



Chapter 3

A Brief History of Theatre Architecture and Stage Technology

“Last night the curtain rose at the . . .” could have begun almost any theatrical critic’s review during the 1940s or 1950s. Interestingly, the curtain rises on few productions these days, not for a lack of productions but because two of the three current styles of stage configuration normally don’t use a front curtain. Of the three types of theatrical space used in the modern theatre—**proscenium**, **thrust**, and **arena** (see Figure 3.1)—only one, the proscenium, traditionally uses a front curtain. Each of these spaces has its own set of design and staging requirements, but they have all evolved from the same common heritage: the theatres of ancient Greece.

Greek Theatre

Our knowledge of Greek or Roman theatres is based almost exclusively on archaeological studies and educated guessing. No one can say with authority that “this is the way it was.” My summary offers the same disclaimers.

In practical reality, there was no single style or type of Greek theatre. A number of elements, however, seem to have been common to almost all the ones we know. The typical Greek amphitheatre illustrated in Figure 3.2 is a composite reconstruction based on a number of theatres dating from the fifth century B.C.

The steeply raked seating area for the audience, called the auditorium, or *theatron*, surrounded on three sides the circular playing area, known as the *orchestra*. Immediately in back of the orchestra was the *skene* (skee-nee), or stage house. The front wall of the skene probably had several doors or arches through which actors made their entrances. The exact purpose of the skene isn’t known, but since it hid the actors from the audience’s view and contained a number of rooms, it is assumed that it served various functions such as housing for stage machinery, storage for props, and possibly space for dressing rooms. The *paraskenia* were long, high walls that extended on either side of and parallel with the skene. It is believed that a low platform, about a foot high, extended across the front of the *paraskenia*. On later Greek theatres, they did not extend directly from the skene but were placed closer to the audience. A natural by-product of this relocation was to extend the low platform across the front of the skene to create a platformed stage. A columned arch, the *proskenium*, was located at the rear of this

proscenium: A stage configuration in which the spectators watch the action through a rectangular opening (the proscenium arch) that resembles a picture frame.

thrust stage: A stage projecting into, and surrounded on three sides by, the audience.

arena stage: A stage completely surrounded by the audience.

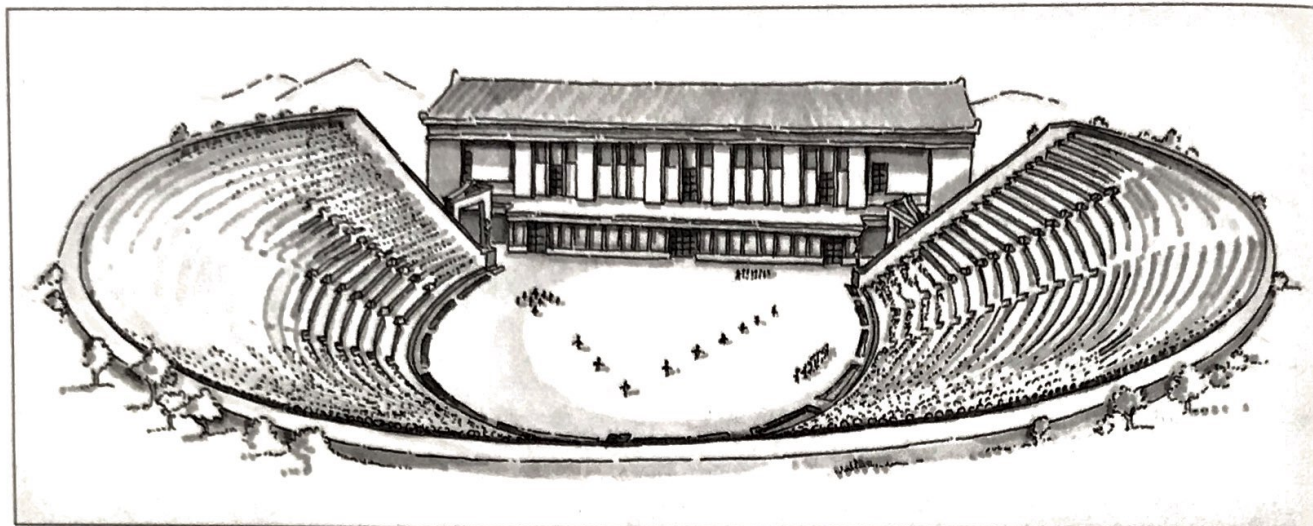


FIGURE 3.2
A typical Greek theatre.

stage and just in front of the skene. It served to support a porchlike projection from the second story of the skene.

Although most of the scenes in Greek plays were set outdoors, the Greeks used several devices to move or change scenery. The *eccyclema*, a wheeled platform, was apparently used in a variety of ways. If a scene called for a throne, the central doors in the *skene* were opened and the *eccyclema*, with a throne on top, was rolled forward. One of the Greeks' theatrical conventions dictated that violent deaths take place offstage, but the bodies were later revealed onstage. The *eccyclema*, this time piled with corpses, was again rolled onto the stage.

Periaktoi, which probably date from the fourth century B.C., were tall, three-sided forms that rotated on a central pivot. Each side was painted with a different scene. Although their exact use isn't known, they were probably placed in the background, and when a change of scene was desired, the *periaktoi* were rotated to reveal another face.

Possibly the most interesting machine was the *machina*. This was a basket or platform that was lowered to the orchestra level from the second story of the *skene*. Many plays called for intervention by the gods, and the *machina* was used to help the gods descend to, or rise from, the earth.

Pinakes were probably as close as the Greeks came to scenery. They were painted panels similar to modern flats. They were hung from the *skene*, but it is not known whether they were changed for each play or whether they were simply decorative.

Roman Theatre

Roman architects tinkered with Greek designs, but most of their theatres were simply modifications of the basic Greek form. The most conspicuous Roman development was the compression of the three separate parts of the traditional Greek theatre (orchestra, auditorium, and skene) into one structure. The integration of these elements caused some interesting developments in the structure of the Roman theatre, as shown in Figure 3.3. The auditorium (called a *cavea*) was limited to a semicircular configuration. In many of the theatres, the *cavea* was separated from the orchestra by a short wall. The orchestra became a semicircle extending outward from the stage area, which was framed by the proscenium. The

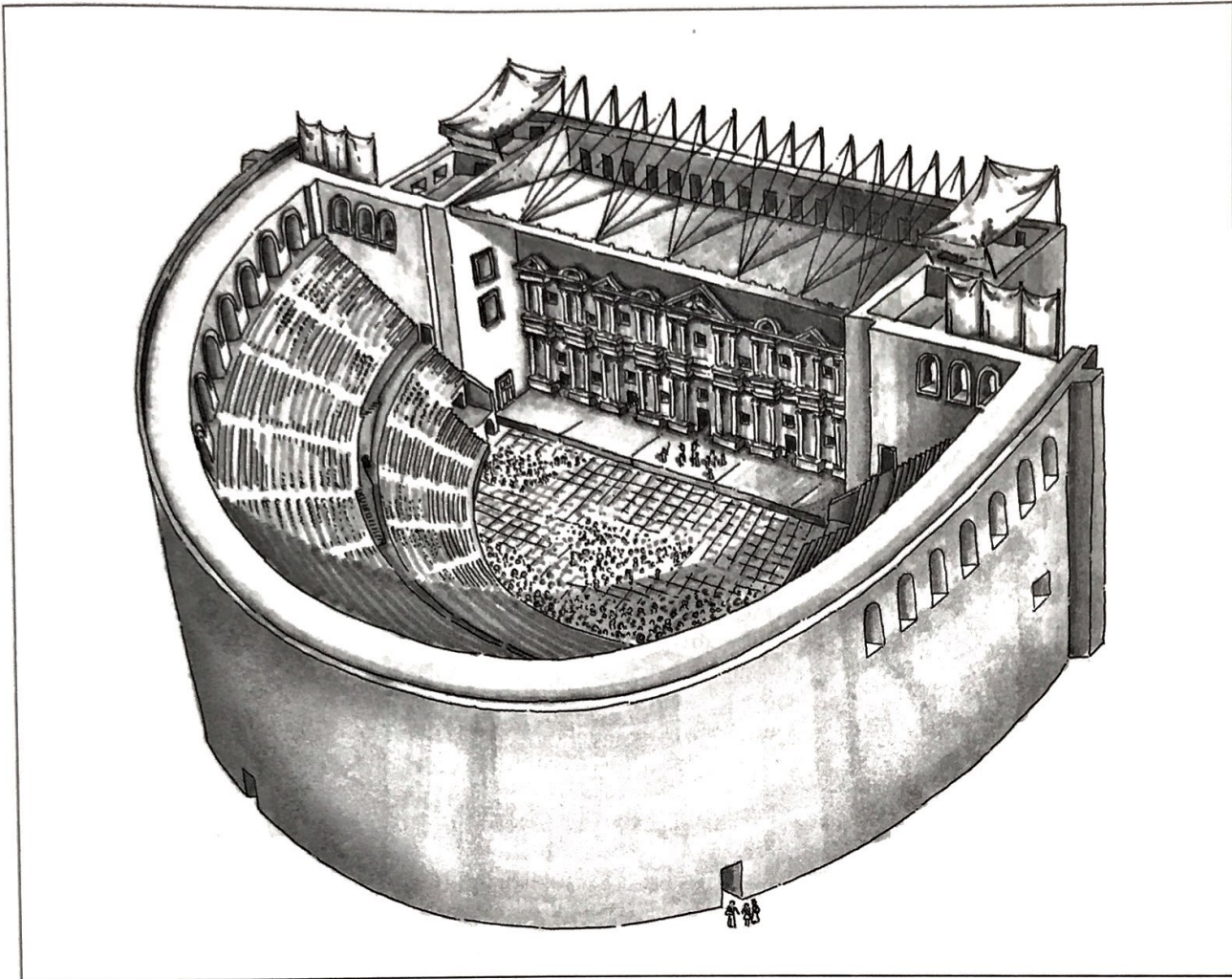


FIGURE 3.3
A typical Roman theatre.

skene was transformed into an elaborately decorated single facade called the *scaenae frons*. Its height generally matched the height of the *cavea*.

A number of subtle changes were also brought about by the development of the consolidated Roman theatre structure. The theatres were usually built on level ground instead of the hillside sites favored by the Greeks. In addition, a roofing system was developed for a number of the theatres. The roof extended from the *scaenae frons* to the edge of the proscenium. Some of the theatres even had an awning, known as a *velum*, covering the entire seating area.

Scenery in the Roman theatre differed little from the Greek. *Periaktoi* were used, but evidence indicates that the three faces were painted with thematic material—tragic, comic, and satiric scenes—rather than representative scenes of various locations. Two types of curtains were introduced by the Romans. The *auleum* was a front curtain that in early Roman theatres was lowered into a slot or trough in the floor and in later theatres was raised above the stage on ropes. The *siparium* was hung at the back of the stage. It provided a background for the action of the play and also concealed the backstage area. Entrances were probably made through slits in the curtain. Nothing is known about what, if anything, was painted on either curtain.

It is known that some Roman amphitheatres, such as the Colosseum, made extensive use of elevators, moving platforms, and trapdoors to raise animals,

people, and scenery from the basements underneath the amphitheatre's floor to the arena level. There is also evidence of the use of complex moving scenery such as dancing trees, rocks, and other devices. While there is scant evidence that any of this stage machinery was used in the theatre, it does show that the Romans had developed a highly sophisticated collection of stage machinery that wouldn't be duplicated for at least another thousand years.

With the fall of Rome in A.D. 476 and the subsequent decline of the Roman Empire, these grand theatres, which were also the sites of circuses, gladiatorial fights, and lion feedings (Christians and slaves being the primary food), were essentially abandoned, silent relics of a lost era. For approximately five hundred years after the empire fell, the formal theatre was virtually dead. Yet the theatrical tradition was kept alive by bands of traveling entertainers, primarily actors and jugglers. These vagabonds surreptitiously performed wherever they could find an audience—in courtyards, village squares, and other temporary stage locations.

Medieval Theatre

During the Middle Ages, the suppression of theatrical activities was a direct result of the church's opposition to secular drama. Yet the same church that denied the sacraments to actors was also responsible for the revival of the theatre. Sometime during the tenth century, clerics began to use dramatized scenes to help convey their lessons and church doctrine to congregations. During the thirteenth century, many of these interludes became too complex to be staged inside the churches, so they were moved outdoors. Staging techniques naturally varied from church to church and location to location. Platform stages were generally constructed adjacent to the church, and the audience stood in the town square (see Figure 3.4). In some cases, the platforms were mounted on wagons, appropriately called *pageant wagons* (Figure 3.5), which were pulled from town to town to perform the plays.

All of these productions shared some common characteristics. The sets were identical, in concept if not detail, and followed the conventions that had been developed by the clergy for the church productions. The sets were composed of

FIGURE 3.4
A platform stage.





FIGURE 3.5
A pageant wagon.

small buildings called *mansions*, or stations, that depicted locations appropriate to the biblical stories dramatized in the productions (see Figure 3.6).

The mansions for heaven and hell were on opposite ends of the stage, with the other mansions sandwiched between them. There was a common playing area, called a *platea*, located in front of the mansions, where most of the play's action took place.

One interesting by-product of the medieval theatre was the development of a large number of relatively realistic special effects. Stage machinery, fittingly called *secrets*, included trapdoors and a wide variety of rigging that was used to move people and objects about the stages. In one account of "a play staged at Mons [a city in southwestern Belgium] in 1501, technicians were hired to construct the secrets, and seventeen people were needed to operate the hell machinery alone; five men were paid to paint the scenery, and four actor-prompters were employed both to act and to help with the staging."¹

¹Oscar G. Brockett, *The Theatre: An Introduction*, 4th ed. (New York: Holt, Rinehart and Winston, 1979), p. 106.

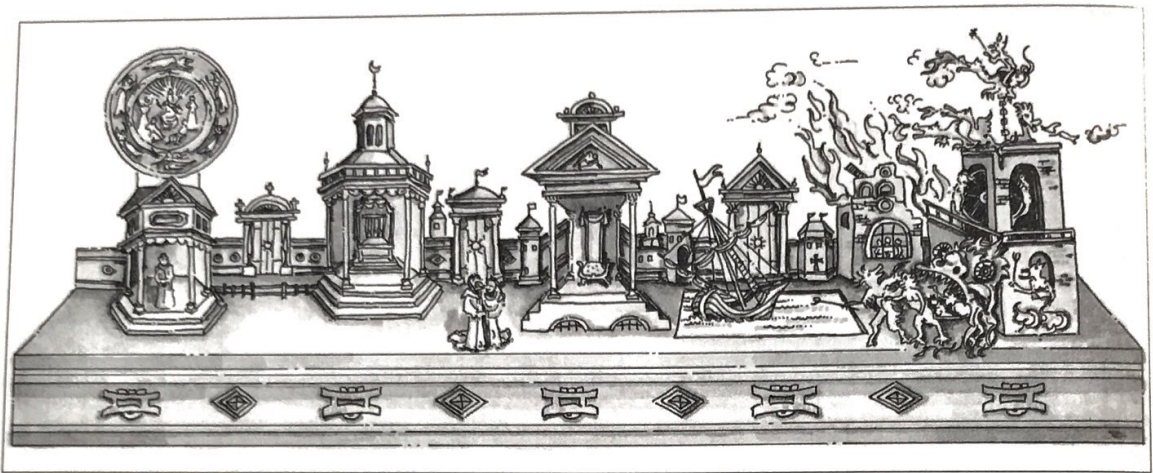


FIGURE 3.6
A typical medieval mansion stage.

1500-1650

With the Renaissance, the theatre became a central part of the cultural reawakening that quickly spread throughout Europe. Although church-sanctioned pageants continued, secular drama reemerged and became the dominant theatrical form. Theatres, which hadn't been permitted or constructed for over a thousand years, sprang up all over Europe. Because of the strong interest in classical forms and structures, the basic shape of almost all these theatres corresponded with the description of Greek and Roman theatres contained in the architectural writings of Vitruvius. Although the theatres were patterned after the classical forms, their designers made many interesting, and clever, adaptations.

The Teatro Olimpico in Vicenza, Italy, was one of these theatres (see Figure 3.7). Built between 1580 and 1585, it was designed in the style of the ancient Roman theatres. Probably the most significant change was that the theatre finally moved indoors, with the entire structure enclosed in a building. The *cavea*, or auditorium, was designed not as an exact semicircle but as an ellipse, and this minor change dramatically improved the sight lines in the theatre. The *scaenae frons* was no longer a single decorated wall but was broken by several arches; elaborate permanent sets of street scenes were built, in **forced perspective**, on a **raked stage** floor in back of the arches. In many Renaissance theatres, the stage floors were raked to improve the visual effects of the scenery. The actors normally performed on a flat playing space in front of the raked stage.

A second minor Renaissance innovation in southern Europe was the introduction of elaborately painted, forced perspective, scenery. The use of **stock sets**—usually painted **drops** of the “comic scene,” the “tragic scene,” the “satyric scene,” and so on—necessitated the evolution of the proscenium, or picture frame, stage. Drops, which greatly enhanced the feeling of depth created by the painted perspective, were usually hung at the upstage edge of the stage.

At this time, and the next several hundred years, stages were lit like any other indoor location—with varying arrangements of candles, lanterns, and torches. The first recorded use of a stage lighting effect occurred during the Re-

forced perspective: A visual-distortion technique that increases the apparent depth of an object.

raked stage: A stage floor that is higher at the back than the front.

stock set: Scenery designed to visually support a generalized location (garden, city street, palace, interior) rather than a specific one; commonly used from the Renaissance through the early twentieth century and still in use today in some theatres.

drop: A large expanse of cloth, usually muslin or canvas, on which something (a landscape, sky, street, room) is painted.

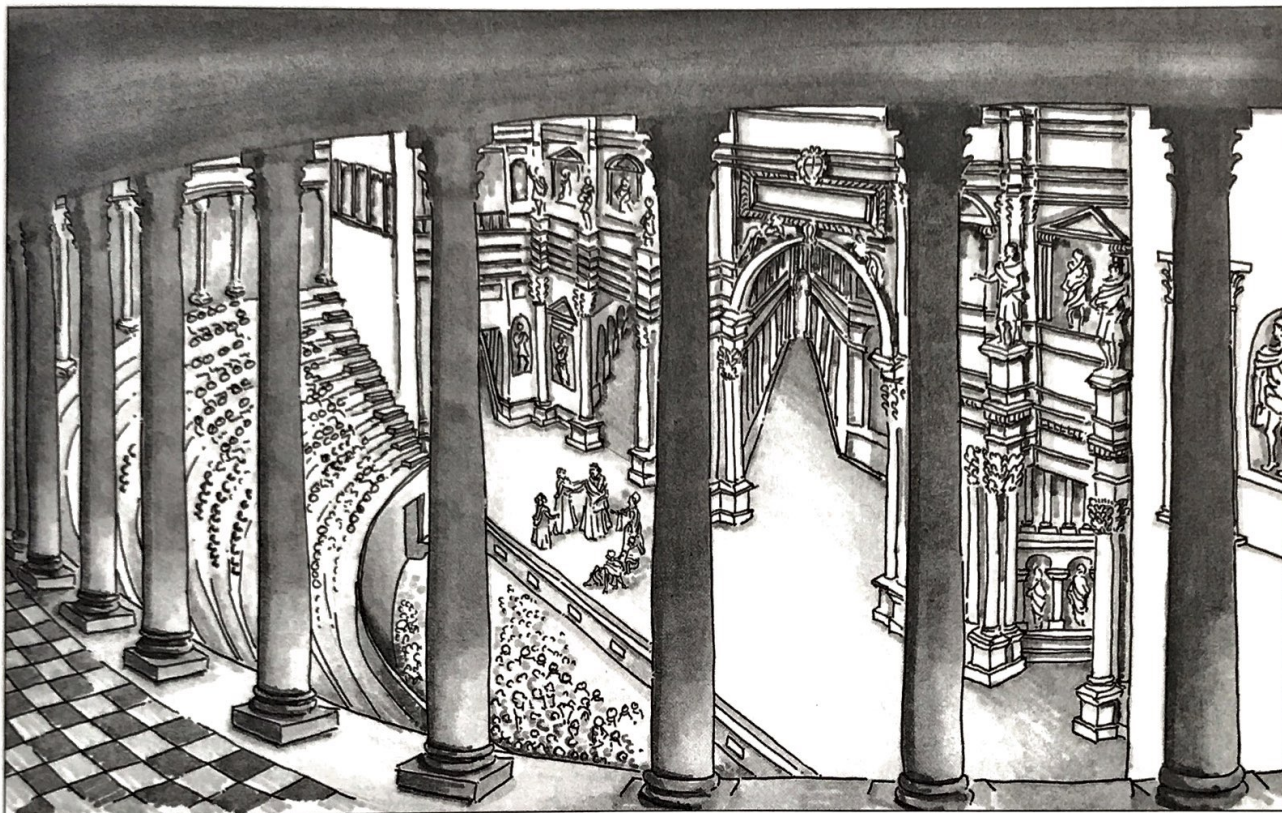


FIGURE 3.7
The Teatro Olimpico.

naissance. In a treatise written in 1545, Sebastiano Serlio recommended “placing candles and torches behind flasks with amber- and blue-colored water.”²

At approximately the same time, drama in England was being produced in a different type of structure. A number of theatres had been constructed just outside London by 1600. Probably the most famous was the Globe (1599–1632), the home theatre of William Shakespeare (see Figure 3.8). Although these theatres differed in detail, their basic shape was similar.

The stage of a typical Elizabethan theatre was a large, open-air platform generally raised from 4 to 6 feet off the ground (see Figure 3.9). The platform was surrounded by a yard, or *pit*, which served as the space for the lower-class audience—the groundlings—to stand. At the upstage end of the stage platform was the area that formed the *inner below*. There is some dispute about the shape of this structure. One theory maintains that it was a curtained alcove recessed into the upstage wall. Another hypothesis holds that it was a roofed structure, curtained on three sides, that projected a little way onto the stage platform. A final theory contends that there was no inner below at all. Depending on the theory to which you subscribe, the *inner above* was an area above the inner below on the back wall, or the acting area provided by the roof of the structure that projected onto the stage, or an area that didn’t exist as a playing space. In any case, separate entrances apparently flanked either side of the inner below to provide access to the stage.

²“Stage Design.” *Encyclopaedia Britannica*. 2003 (<http://www.Britannica.com/eb/article?eu=118829>).

apron: The flat extension of the stage floor that projects from the proscenium arch toward the audience.

borders: Wide, short, framed or unframed cloth drops suspended to prevent the audience from seeing above the stage; normally match the decorative treatment of the wings and drops in wing and drop sets.

elevator trap: A small elevator used to shift small pieces of scenery, or an actor, from the basement underneath the stage to the stage or vice versa. Usually no larger than 4 x 4 or 4 x 6 feet. Also known as a disappearance trap.

elevator stage: A large elevator used to shift large scenic elements or whole sets between the area beneath the stage and the stage.

revolving stage: A large, circular disk that pivots on its central axis. Built into the stage floor as part of the theatre's permanent equipment.

concentric revolving stages: A revolving stage with, usually, two sections, one rotating inside the other.

1650–1900

The interest in spectacle and visual effects that began in Italy in the mid-1500s moved rapidly northward across Europe during the next 100 years. By about 1660, the architectural style of theatre buildings and the types of scenery used in them were fairly standardized throughout England and the rest of Europe.

The theatres were primarily rectangular, with the stage set at one end of the building, as shown in Figure 3.10. The raked stage was framed by the proscenium arch, and the **apron** thrust toward the auditorium. Like its historical antecedents, the forestage of the Elizabethan stage and the *platea* of the medieval theatre, the apron was the site of the majority of the action of the play.

Although the scenery had become more elaborate by this time, with more locations depicted, it still followed the tradition of providing a visual background for the play rather than an environment in which the action of the play could happen. It was painted in perspective on movable drops, wings, and **borders** and was placed on the raked stage, where the inclined floor greatly added to the sense of depth created by the perspective painting of the scenery. Most of the plays took place in a generalized location (drawing room, courtyard, palace, garden, and so on), so each theatre owned stock sets that depicted these various scenes. When the action of the play took place in a library, the library set was used. If the theatre didn't happen to have a library set, another stock interior set, such as the drawing room, was substituted.

The auditoriums of these theatres also followed a traditional arrangement (see Figure 3.11): multitiered boxes (for dignitaries and other notables), galleries (for those who could afford the extra charge), and the pit (for those who wanted to see the play but couldn't afford, or weren't permitted, a better seat). This style of proscenium theatre was essentially modern. Some theatres continued to install raked stages, but more and more new structures were built with flat stages. Theatres were constructed in this style until the late nineteenth century.

During this time period the most significant advancements in stage machinery occurred in the Japanese Kabuki theatre. From its inception in 1603, and for the first 125 years of its existence, Kabuki theatre was performed outdoors. In 1724 the government gave permission for Kabuki troupes to build indoor roofed theatres. Shortly thereafter, highly sophisticated stage machinery began being developed. In 1736 **elevator traps** were introduced. This was followed less than twenty years later (1753) by **elevator stages**. Within five years (1758) Kabuki theatres began using **revolving stages** to shift scenery. The stage machinery became even more complex with the introduction of **concentric revolving stages** in 1827.³

There were no significant developments in stage lighting between 1630 and approximately the 1780s. Candles and oil lamps continued as the primary illumination source, and they were placed in locations—footlights, wings, overhead chandeliers—where they could get the most light on the stage. With the exceptions of the chandeliers, the sources were normally hidden from the audience's view. In 1783 a new lamp—the Argand oil lamp, was introduced. It had a cylindrical wick enclosed in a glass chimney that produced a brighter, whiter, and cleaner light than its floating wick predecessors.

In 1792 a Scottish engineer, William Murdock, developed a practical method of distilling gas from coal. This was the genesis of gas lighting. Gas lighting was a significant advancement over oil lamps and candles. It was much brighter and cleaner burning; and, of significant import to theatre practitioners, the intensity of

³Oscar G. Brockett, *History of the Theatre*, 6th ed. (Boston: Allyn and Bacon, 1991), p. 269.

PRODUCTION INSIGHTS

Function Follows Form

The structure and equipment of theatres has affected theatrical conventions through history. The funeral marches so prominent in Shakespearean tragedies were simply expedient methods to clear bodies from the stage. The Elizabethan theatres didn't have a curtain to hide the stage, and the plays were held in the daytime, so the stage was always lit. This precluded any artful, or semibelievable,

method for getting rid of the bodies. Hence the funeral marches.

In the Restoration and eighteenth-century theatres, entrances were made from doors on either side of the apron, because the raked stage was cluttered with scenery and the actors' intrusion there would have distorted the illusion of depth carefully designed into the forced-perspective scenery.

gaslight was easily controlled. Within a relatively short period of time theatres throughout Europe and North America were equipped with gaslight. Distribution of gas throughout the stage and auditorium was accomplished with a maze of pipes and tubing. The gas panel or gas table, a centralized system of valves used to control the intensity of the various onstage gas lamps, was, in effect, the first light board. The group master control systems described in Chapter 16, "Lighting Production," are identical with the control methods utilized on these gas tables or panels. This flexible distribution system was a quantum leap in lighting control. Prior to its development, intensity control had primarily been accomplished by snuffing and relighting candles or lamps. Experiments with various mechanical systems that could control intensity and effect color changes by raising and lowering colored glass cylinders over the oil-lamp flames had not been particularly successful. Although gaslight offered a vast improvement over oil lamps, it was not without its challenges. Even when the flame was enclosed within a glass chimney, the open flame still posed a significant fire hazard. Additionally, gas lamps created a not insignificant amount of heat and unpleasant odors.

Thomas Drummond, a British engineer, invented limelight in 1816. Limelight is created when a sharp jet of flame is focused against a block of limestone. As the limestone incandescens, it produces a light that is both very bright and relatively soft. When coupled with a mirrored reflector, the limelight produced a relatively cohesive beam of light that was intense enough to reach the stage from the

FIGURE 3.11

The auditorium structure of a typical late-seventeenth through late-nineteenth-century theatre.



auditorium and still be significantly brighter than the other areas of the stage. Thus was born the first followspot.

The first electric light used in the theatre was the carbon arc. This light, produced when electricity arcs between two electrodes, is extremely white and bright. By 1860 the Paris Opera had developed a projector, a followspot, and several effects utilizing the carbon arc.

Thomas Edison's development of a practical incandescent lamp in 1879 and the rapid electrification of Europe and North America were the next great advances in theatrical lighting. By 1900 almost all theatres throughout Europe and North America had converted to electricity. Interestingly, the conversion to electricity did not immediately spawn any significantly new methods or techniques of stage lighting. Stages continued to be lit as they had with gaslight. Conventional footlights, **borderlights**, and **winglights** were simply electrified. Intensity was controlled with resistance dimmers utilizing the group master control methods developed and refined with gas lighting control tables. Resistance dimmers continued to be the standard theatrical dimmer until the late 1940s.

Twentieth Century

borderlights: Any lights hung above the stage, behind the borders (horizontal masking pieces). In this context the borderlights were striplights—long, narrow, troughlike fixtures usually containing eight to twelve individual lamps.

winglights: Lights hung on either side of the stage, usually concealed by wings (vertical masking pieces). In this context the winglights were striplights—long, narrow, troughlike fixtures usually containing eight to twelve individual lamps.

A revolution in the style of theatre began in the late 1800s and continued into the early twentieth century. The work of a number of theatre artists was taking a decidedly different turn from the declamatory style of earlier theatre. The new theatre was devoted to a more realistic and naturalistic type of drama and stressed the previously unheard-of concepts of unity of style for all elements of the production. The Théâtre Libre, founded by André Antoine in Paris, and the Moscow Art Theatre, founded by Konstantin Stanislavski and Vladimir Nemirovich-Danchenko, were but two of the leading groups in this movement toward a more naturalistic and unified style.

As the productions became more realistic, it was natural for the shape of the theatres to change to support this new form. The new plays required that the settings become environments for the action of the drama rather than backgrounds. Consequently, as the action of the play moved onto the stage from the apron, the

PRODUCTION INSIGHTS

From the Boxes to the Pits

Throughout history the various shapes of theatre have been determined, to a large extent, by the mores of the sponsoring society. In ancient Greece, everyone (except the slaves) was considered of equal rank, so the seating was similarly democratic and unsegregated. In the southern Renaissance and in Europe for the ensuing 200 years, the majority of theatres were built by the aristocracy for their own amusement. The visual illusions of forced-perspective scenery were best seen from a single point in the center of the auditorium. This ideal location, subsequently

known as "the Duke's seat," was usually found in the second-level box at the back of the auditorium.

The theatres of Elizabethan England, such as the Globe, also had elevated boxes surrounding the stage. The aristocracy, and those others who could afford the higher ticket prices, sat in the boxes. The common people stood in the pit. About the time of the French Revolution, seats began to appear in the pit throughout European theatres as the various societies became more democratic.

depth of the apron shrank. When this happened, it became difficult to see all of the action from the boxes and gallery seats adjacent to the proscenium, so the shape of the auditorium began to evolve. The side seats were eliminated, and the remaining seats faced the stage.

Everything speeded up in the twentieth century. Almost as quickly as the realistic movement became the dominant mode of theatre, splinter groups broke off from it to create a number of antirealistic movements. These movements rose, fell, and evolved so rapidly that most of them didn't have a chance to develop distinctive types of theatre structures. Actually, most of these movements didn't need to change the basic shape of the proscenium theatre or its machinery, because the existing theatres provided a workable environment for their divergent styles.

In the United States, the Little Theatre movement of the 1920s and 1930s was an effort to establish quality productions outside of New York City. It also gave new playwrights a chance to improve their craft and have their works produced in an environment that was less critical than the supercharged atmosphere of Broadway. This movement continued and expanded throughout the country. Its crowning glory has been the establishment of a number of excellent contemporary regional professional theatre companies in such cities as San Francisco, Dallas, Denver, Hartford, Washington, San Diego, Minneapolis, Tucson, and Sarasota.

A ripple effect of the Little Theatre movement was that fledgling companies, funded more by inspiration and lofty intentions than money, began to produce theatre in "found" spaces. Existing barns; churches; feed stores; grocery stores; libraries; old movie houses; and other large, relatively open buildings were all candidates for takeover. Many of these groups relished the enforced intimacy between the actors and audience that shoehorning theatres into these cramped spaces provided. Whether by accident or design, many of these converted theatre spaces didn't have the room to erect a proscenium stage and auditorium. For whatever reasons, thrust and arena stages sprang up all over the country.

The form and structure of the physical theatre have gone through a great many developments. Any number of people have attempted to "improve" the spatial relationship between the stage and auditorium. It is doubtful, however, that anyone will ever devise any genuinely new developments in this relationship, simply because the theatrical experience is based on the premise that the actors need a space in which to perform and the audience must be in a position to see and hear them. When the form of the physical theatre is thought of in this context, it

becomes apparent that there are no different types of theatre, only variations on a basic theme.

Like everything else, theatrical lighting began a rapid evolution in the early twentieth century that has continued unabated since that time.

Initially, the conversion from gas to incandescent lamps simply involved re-fitting extant gas fixtures for electricity. The first major technological development in stage lighting of the twentieth century resulted from refinements to the incandescent lamp that significantly increased the lamps' brightness and longevity. These improvements led to the development of incandescent spotlights, and steady progress in spotlight design continued throughout the twentieth century. Initial designs, such as the plano-convex spotlight, were a vast improvement over gaslight and electric arc technologies. Within a few decades the more efficient Fresnel and ellipsoidal reflector spotlights had largely replaced the plano-convex instruments. The tungsten-halogen (T-H) lamp was introduced in the early 1960s. It produced a whiter light, and its rated lamp life was minimally ten to twenty times longer than that of its predecessor. In the 1970s borosilicate lenses, which produced a much whiter light and were less susceptible to heat fracture than their Pyrex predecessors, became the industry standard.

The first electronic dimmer was the thyatron tube dimmer, developed by George Izenour in the late 1940s. For the first time the dimmers could be controlled from a remote location. Electronic control allowed development of the preset control system. Preset control was to remain the dominant method of dimmer control until it was supplanted by digital control in the 1980s. The principles of preset, as well as other control techniques, will be discussed in Chapter 16, "Lighting Production."

Sound effects had been a central part of theatre production since the Greeks. Until the development of electrically powered record players and amplified sound in the 1930s, any music used in the theatre was played live. Sound effects were also produced live, utilizing a fascinating array of mechanical devices, many of which had changed little in design or effect in, literally, centuries. The development of the tape recorder in the late 1940s ushered in the beginning of a period of experimentation and development in theatre sound that continues unabated. High fidelity sound—recorded sound that mimics the full range of human hearing—became commercially available in the early 1950s. Stereo sound followed almost immediately. High fidelity, stereo, tape-recorded sound had become the standard in effects sound in the theatre by the early 1960s. It continued to be the dominant technology until the introduction of a variety of digital storage, replay, and recording devices began in the early 1980s.

Since computers and digital technology were introduced to the world of technical theatre in the early 1980s, there has been a literal explosion of new developments in all areas of theatre technology. Specific uses of these new technologies will be explored in many of the chapters that follow.