

SEVENTH EDITION

Theatrical Design and Production

An Introduction to Scenic Design and Construction, Lighting,
Sound, Costume, and Makeup



J. MICHAEL GILLETTE

Theatrical Design and Production

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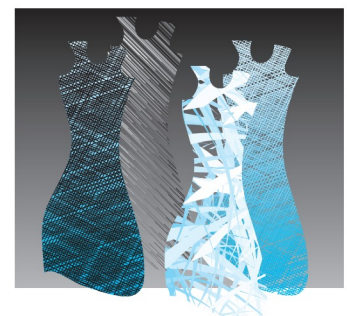
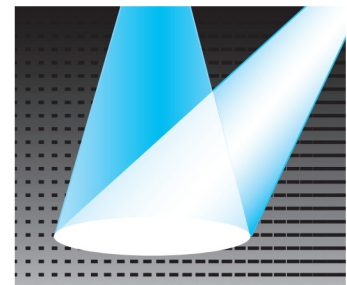
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*An Introduction to
Scenic Design and Construction,
Lighting, Sound, Costume, and Makeup*

SEVENTH EDITION

J. Michael Gillette

University of Arizona





THEATRICAL DESIGN AND PRODUCTION: AN INTRODUCTION TO SCENIC DESIGN AND CONSTRUCTION, LIGHTING, SOUND, COSTUME, AND MAKEUP, SEVENTH EDITION

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Preface

First courses in the world of theatrical design and production, like the art they introduce, come in a bewildering array of shapes, sizes, textures, and colors. Some students receive their introduction to this subject area in a general overview course that covers the design and production elements of scenery, costumes, lighting, and sound in a single semester. Other students may enjoy the luxury of an entire year in which to discuss the same material. Still others may take individual courses that specialize in the theory and craft of the separate areas that comprise the field of theatrical design and technical production. The course content is very flexible indeed.

To create a text that will serve the needs of all these courses is a distinct challenge. I've tried to rise to that challenge by organizing the material in two ways. The chapters appear in a logical sequence, but each chapter is also an island of information that can stand alone. My hope is that this organization will enable each instructor to pick and choose the type and amount of material that is appropriate for his or her particular course. This type of organization also makes the text a useful reference for students to keep throughout their design and technical production careers.

Organization and Content

Just as a play wouldn't start without the scenery being in place, this book doesn't delve into technical procedures without first setting the stage. Chapters 1 through 4, "Production Organization and Management," "The Design Process," "A Brief History of Theatre Architecture and Stage Technology," and "The Stage and Its Equipment," provide a grounding in real-world issues and are appropriate for use in almost any type of technical production class.

Of special significance is Chapter 2, "The Design Process." It contains material that, prior to the first edition of this book, had not been included in beginning technical theatre texts. It is a problem-solving and conceptual-thinking model created specifically for theatrical practice. Its purpose is to increase each student's creative capacity by reducing the effects of two prime ingredients of creative dysfunction—fear and frustration. The mechanism used to effect this change is a seven-step procedure that enables students to make logical, rational, and considered decisions when making the myriad choices involved in creating a design or solving a technical challenge in any area of theatrical production.

Chapter 3, "A Brief History of Theatre Architecture and Stage Technology," provides a concise chronology, both pictorially and textually, of the history of theatre architecture. I've included this information for two reasons: the functional design of the environment in which a play is produced has always been a major factor in determining the type, style, and design of technical elements used in a production, and all too frequently student designers are not required to take courses in theatre history.

Chapters 7 and 8, "Mechanical Drafting" and "Perspective Drawing," contain specific how-to information on the drafting and mechanical perspective techniques most commonly used in theatrical production. These chapters

appear here because it may be helpful for students to learn the grammar of graphic language before they encounter these types of drawings in the scenic and lighting design chapters. Chapter 7, “Mechanical Drafting,” provides information about the materials and types of drafting used in the theatre, as well as helpful hints on the process of drafting. Chapter 8, “Perspective Drawing,” offers a step-by-step procedure, with exercises, for creating accurate scale mechanical perspective drawings.

Chapter 15, “Electrical Theory and Practice,” provides a concise explanation of the nature and function of electricity and electronics and the practical use of the power formula, as well as information on wiring practices and standards.

Chapter 22, “Drawing and Rendering,” provides an overview of the types of paints, pastels, markers, and papers commonly used in theatrical rendering, as well as information on basic application techniques used with these media.

The remainder of the text provides an overview of the function and responsibilities of the scenic, lighting, costume, and sound designers. It also contains primary information about the tools and basic techniques that are used to bring each designer’s concepts to the stage.

As with any art form, the basic element necessary for creating a successful design in theatre is an understanding of design principles and chosen medium. I hope that this text not only provides those basics but also offers encouragement and inspiration to create.

Features

In many ways, *Theatrical Design and Production* is a traditional introductory text for the various design and craft areas of theatrical production. With a number of features, however, I strive to set this text apart.

Philosophy The underlying spirit of this text is firmly rooted in my belief that learning and creating in the various fields of theatrical design and production can be, and should be, fun. With that thought in mind, I’ve tried to make this text not only informative and practical but also motivating and inspirational.

Color Analysis The sixteen-page color analysis section presents a discussion of the practical applications of color theory by analyzing the interactive effects of the color selections for the scenery, costumes, and lighting for two productions — one with a very narrow, muted palette and the other with a full-spectrum, heavily saturated color style.

Safety Tips Safety tips are discussed throughout the text. They have been placed in special boxes adjacent to the relevant text to help readers integrate learning about a tool, material, or process with its safe use.

Running Glossary To help students learn and remember the vocabulary of the theatre, new terms are defined in the margin on the page where they first appear.

Production Insights Placed throughout the text, these boxes identify material that provides further depth and practical information to the discussion.

Design Inspiration Similar to the “Production Insights” boxes, but located only in design chapters, these include material that will enhance student understanding by providing insights and solutions to real theatrical problems.

Illustration Program An extensive photo and illustration program provides a very strong adjunct to the textual information. Photos from professional theatre productions are used to provide a model that students can strive to emulate.

New to the Seventh Edition

The most prominent feature of this edition is the updating of the technology and practices in almost every section of the book. Outdated tools and practices have been eliminated. The tools, practices, and technology of industry-standard techniques such as motorized scenery, digital recording, and digital projections are thoroughly explained.

Chapter 1, “Production Organization and Management,” has been updated to reflect the evolution of responsibilities and positions in each design area.

Chapter 10, “Tools and Materials,” has been extensively revised. The descriptions of the various tools have been condensed; a variety of new tools commonly used in the various shops have been added, and many outmoded tools and techniques — such as lashing hardware, the brace and bit and (sob) the clout nail — have been eliminated.

Chapter 11, “Scenic Production Techniques,” has also been extensively revised. Changes in organizational responsibilities have been noted; the descriptions of wood and welding joints have been condensed to “let the pictures do the talking”; the sections on platforming, door construction, and moving scenery have been revised to bring the information on the technology, materials, and techniques used in these areas in line with current standards and practice.

Chapter 14, “Lighting Design,” has been updated with numerous CAD-drawn light plots and graphics (replacing the previously hand-drawn plots and graphics) to reflect the reality that the majority of lighting paperwork is now computer generated. Explanations of design concepts and drafting techniques have been expanded in an effort to clarify the information. Because of the increased use of lighting design drafting programs such as Vectorworks, key elements of that program are explained. Lighting control technology, and the methods of keeping track of the light cues, have changed rapidly since the sixth edition of this book. Control methods that are no longer used have been dropped, and coverage of new techniques has been introduced.

Chapter 16, “Lighting Production,” has been similarly updated. The technology used in stage lighting continues to evolve with amazing speed. An entirely new type of light source—light-emitting plasma—is explained. The information on LED technology has been updated, and several new fixtures using this maturing light source are discussed and illustrated. Outdated information on lenses, fixtures, and control boards has been replaced with current techniques and practices. Photos reflecting industry standard technology have replaced the illustrations of previous generations of equipment.

Chapter 17, “Projections and Media,” has been completely rewritten. This wholesale change was necessitated by the reality that digital projection has all but entirely replaced film-based projection techniques. The obsolete equipment has been eliminated and replaced with a full explanation of both the equipment and techniques used in digital projection and design.

Chapter 21, “Sound Design and Technology,” has also been completely rewritten because of not only the obvious technological advances in the field, but also the rapid evolution of the principles used in creating sound designs. A full explanation is now offered of the sound team organization and functions, the sound design process, as well as the digital and analog equipment currently being used in the field of sound design.

The updating for this edition could not have been accomplished without the information, ideas, and counsel provided by the following practicing professionals/educators in their respective fields: Michael McNamara (lighting), Richard Dionne

(technical theatre), Richard K. Thomas (sound), Jake Pinholster (projections), and Sandy Strawn (properties). Their knowledge, information, and assistance have been invaluable in making this edition current in the areas of technology, materials, and practice.

Finally, I would like to thank those friends and colleagues who have offered suggestions for improving *Theatrical Design and Production*. In particular I would like to thank the following reviewers for their help in preparing the seventh edition of this text.

Jan Chambers, University of North Carolina

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Chapter I

Production Organization and Management



“Great art conceals art.” That statement has been attributed to Konstantin Stanislavski, founder of the Moscow Art Theatre and developer of Method acting. He was referring to the phenomenon that occurs when actors create brilliantly believable roles. Great actors don’t seem to be working. They make us believe that they *are* the characters they are playing and that everything they say or do is happening spontaneously, without thought or effort. Stanislavski meant by his aphorism that a seemingly effortless job of acting is the end result of years of training, dedication, and just plain hard work.

Great art *does* conceal art, but not just the art of the actor. Imagine a male actor, wrapped in a heavy fur cape, standing in the middle of the stage and delivering a soliloquy. The stage resembles a craggy mountain peak, with an angular platform surrounded by an immense expanse of solemn purple and blue sky. The actor strides to a rocky outcropping. Under his weight the platform slowly starts to tip. The actor scrambles backward to save himself and catches the hem of his cape on another “rock.” The cape comes off, and the **followspot** reveals the actor standing in his BVDs with his cape around his ankles. The spotlight operator, horrified, tries to turn off her light. But she doesn’t hit the right lever and, instead of turning it off, changes its color from deep blue to brilliant white.

This unlikely scenario illustrates the fact that less-than-great art conceals little. It also demonstrates that Stanislavski’s injunction can be just as true for the design and technical elements of the production as it is for the actors. Together, they can create the delicate illusionary reality that we call theatre. The illusion that the spectators see is just that. A great performance doesn’t simply happen; it is the product of a great deal of organization, teamwork, talent, and dedication.

Theatre folk have always delighted in surrounding the process of putting on plays with an aura of mystery. This tradition stems from the probably accurate belief that a play’s entertainment value increases if the audience thinks that the production just happens spontaneously. The Mickey Rooney and Judy Garland movies of the 1930s are perfect examples. Mickey, Judy, or one of their friends says, “Let’s put on a show!” Someone chimes in that her uncle owns a barn. Amazingly, the barn happens to have a highly polished linoleum floor that is perfect for tap dancing, and the barn is equipped with a full orchestra, sets, lights, and spectacular costumes. The show is an astounding success.

followspot: A lighting instrument with a high-intensity, narrow beam, mounted in a stand that allows it to tilt and swivel so the beam can “follow” an actor.

production team: Everyone working, in any capacity, on the production of the play.

production design team: The producer, director, and scenic, costume, lighting, sound, and other designers who develop the visual and aural concept for the production.

production concept: The creative interpretation of the script, which will unify the artistic vision of producer, director, and designers.

production meeting: A conference of appropriate production personnel to share information.

supernumerary: An actor, normally not called for in the script, used in a production; an extra; a walk-on.

The real world of theatrical production isn't like that. Getting a play from the written word to the stage requires a lot of challenging work. The result of all this effort, the **production team** hopes, will be artistic and artful, but the business of making a script come alive on the stage is a process that isn't all that mysterious.



The Production Sequence

How does a play happen? What sequence of events must occur for it to move from the pages of a script to a live performance before an audience? Every play goes through several stages of development.

Script

The overwhelming majority of theatrical productions begin with a script. This is not true, however, for every theatrical performance. The production of some plays begins with just an idea. That idea may be developed by the performing group in a variety of interesting and creative ways. Some of these concepts may evolve into written scripts, and others may remain as conceptual cores that the actors use as guides when they improvise dialogue during the actual performance.

Concept, Design, and Construction

We will assume that our hypothetical production begins with a traditional script. After the script has been selected, the producer options it, or secures the legal rights to produce it, and hires the director, designers, and actors. The members of the **production design team** read the script and then develop the **production concept**, also referred to as the “production approach.”

The production concept is the central creative idea that unifies the artistic vision of the producer, director, and designers. In many ways, any production concept originates with the personal artistic “points of view” of the members of the production design team. The personality, training, and prior experiences of each team member will shape and color his or her thoughts about the play. One of the primary jobs of the director is to mold these individual artistic ideas and expressions into a unified vision — the production concept — so that, ideally, each designer’s work supports the work of the other designers as well as the central artistic theme of the production. Normally, the production concept evolves during the first few **production meetings** from the combined input of the members of the production design team. The principles of the production concept are best explained by example.

Let’s assume that our hypothetical production team is working on a production of Shakespeare’s *The Merchant of Venice*. Most productions of this play would probably be traditional: Elizabethan costumes and a set that mimics the appearance of the Globe Theatre, the theatre most scholars think was used by Shakespeare. However, some production groups might choose, for a variety of reasons, to develop a nontraditional production concept. In a production of this play directed by Cosmo Catellano at the University of Iowa, the performance was set inside a World War II Nazi concentration camp. In this production, all of the actors in the play were portrayed as Jewish interns of the camp. **Supernumeraries**, dressed as Nazi officers and their female companions, sat in the auditorium and watched the play alongside the paying audience. Additional extras, in the uniforms of concentration camp guards and carrying weapons, patrolled the stage throughout the performance. While the script wasn’t altered, the radical production concept forced the audience to concentrate on the Jewish persecution themes that are very much a part of the script.



(1)



(2)



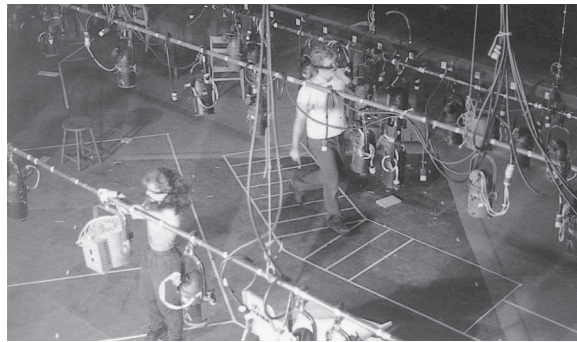
(3)



(4)



(6)



(5)



(7)

FIGURE 1.1
A great deal of backstage activity occurs before the production reaches the stage. Photo 1, 2 by Evon Photography, courtesy of the University of Arizona School of Theatre, Film, and Television. Photos 3-7 by author.

FIGURE 1.2
The director discusses a scene with the actors.



FIGURE 1.3
Scene shifting must be carefully organized and choreographed.

After the production concept is agreed on, the sets, props, lights, costumes, and sound are designed. Then the various diagrams, sketches, and other plans are sent to shops for construction, fabrication, or acquisition of the production elements (see Figure 1.1).

While the various visual elements are being built, the director and actors are busy rehearsing (see Figure 1.2). After the rehearsal and construction period, which usually lasts three to seven weeks, the play moves into the theatre, and the technical and dress rehearsals begin.

Rehearsals

Technical rehearsals are devoted to integrating the sets, props, lighting, and sound with the actors into the action of the play. During this hectic period, the patterns and timing for shifting the scenery and props are established. The movements of any scenic or property elements (see Figure 1.3), regardless of whether those movements happen in front of the audience or behind a curtain, have to be choreographed, or **blocked**, just as are the movements of the actors. This ensures that each shift will be consistent in timing and efficiency for every performance.

technical rehearsals: Run-throughs in which the sets, lights, props, and sound are introduced into the action of the play.

blocking: Movement patterns, usually of actors, on the stage.

**FIGURE 1.4**

Sound is normally run from an in-house position. Purdue Theatre sound mix position (courtesy of Michael Banks).

The shifts may be numerous or complex enough to warrant holding a separate **shift rehearsal**, in which the director, scene designer, technical director, and stage manager work with the scenery and prop crews to perfect the choreography and timing of all scenic and prop shifts.

The basic timing and intensity of the light **cues** will have been established during the **lighting rehearsal** (which precedes the first technical rehearsal). But during the tech rehearsals almost all of the light cues have to be adjusted in some way, because it is the rule rather than the exception that new lighting cues are added and old ones deleted or modified during this time. The lighting designer meets with the director and stage manager in the theatre to discuss the modifications and have a look at them. The intensity, timing, and nature of the sound cues are subjected to similar changes during the technical rehearsals (see Figure 1.4). Depending on the production schedule and the complexity of the show, there are generally one to three tech rehearsals over the course of a week or so.

Prior to any technical rehearsals, preliminary sound levels will have been roughly set for all prerecorded cues. After load-in, those cues will be tweaked for the acoustics of the auditorium. Ideally, separate rehearsals will be held to ensure that all wireless mics are working properly and that the positioning of the orchestra mics results in a well-balanced mix of their performance.

When producing a musical, there should be a full technical sound rehearsal, often called the *sitzprobe*, where the actors and orchestra sit (the *sitz* of *sitzprobe*), and sing/play through the score. This rehearsal is used to get preliminary balance levels between the orchestra and the performers' wireless mics in the performance space.

Unionized productions normally hold a "10-out-of-12" rehearsal: ten hours of rehearsal in a twelve-hour period. This is the first opportunity to bring all of the various design/technical elements together into a seamless whole and to practice all shifts and transitions so they will flow smoothly during the ensuing technical and dress rehearsals.

The **dress rehearsals** begin toward the end of "tech week." During these rehearsals, which are a natural extension of the tech rehearsals, any adjustments to costumes and makeup are noted and corrected by the next rehearsal time (see Figure 1.5). Adjustments to the various sound, lighting, and shifting cues continue to be made during the dress rehearsals. Depending on the complexity of the production and the number of costumes and costume changes, there may be one to three dress rehearsals.

After the last dress rehearsal, there are sometimes one to ten or more preview performances (with an invited audience and/or reduced ticket prices and no critics) before the production officially opens to the public and critics.

shift rehearsal: A run-through without actors to practice changing the scenery and props.

cue: A directive for action, for example, a change in the lighting.

lighting rehearsal: A run-through without the actors to look at the intensity, timing, and placement of the various lighting cues.

dress rehearsal: A run-through in which the actors wear costumes and makeup.

FIGURE 1.5

Costumes must be adjusted to fit properly. Photo by Evon Photography. Courtesy of University of Arizona School of Theatre, Film, and Television.



Theatre Organization

More than anything else good theatre requires good organization. Every successful production has a strong “artistic responsibility” organizational structure that follows a fairly standard pattern. Figure 1.6 depicts the organization of a hypothetical, but typical, theatrical production company. Each company’s structure is unique to its own needs, and it is doubtful that any two companies would be set up exactly the same. One particular feature of Figure 1.6 should be noted. In this flowchart the director and the designers are symbolized as equals. This equality is essential to the collaborative process that is theatre art and will be discussed at greater length throughout this book. The functions of the various members of the company will be taken up in the next section. It should be reiterated that this is an artistic responsibility or “make happy” flowchart. This simply means that the work produced by someone “reporting” to a position higher on the flowchart must artistically satisfy the visual requirements stipulated by that higher position. To illustrate, the visual appearance of the properties must satisfy the scenic designer. It is also important to note what this chart is not: this is not a work responsibility flowchart. A “work responsibility” flowchart would look significantly different. In the real world property masters normally do not “work for” scenic designers. Most property masters work for — are accountable to — the production manager for the on-time, on-budget, as-designed production of properties.

The production meeting is probably the single most important device for ensuring smooth communication among the various production departments. The initial production conferences are attended by members of the production design team. Their purpose is to develop the production concept. After the designers begin to produce their drawings, sketches, and plans, the production meeting is used as a forum to keep other members of the team informed about the progress in all design areas. At this time, the stage manager normally joins in the discussions.

When the designs are approved and construction begins, the production meeting expands to include the technical director and appropriate crew heads. As construction starts, the director becomes heavily involved in rehearsals. At this time, a few adjustments are almost inevitably necessary in one or more of the design elements. These changes should be discussed and resolved at the

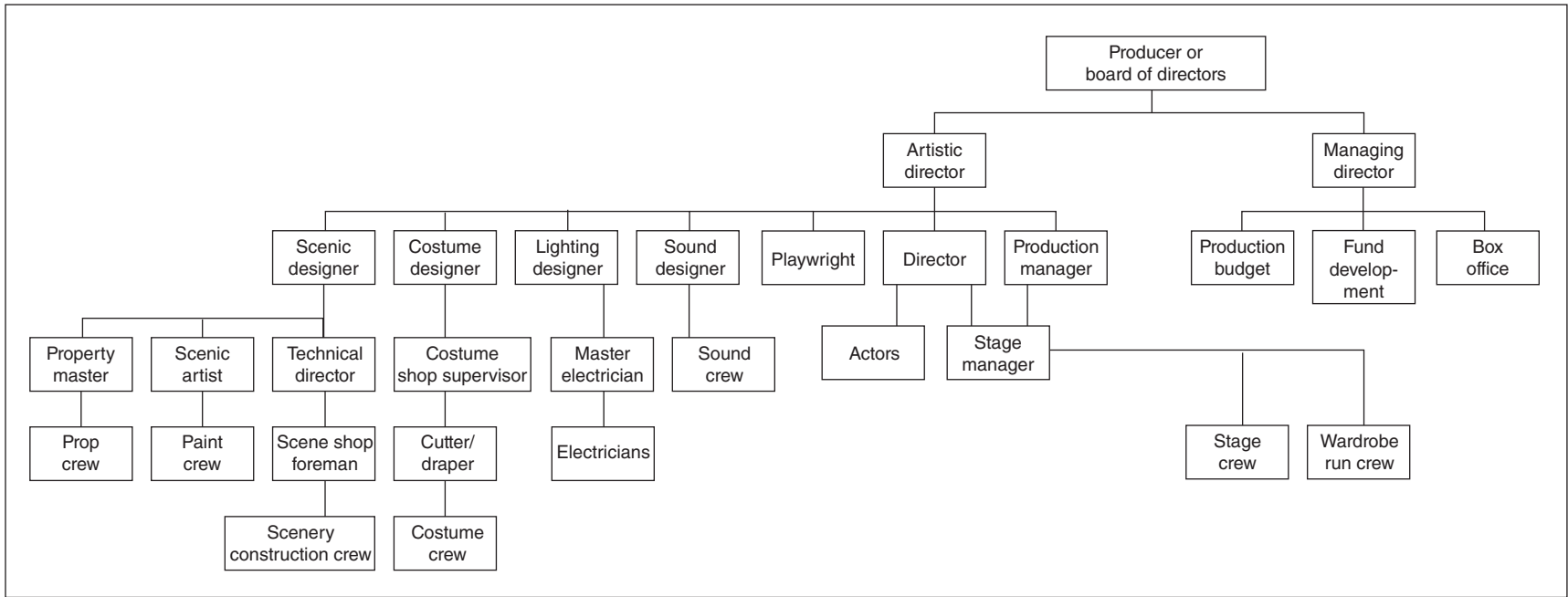


FIGURE 1.6
The organizational structure chart of a typical theatrical production company.

production meeting so that all departments are aware of the progress and evolution of the production concept.

While the production concept is being developed, the production meetings are usually held as often as it is practicable and necessary — daily or less frequently. As the meetings become less developmental and more informational, their frequency decreases to about once a week. The last meeting is usually held just before the opening of the production.

Who participates in production meetings depends, to a great extent, on the nature of the producing organization. A single-run, Broadway-type professional conference usually includes only the members of the production design team and their assistants. A production conference at a regional professional theatre includes the production design team and some of the other members of the permanent production staff, such as the production manager and technical director. For a professionally oriented educational theatre, the staffing of the production meeting is generally the same as for the regional professional production group and ideally will include those faculty supervisors overseeing the work of student designers, technical directors, and crew heads.

The development of advanced communication technologies and the reality that most professional designers are working on more than one project at a time often necessitate that much of the direct communication between members of the production design team take place over great geographical distances. Designs can be sent by overnight express, forwarded as e-mail attachments, or faxed. Phone or video conferences can be used in place of face-to-face meetings. While these developments speed the transfer of data and information, the isolation of the design team members from each other may break down the necessary communication flow within the group. But if everyone is aware of this potential “communication gap,” it doesn’t have to become a problem. More and more designers are communicating electronically, and we can expect even more “remote conferencing” in the future.



Production Job Descriptions

Although the organization of any company will fit its own needs, the duties of those holding the various positions will be much the same.

Producer

The producer is the ultimate authority in the organizational structure of a theatrical production. He or she is, arguably, the most influential member of the team. The producer secures the rights to perform the play; hires the director, designers, actors, and crews; leases the theatre; and secures financial backing for the play. The specific functions of the producer can vary considerably. In the New York professional theatre, most productions are set up as individual entities. As a consequence, the producer and his or her staff are able to concentrate their efforts on each production. They will sometimes be working on the preliminary phases of a second or third production while another show is in production or in the final stages of rehearsal, but in general they concentrate on one show at a time.

Regional professional theatres such as the Guthrie Theatre in Minneapolis, the American Conservatory Theatre (ACT) in San Francisco, the Arizona Theatre Company in Tucson and Phoenix, the Asolo Theatre in Sarasota, Florida, and others have been set up in every section of North America over the past forty years. Generally, these theatres produce a full seven- or eight-month season of limited-run productions. Some of them have active summer programs. Because of the

sweeping responsibilities imposed on the producer within these organizations, the functions of the position are generally divided between two persons, the *managing director* and the *artistic director*. The business functions of the producer — contracts, fund-raising, ticket sales, box-office management — are handled by the managing director, and any artistic decisions — selection of directors, actors, and designers, for example — are made by the artistic director. The managing and artistic directors are hired by the theatre's board of directors, which is responsible for determining the long-range artistic and fiscal goals of the theatre.

In educational theatre, the department chair and administrative staff frequently function in the same capacity as the managing director. The duties of the artistic director are often assigned to a production committee, which selects the plays and is responsible for their artistic quality.

In other nonprofit theatres, such as community or church groups, the functions of the producer are usually carried out by a production committee or board of directors, which functions as previously described.

Playwright

The playwright is obviously a vital and essential link in the production chain. The playwright creates and develops the ideas that ultimately evolve into the written script. In the initial public performance of the play, he or she may be involved in the production process. The playwright frequently helps the director by explaining his or her interpretation of various plot and character developments. During this developmental process, the playwright often needs to rewrite portions of some scenes or even whole scenes or acts. If the playwright is not available for conferences or meetings, the production design team proceeds with the development and interpretation of the script on its own.

Director

The director is the artistic manager and inspirational leader of the production team. He or she coordinates the work of the actors, designers, and crews so that the production accurately expresses the production concept. Any complex activity such as the production of a play must have someone with the vision, energy, and ability to focus everyone else's efforts on the common goal. The director is this leader. He or she works closely with the other members of the production design team to develop the production concept and also works with the actors to develop their roles in a way that is consistent with the production concept. The director is ultimately responsible for the unified creative interpretation of the play as it is expressed in production.

Production Manager

Theatres with heavy annual production programs, such as regional professional theatres and many educational theatre programs, frequently mount several productions or production series simultaneously, often in multiple theatres or venues. In many of these situations the directors and designers are hired or assigned for only one production per year. At the same time the "construction people" — those who actually build the scenery, props, costumes, lights, and sound — are normally hired on an annual basis to work/supervise all of the shows that are produced by that organization. Typically, the technical director runs the scene shop and supervises the production of the scenery for every play in the company's season. Similarly, the property director runs the prop shop and supervises the creation/acquisition of the props used in each production. The same applies for the costume shop supervisor, master electrician, and so forth.