- 21 Benedetto Marcello, *Il Teatro alla Moda* (Venice, 1720). Without a doubt, Marcello exaggerated to make good stories. Nonetheless, there is much truth in what he wrote. All references here are to the English translation by Reinhard G. Pauly, "Benedetto Marcello's *Il Teatro alla Moda*." *Musical Quarterly*, 24 (1948): 222–33, 371–403; and 25 (1949): 85–105. Hereafter cited as Pauly.
- 22 A contemporary description of the Milanese theatre, with two plates, is in Serviliano Laruada, *Descrizione di Milano, ornata con molti disegni in rame delle fabbriche più cospicue, che si trovano in questa metropoli*, 5 Vols. (Milan, 1737–38) 2: 136–9.
- 23 The original designs of the Bibiena family and their workshops are scattered throughout the world. The largest number is in the Staatliche Graphische Sammlung in Munich, which holds over 600 designs. Other significant repositories include the Austrian Theater Museum, Graphische Sammlung Albertina, and Akademie der bildende Künste, all of Vienna, and the Metropolitan Museum of Art, New York. See the exhibition catalogue by Deana Lenzi and Jadranka Bentini, *I Bibiena: Una Famiglia in Scena Da Bologna all'Europa* (Venice, 2000).
- 24 Ferdinando Galli-Bibiena, *L'Architettura civile* (Parma, 1711). All references are to the English translation in Dunbar Ogden, *The Italian Baroque Stage: Documents by Giulio Troili, Andrea Pozzo, Ferdinando Galli-Bibiena, and Baldassare Orsini* (Berkeley, 1978). The original Italian edition can be viewed at: <http://dx.doi.org/10.3931/e-rara-9304>.
- 25 The published print for this "operation" (1711 edition, opposite p. 139 and reproduced in Ogden 1978, *Baroque Stage*: 63) does not do justice to the theories of Bibiena. The original drawing for Operation 68 survives in the Staatliche Graphische Sammlung in Munich. See Baker 2013, *From the Score to the Stage*, plate 24 for a reproduction of the original drawing.
- 26 This number does not include projects that did not come to fruition.
- 27 Tallow candles were manufactured from animal fats, with a cotton wick for the flame.
- 28 Occupants of boxes provided their own lighting. Many people brought a candle for extra light to read their personal copies of the libretto. Librettos from the period housed in the Museo Teatrale alla Scala in Milan still show wax droppings on numerous pages.

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