DEVELOPMEMT OF STAGE LIGHTING IN ENGLAND AND AMERICA

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by

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INTRODUCTION

Of all the elements exigent to dramatic presentations, stage lighting offers the most fascinating study. Although ephemeral in quality, it is, paradoxically, diuturnal in its influence. The deficiency of it has influenced the drama as much as the abundance of it. Previously employed to perfect the art of other factors in stage production, it is now recognized as an art in itself. Following the advance of science and invention, it leads the development of histrionic art. The most important agent in stage production, it is the last to be developed. It stands as the one agent which binds all of the others into a single unified whole, historically, scientifically, and artistically.

During the vicissitudes of character and purpose of lighting throughout the centuries, the fundamental precepts and theories established by the ancients, have remained constant. Science and invention merely contributed quantity, quality, and flexibility; and art converted these contributions into illusion, realism, symbolism, and beauty.

These transmutations hold a great human appeal which has emicated from the lights of the theatre through all the time--that of romance. It flickered in the shadows of the candle-light, it flared in the red flame of the oil, it scintillated from the glare of the gas, and now it shines

through the multi-colored bulbs of electricity. Humanity seeks in the world of unreality, the fulfillment of those longings which it has so unsuccessfully sought in the world of reality; in the light and shade of stage illusion, at brief intervals, it is satisfied.

CHAPTER 1

The Origin of Stage Lighting and Its Development in Medieval Drama and Civic Pageantry

The origin of stage lighting in England, as well as on the Continent, is found in the ritual of the pagan religion.[1] At the seasonal festivities the primitive people lighted huge bon-fires and ran about the fields with flaming torches in order to disperse unfriendly spirits. In November the Druids performed gruesome ceremonies around the huge fires high on the carnes in cleared spaces, and afterwards carried away the consecrated coals to their newly swept hearths to light their fires for the coming year.[2]

From these religious ceremonies evolved certain folk dances and songs. The first conscious use of light for effect is found in these dances in which the performers wore stones in their hair and around their bodies. In order to enhance the brilliance of the stones, attendants with brightened shields reflected fire light constantly upon the dancers.

Sunlight served the mimes which Caesar brought from Rome to entertain him with their varied dramatic repre-

1- Early English Plays--Edited by H.C.Schweikert p. 5
2- A complete History of the Stage--Charles Dibdin vol. 2 p. 224

sentations.[1] The Anglo-Saxon's scop or gleeman entertained the guests at important celebrations and feasts in the great halls by the flickering light of the torches and the fire-place.[2]

Gradually as the influence of Christianity was felt, dances were changed to magnificent pageants glorified by the multi-colored light of cathedral windows and dignified by the soft light of many candles. Among the common people the local festivities were retained and later became the foundation for the civic pageants which contributed to the development of stage technique in the fifteenth and sixteenth centuries.[3]

Candles were used in the church mass, not as a means of illuminating the scene, but of symbolizing the life of Christ. In the third century the church had adopted the custom, among other pagan ceremonies, of lighting torches to the martyrs in the daytime as the heathens did to their gods. The allegorists of the church spiritualized the burning candles for the edification of the devout. According to them the candles represented Christ; the wax signified his flesh; the fire, his duty; the wick, his humanity; and the light, his doctrine. The wick further signified humility; the moulded wax, the obedience and the flame, the love of God.

1- A complete History of the Stage--Charles Dibdin vol. 2 p.224
2- The dramatic History of the World--Kolachelam Sreenvasa p. 80
3- William Hone--"Ancient Mysteries" p. 17

Also the wax and wick represented body and soul; and the light, the shining faith.[1]

Drama developed from this symbolic nature of the service of the mass. The clergy, in order to place more realistically the salient points of Christ's life before the congregations, chose the first dramatic scenes from the two great church festivals, Easter and Christmas. Very simple was the first dramatic scene, a four lined dialogue or trope spoken by four priests two of whom represent angels, and two, women. The setting is a sepulchre placed on the high alter and lit with candles.

> "Quem quaeritis in sepulchro (o) Christicolae?" ("Whom do you seek in the sepulchre, O Christian woman?") asks one of the angels.
> "Jesum Nazarenum curcifixum, O Caelicolae?) ("Jesus of Nazareth who was crucified, O Heavenly Ones,") the women reply, and are answered:
> "Non est hic; surrexit sicut praedixerat. Ite mentiate quia surrexit de sepulchro." ("He is not here; He has arisen even as He foretold. Go, announce that He is arisen from the sepulchre.")[2]

To this simple dialogue additions were made from time to time accompanied by changes of setting. As the dramatic form grew more intricate and the setting more elaborate, the physical characteristics of the stage gradually changed,

1- Charles Hastings--The Theatre, Its Development in France and England and a History of Its Greek and Latin Origins
2- William Hone--Ancient Hysteries--Described Especially the English Miracle Plays Founded on Apocryphal New Testament Story.

and upon these changes is based the development of lighting in the medieval theatre.

Nicoll divides the Medieval Theatre into six different groups: the church as a theatre; the church-like arrangement of the acting place when first the drama was brought into open air; the stationary setting; the pageant; the round, and the curtained platform.[1]

In the church theatre he finds three different arrangements for presenting liturgical drama; at first the sepulchre was placed on the high altar to the east of the church; then it was removed to the north side; later were added different scenes which were acted in the different aisles, thus giving rise to the form of the stage when the drama passed to the open air.

There is no evidence that candles were used other than symbolically while the performances were given before the high altar. Apparently, candles and tapers were a means of gaining illumination and effect after the sepulchre was moved to the north side. An early record belonging to the church of Durham before the suppression alludes to the ceremony on Good Friday, "Desposition Crucio," in which lighted tapers were placed before the sepulchre, which burned until Easter morning. The ceremony "Alevalio Crucio" on Easter morning declares, "----and at every corner did start one of these ancient gentlemen to bear it over the said image, with the Holy Sacrement carried by two monks around the church, the

1-Nicoll. The Development of the Theatre. p. 64

whole quire waiting upon it with goodly torches and great store of other lights."[1]

In an old play "Magi" which developed at the end of the eleventh century, we find an attempt to construct a movable star from a chandelier made in the form of a crown illuminated with tapers, the first crude beginning of the use of machinery in light effects. In order to aid the imagination and to indicate the time element, the directions are given for this part of the performance:

> "Let the middle one of the three kings coming from the east, pointing with his staff at the star, say in a loud voice, 'This star blazes with exceeding brightness.' Let the procession having drawn up in the nave of the church, make a stand. Moreover, when the procession begins to enter the nave of the church, let the corona# hanging before the cross, be raised in the fashion of the star; and let the Magi pointing to the star proceed up to the Image of Holy Mary."

Directions found in a twelfth century manuscript show a further development. Not only does the star rise, but moves forward guiding the shepherds.

> "--then let them point out the star to each other and say, 'Behold the star!' Behold the star!' Behold the star!' Then the star moving forward let them follow after and the star leading them, saying--"[2]

In many instances a real artistic setting is discovered in the performances by the clergy. One account describes a performance given on Easter day in which the al-

1- Joseph Quincy Adams--Chief Pre-Shakesperian Dramas
2- Ibid
#- The corona was a chandelier in the shape of a crown, illuminated with candles, and hanging above or slightly in front of the altar. Ibid

tar was made in a high place in the church with many steps leading up to it. The steps were decked with black cloth and on every step was placed a silver candle-stick with a burning candle. The soldiers who guarded the sepulchre were in harness "as bright as Saint George, which keeps the grave till the priests come and take him up: And them commeth sodenlie a flash of fire, wherewith they are all afraid and fall down."[1] This is the first instance found of light being used for spectacular effect.

It is apparent from the sudden flash of fire and from the arrangement of the candles, that those in charge had realized the value of lighting effects, and were using every available resource to improve them. The illumination of celestial beings and the introduction of the deity by lightning and thunder was a favorite effect used in the miracle and mystery plays, and later in the Renaissance Theatre. Originally invented by the clergy to frighten and awe their congregations, lighting effects were later developed as a beautiful spectacle to delight the eyes of the nobles.

When the church theatre had reached the third stage of its development, lighting had developed from its original symbolic nature to that of a spectacular one, and fairly elaborate lighting effects and machinery were employed in the productions. Lightning was made by throwing resin and gun-powder into the candles, Deities were hoisted

1- William Hone--Ancient Mysteries (etc.) p.30

to the roof of the church, Hell was represented by constructions of flax and linen. The red light of Hell and the celestial light of Heaven were always carefully planned.[1] It is possible that at this time performances were given at night and illuminated by candles, torches, and cressets. Cressets or crudely woven baskets of iron, mounted on poles, were filled with blazing pine knots and pitch, and emitted a fitful, flickering light.

When the liturgical stage passed from the church theatre to the open air, it retained its original characteristics, that is the convention of simultaneous action. The boxes or platforms known as houses or mansions were placed alongside each other according to their original geographical arrangement in the church.[2]

Stage lighting in the open theatre was limited to spectacular fire effects which were needed to make events more realistic. At Coventry the Copper's Pageant possessed a "hell-mouth" and the Drapers were provided with a windlass, a means of showing fire belching from the mouth. Hell provided the pageants with many spectacular effects, because it was generally belching smoke and fire. Lucifer was often depicted as going down to hell apparelled in a robe of fire. Belial in "The Castle of Perseverance" was

1- William Hone--"Ancient Mysteries- (etc.)"
2- Brander Matthews--"Evolution of Scene Painting" Scribner's

to look as if he had gun-powder burning in pipes in his hands and ears. Devils appeared and ran about the stage with long flaming spears on which they prequently threw resinous pitch from which issued terrible flame and smoke, others carried black rods full of squibs. Occasionally they set one of the "mansions" on fire and conflagration was then added to the general effect. [1] It was discovered that a brand soaked thoroughly in aquavitae burned readily. The Holy Ghost was made to descend like a great fire-brand artifically made with squibs. There was no concentrated place of action, no unity of time or place. The space in front of the houses was for general action, consequently there could be no unity of lighting in relation to time and place. It is possible that there was a representation of night made by a black cloth hung at some place on the stage.

The sky was sometimes represented in a most beautiful order with the orbits for the heavens made of huge wheels constructed to move in the air from the center to the edges, and filled with small lamps to represent stars. [2] There must have been some arrangement by which light could be made to shine suddenly, as there are several instances found in which beams of light appear "overwhelmingly bright." In the play "Mary Magdalene" a cloud descends from heaven and sets a temple on fire. Vice, in the "Play of Love" leaves the stage and runs about the audi-

1- Nicoll--The Development of the Theatre p. 72
2 Ibid p.74

ence carrying a copper tank on his head full of burning squibs.

With the passing of the miracle plays and the introduction of the interlude, elaborate settings were unnecessary. The plays were generally given in courts with more emphasis placed upon properties and costumes. They were generally given at night which necessitated the use of candles or torches for illumination. There was no simultaneous action, and unity of time and place was given more attention.

Civic Pageants

It is well at this point to review briefly the element of civic pageantry and the influences of John Rastell in the development of stage lighting.

Pageantry evolved from the "masked ridings" of folk origin which developed into elaborate processions, assumed the symbolic characteristics of religious drama, borrowed from the court entrements and French pageants, and emerged a gorgeous colorful affair of movement, music, speech, and plot, decorated by ingenious scenic devices and later roofed by temporary vaults, made in many instances to represent heavenly orbits in dazzling array.

They were generally exhibited in the larger towns in England to entertain foreigh monarchs; to celebrate the coronation of kings and queens on their return from abroad; to observe the setting of the mid-summer watch, and the Lord Mayor's show. Therefore the cities employed a number of

artists to furnish machinery for the pageants and to decorate them and dispose of them when not in use. Being paid officials, they probably were on the alert for new devices and machinery in order to improve the elaborate and magnificent displays.

Apparently the early pageants were little more than processions. There are records of a London pageant as early as 1236 in honor of the coronation of Queen Eleanor. In the early part of the 16th century when Elizabeth departed from Greenwich by water, she was attended by the city fathers in new barges which were richly decorated. One barge was made especially elaborate with a great red dragon spouting flames of fire into the Thames. [1] With this lighting effect, the procession must have been at night. The dragon was probably a relic of some religious play.

From 1510 to 1536 many of the London pageants were conducted under the supervision of Rastell, who was probably the first to carry over his experiments in pageant production to the stage of the drama. Rastell was a scholar, dramatist, chronicler, and printer. In 1524 he built the earliest stage known to the historian of the Tudor drama, at Finsbury Fields not far from the district where Burbage and Alleyn erected their theatre over half a century later. [2]

1- W. M. Wilmington--Annals Founders- vol. 1
2- A. W. Reed--Early Tudor Drama p. 18

In 1520 Rastell made and decorated the roofs of the Banqueting Hall for the Field of the Cloth of Gold, which were astronomical in nature. In 1522 he devised a pageant in honor of the visit of Charles V and Henry VIII, when they passed through the city to St. Paul's. Hall records a description of it. I quote a portion of it:

> "There was builded a place like heaven, curiously painted with clouds, orbes, starres, and hierarchies of angels. In top of the pageant was a great type, and out of the type sodainly issued out of a cloud a fayre lady richely apparelled, and then all the ministrels which were in the pageant played and the angel sang, and sodainly again she was assumpted into the cloud which was curiously done."[1]

Rastell must have made use of the scenic devices which were in use in the Renaissance Theatre; but which were not in general use in England. It Greenwich in 1527 Rastell devised a pageant "Father in Heaven" and an interlude "Love and Riches" for the entertainment of the French ambassador who came to arrange a marriage with Princess Mary. Two halls were built, one for the banquet, and the other for the pageant. A curious feature was an arch between the two halls in which was displayed a painting by Hans Holbein of the "Taking of Teronenne."[2] Here we have elements of stage technique displayed separately.

The following is an account given by Hall of Rastell's work:[3]

1- Hall--Chronicles- Quoted by Campbell- p.99
2- R. O. Misc. Bks. Exchequ. T.R. p. 227
3- Hall, Chronicles

> "On the ground of the rofe was made the hole earth environed with the sea, like a very mappe or charte, and by a conning makying of a nother cloth, the Zodiache and the two poles apered the earth, and water compassing the same, and in the Zodiak were the twelve signes, curiously made, and above this were made the seven planets as Mars, Jupiter, Sol, Marcuries, Venus, Saturne, and Luna, every one in their proper houses."

From the above description in is probable that he had a knowledge of Vitruvius' great book on architecture, in which is a precept that one of the subjects in which a painter should be schooled is a thorough knowledge of astronomy. If he had read this book, it follows that he must have used many of the scenic machines described in it for his own use, particularly on the stage he built in 1524.

It is unfortunate that no description of this stage has so far been discovered. The only information concerning it is found in a law suit published by H. R. Plomer and included by Prof. A. W. Pollard in"Fifteenth Century Prose and Verse." The materials of which the stage was built are cited to be board, timber, lath, nail, sprig, and daubing to the value of fifty shillings; but, no other account is given.- Rastell undoubtedly staged many plays there, including his own interludes which were given by candle light, and probably produced after the manner of the contemporary stage of the Renaissance.

It is uncertain whether or not John Rastell made any

contributions to the development of stage lighting. We know that he undoubtedly possessed authentic knowledge concerning stage presentations, and that he owned a theatre in which he produced many plays, among which were several of his own composition.

This view of civic pageantry serves only to trace the possible origin of astronomical and celestial lighting used in the scenes as late as the Restoration period. In these scenes lighting was employed to enhance the glory of the divinities and the beauty of decorations, as well as to improve visibility.

In conclusion, a brief review of the medieval times, shows that light was used very simply in the liturgical drama to express symbolism, to illuminate the scene, and to aid the dramatic action, the artistic effect, and the spectacle. Candles and tapers were utilized in the symbolic ritual of the church service. At first they were stationary about the altar; but later they entered the action of the ritual and were lighted or extinguished as needed. Cressets and torches were employed chiefly for purposes of illumination, and were carried in processions and held to light the simple action. For artistic purposes candles and tapers were used and the effect obtained depended on arrangement. In dramatic action coronas were paramount, while for spectacular purposes, squibs, brands resin, pitch and gunpowder proved sufficient. Light was also represen-

tative and used to differentiate between night and day, to depict Hell; but not to give unity of time or place.

The lighting of the civic pageantry was indicative rather than progressive. The chief value derived from the study of this period is the discovery of John Rastell and his relation to the progress of production. He serves as one of the links between the civic theatres and the court theatres, and it is not improbable that through him, the Renaissance stage lighting and scenery was introduced to the civic stage in England at an earlier date than has been conceded by authorities.

CHAPTER 11

The Lighting of the Italian Renaissance Theatre

In order to understand the influence which the Italian Renaissance Theatre exerted upon the lighting of the English Tudor stage, particularly, the presentations at the universities and courts, it is necessary to review its origin and devlopment, as well as the contributions of the outstanding authorities of the time. Such a review will reveal the fact that the fundamental laws and precepts of stage lighting are embodied in the works of these early masters, and that time, science, invention, discovery, and art have only modified and developed them.

Primarily, the interest of the Renaissance Theatre was in the rediscovery and application of perspective to scenery, and the source of this research lay in the early artnof Greece and Rome. As early as the beginning of the fifteenth century, Vitruvius' work "De Architectura," a formal dissertation on the ancient artists was discovered. Under the auspices of the Roman Academy, Sulpitius Verulamus published the first edition in 1486.

In Book V of "De Architectura" is a discourse on theatres in which Vitruvius describes the "scene" of the ancient theatre, where we find the first use of painted scenery.

> "In the center are double doors decorated like those of a royal palace. At the right and left are the doors of the guest chambers. Beyond are spaces

provided for decoration-places that the Greeks call "Tepidktoi" because in these places are triangular pieces of machinery which revolve, each having three decorated faces. When the play is to be changed, or when the Gods enter to the accompaniment of sudden claps of thunder, they may be revolved and present a face differently decorated."

And later he writes in regard to scenes:

"There are three kinds of scenes, one called tragic, second, the comic, third, the satyric. Tragic scenes are delineated with columns, pediments, statues, and other objects suited to kings; comic scenes exhibit private dwellings, with balconies and views representing rows of windows, after the manner of ordinary dwellings; satyric scenes are decorated with trees, caverns, mountains, and other rustic objects delineated in landscape style."

There is no mention of artificial lighting. Obviously none was needed in the early outdoor theatre. These ingenious people started performances in the last darkness before dawn, and utilized the rising sun, and the disappearance of the moon and stars for the dramatic setting, thus establishing unity of time and setting. In Euripides' "Iphigenia at Aulis" the play opens with the dawn.

"Agamemnon (To attendant): 'What star is that there sailing?'

Attendant: 'Sirius, in his middle near the seven Pleiads riding.' "

And later, when dawn begins to break:

"---that silver light
Shows the approach of morn, the harbinger
Of the sun's fiery steed."

Vitruvius was translated into several languages and all the great artists of the time followed his precepts. The fact that perspective in relation to stage scenery

interested such artists as Mantegna, Peruzzi, Raffaello, and Leonardo da Vinci; and that for two centuries the art of the stage developed under the patronage of scholarly research, cannot be too strongly emphasized.

The physical characteristics of the stage upon which lighting is so dependent, underwent considerable change from the three scenes which Vitruvius described, to the building of the Teatro Farnese at Parma in 1618. Records show that plays produced in the fifteenth century were given on stages five feet high against a background composed of five columns dividing the set into four compartments, each compartment closed by a curtain behind which was a tiny room.[1] Each room denoted a separate locality. An account of a play given in 1471 at Ferrara describes the wooden stage as erected in the court yard, and composed of five battlemented houses with a window and door in each. There was apparently no unity of place, for in the course of the performance, a ship came sailing serenely across the court-yard.

At first the performances took place by daylight in the court yards of the nobles. Frequent showers spoiled the costumes and the sets which became more and more elaborate. This necessitated producing plays in-doors. by

1- Nicoll--The Development of the Theatre p.84

artificial light. Spectacular effects were then introduced to delight the eyes of the nobility. Here a scene was painted to ornament the background, there an attempt was made to represent the splendour of the heavens, by using brass lamps for planets in all their glory. Dramatic episodes of the Bible offered a field for lighting effects; always the Holy Ghost was brilliantly illuminated, and consideralbe use was made of burning altars and flaming swords.

Basing his work upon the precepts of Vitruvius, Serlio constructed the three scenes architecturally according to perspective, with wooden frames and canvas. A street occupied the center of the scene with diminishing houses built on either side. The whole scene ended in a backdrop, painted in perspective.

When Palladio constructed the first permanent theatre at Vicenzo in 1560, he built a permanent architectural facade. The stage was long and narrow. Behind it was the proscenium. In the proscenium facing the audience was a large open arch planked on each side at equal distances by two smaller ones. Behind each were perspective alleyways which had the appearance of streets entering a court, which was the stage. The windows of the houses on the perspective streets were lighted by means of lamps to give a realistic appearance.

Scamozzi's theatre built at Sabbioneta in 1588 re-

tained the playing space of the Olympic; but instead of the five perspective alley-ways, Scamozzi constructed a ramped stage with a single wide perspective scene. Here the proscenium approached the modern proscenium behind which all of the action took place.[I]

The Teatro Farnese, built in 1618 shows a still further development. It contained the long narrow platform, but the original archway in the center was widened to extend the entire width as a proscenium arch, behind which was the stage depth designed to contain the comic, satyric, and tragic settings. A few years later this proscenium arch was recognized as the means of regulating the lighting and changing the scenes.

The three men who made the greatest improvement in lighting the Renaissance stage and whose precepts were surprisingly modern, were Sebastiano Serlio, Nicolo Sabbatini, and Leone Hebreo de'Sommi. Sebastiano Serlio published in 1505 his work "Architettura" which is based on Vitruvius and the work of his own master, Baldassare Peruzzi. It is in this work that we find the first definite precepts for stage lighting. He writes about the use of colored lights, spectacular effects, and natural phenomena.

To make colored lights, he advises the use of white

I- Sheldon Cheney--Stage Decoration

and red wine bottles filled with wine or colored water, diluted to the desired shade. Back of each bottle is arranged a lamp. In case a very bright light is needed, a torch is placed behind the bottle of wine, and a bright basin behind the torch acting as a reflector.

Serlio goes into considerable detail regarding spectacular effects. For conflagrations he advises the thorough wetting of the objects to be burned, with excellent aquavitae and setting them afire by means of a candle. Lightning effects are most intricate.

> "There must be a man placed behind the Scene or Scaffold in a high place with a boxe in his hand, the cover whereof must be full with holes, and in the middle of that place there shall be a burning candle placed. The boxe must be filled with powder of vermus or sulphire, and casting his hand with the boxe upwards the powder flying into the candle will show as if it were lightning. But touching the beams of this lightning you must draw a piece of wire over the scene, which must hang downwards, where on you must put a squib covered over with pure gold or shining sattine which you will: and while the Bullit is rouling you must smoote some piece of Ordinance and with the same giving fire to the squibs, it will worke the effect whiche is desired."[I]

Serlio also mentions the fact that the moon must be made to appear to rise and set, and the sun to go around the world. This suggests the use of machines for lighting effects, also, and attempt at establishing unity of time and setting. He describes "God descending down from Heaven," of the "bright Moone ascending only with her

I- Quoted from Serlio "Architecture" by Lily B. Campbell in "Scenes and Machines" Page 39

hornes," of the sun rising, making his course around the world, and at the end of the play, going down "most artificially."I

A description of the contrivance used to represent the sun is given by Vasari in an account of the celebration of the nuptials of the Duke of Casimo in 1539.

> "He then arranged with much ingenuity a lantern of wood in the manner of an arch. Behind all the buildings, with a sun one braceio high, in the form of a ball of crystal filled with distilled water, behind which were two lighted torches, which rendered the sky of the scenery and prospect-view so luminous, that it had the appearance of the real and natural sun. This sun, which had around it, an ornament of golden rays that covered the curtain, was drawn little by little by means of a small windlass that was there, in such a manner, that at the beginning of the performance the sun appeared to be rising, and then, having climbed to the centre of the arch, it so descended that at the end of the piece it was setting and sinking below the horizon."II

In the middle of the sixteenth century, Leone Hebreo de' Sommi, an actor and stage manager, wrote a discourse on the presentation of scenes, "Dialoghi in Materia di rappresentazioni sceniche" in which he gives definite theories upon stage lighting. He placed lights on the roof tops of the houses on the stage to aid the brightness and joyousness of the comedy. He followed an ancient custom of lighting fires in the streets, on house tops, and on towers as a sign of gladness. In a tragedy,

I- Quoted from Serlio "Architecture" by Lily B. Campbell in "Scenes and Machines" p. 39
II- Ibid

he extinguished all the lights except those used to illuminate the scene, as a sign of sorrow.[1] Here he established one of the principal precepts in the art of lighting--to accentuate mood.

He relates the production of a tragedy in which there were several happy episodes. This necessitated the invention of a contrivance by which he could have bright scenes for the comedies, and dark scenes for the tragedies. His theory regarding the lighting of the auditorium is based on a law of optics, that a person in a shadow can see much better an object brightly lighted at a distance, for the sight moves with less hesitation and with greater concord to the subject, or the object comes more harmoniously to the apprehension of the eye. Accordingly he placed most of the lights behind transparent and coloured glass. The very few lights that he used in the auditorium, were shaded and set behind the audience in order to protect their eyes and not to interfere with their view of the stage, which he illuminated very brightly.

There were many controversies over the placing of the lights. Some were of the opinion that they should be placed overhead facing the audiences, and others, that they should be placed behind the houses or the sky

1-- Quoted by Nicoll in "The Development of the Theatre" P. 213

borders.[1]

Nicola Sabbatini in his "Practica di fabricar Scene e machine ne' Teatri," Ravenna,* (1638) does not approve of overhead lighting. He prefers lighting the scene from the side to give brightness and shade necessary to stage illusion. The origin of footlights may be attributed to him. He suggests that a parapet should be erected towards the front of the stage some few feet high with lights placed behind it. He also advises the placing of lights behind the "heavens" and the side "case."

He gives a careful description of the construction of the "Heavens."

"When the stage floor has been arranged, first that mjst be given to the heavens, which are either 'entire' or 'cut': if entire, there will be little difficulty, for these are made with three or four rounded frames or arches, when these are placed in action they are given a slope of two inches in a foot, and are fixed firmly and well to the beams of the roof or some other support so that they are secure. Then to these frames there are affixed lengthwise, long thin rods, nailed on at suitable distances. When this piece has been finished the cloths are stretched over the rods----When in intermedii it is necessary for machines to ascend to the sky or descend thence to the stage, one must have a cut heaven, both for convenience and for the delight and wonder which audiences take in it, since they cannot see how the machines which rise from the earth, disappear, or how they descend from the heavens to the stage."2

1- The first mention of invisible lighting adopted by Garrick in 1785. Were sky borders used then?
2- Quoted in Nicoll "The Development of the Theatre p. 102

Sabbatini gives directions for making special lighting effects. If the "Periaktoi" are soaked in aqua-vitae, lighted and then rapidly turned, they will have the qppearance of a conflagration. He also writes that houses on fire may be made to fall in ruins by constructing the frames connecting iron bars, which when pulled away, would remove the necessary support.

He suggested that lights may be hung along the parapet, as described before, or arranged in the arch if the arch is provided. He experienced difficulties in placing the lights. Both oil lamps and torches had their disadvantages for if they were arranged in heavens they interfered with the machines, while if they were hung from the parapet, they were too low for satisfactory light; when arranged within the houses, they interfered with the changing of scenes. Thus, we see that very early the judicious arrangement of lights was considered important in stage production and that difficulties were experienced then as now.

Sabbatini invented a contrivance worked with pulleys by which shades could be lowered and raises at will, thereby establishing unity of time. He devised a rather unique method of creating lightning. He placed in the heavens, boards a foot wide in which zig-zag rifts had been cut. The edges had been cov-

ered with gold leaf. When a candle was placed behind each board and the rift in the board opened and closed quickly, the effect was of lightning.[1] His invention was at least an improvement over the original method in which a black-board with a bright yellow zig-zag painted on it, was hurled down from the heavens. Presumably, the thunder was created when the lightning bolt hit the stage. The thunder accompanying Sabbatini's lightning was created by a thirty-pound ball of iron or stone rolled down an uneven set of steps, fixed in a channel in the chamber overhead. He contributed, in addition, many experimental methods by which scenes were shifted, transformations effected, and other spectacular devices operated.

An account by Filippo Baldinucci (1624-96) of a performance at the Teatro Medicco, which was constructed by Bernardo Buontalenti, shows the typical Renaissance scenery.[2] Against the background of a perspective, which was of peculiar buildings and squares of the city, were shown the different intermedio scenes. The first was composed of all of the Virtues in a cloud which disappeared gradually; then in a cavern full of terrible flames and smoke, all the evils of the world

1- Lily B. Campbell--"Scenes and Machines on the English Stage" p. 158
2- Nicoll--"The Development of the Theatre"

were shown, and from this, appeared a city of Dis in flame and smoke, with high towers in flames; the third scene was a winter one which changed before the eyes of the audience to spring with all of its embellishments; the fourth was a sea scene with tritons and sea-monsters and ships in storms; the fifth required considerable art in depicting a moonlight scene which gradually was obscured by a storm of thunder and lightning, in the midst of which appeared a serene cloud of lovely colour. Above appeared Juno's chariot with Nymphs symbolizing day and night, rain fell from the cloud, then a most natural rainbow, which astonished everyone, appeared.

CHAPTER III

The Lighting of the Court and University Stages in England

It is small wonder that the English Masques exerted considerable influence upon the development of stage technique. As early as 1545 a definite office was created for the Master of Revels of Court. Owing to the interest of royalty in such entertainments as disguising and entrements, no little sum of money or time in research was expended in making each successive masque more elaborate and magnificent than the preceding. Those in charge were always upon the alert for innovations and frequently borrowed from the Renaissance stage. It is but natural that stage technique would flourish under the pleasure-loving Tudors and attained the highest point known in its development under the reigh of Elizabeth.

The English masque originated in the unorganized revels and maskings at court. The development of the physical character of the stage upon which the masques were performed can be divided into five definite periods with the accompanying changes of the stage lighting.

At first the masque was a mere pageant rolled in for the entertainment, composed of song, dialogue, and

dance, then left either at one end of the hall or taken out. Later many pageants were brought in and grouped about the hall, similar to the mansions of the religious plays. Inigo Jones then concentrated the various pageants of the masque at one end of the hall; sometime later he elevated it upon a temporary platform; and finally placed the whole multiple set within the proscenium wall, from which originated the modern picture-frame stage.

In its earlier form, the masque was an elaborate movable device representing a mountaink a moon, a palace, or any spectacular object, with masked ladies and gentlemen arranged on it to form a tableau of some allegorical nature. Lanthornes and candles were generally placed about, for decorative purposes only. Torch bearers preceded or accompanied the pageant for purposes of illumination.

There is an account of an interesting pageant given at court to celebrate the marriage between Prince Arthur and Princess Catherine of Arragon. It was made round after the fashion of a lanthorne, a lamp used at that period. The lanthorne, which was invented by King Alfred, consisted of a candle enclosed by four sides made of transparent horn. The pageant contained many windows and more than a hundred great lights, all so transparent and so brilliantly lighted that the performers within could easily be seen.

In another pageant made to resemble a tower, mention is made of the numerous lights used and the wonderful effect produced. Torch bearers were always numerous. Aside from illuminating the scene or adding to the splendor of the spectacle, they frequently took active part in the performance.

Torches at that time were made of fibrous plants twisted together like a rope and besmeared with pitch and wax. Some were made of wood bound by a rope drawn around them in a spiral form or surrounded by circular bands at equal distances. The inside was probably filled with flax tow saturated with pitch, wax, or oil. Such torches used as footlights are shown in an early seventeenth century engraving of a French masque.[1] The

1--This engraving is in my possession. No one has been able to identify it with a definite production. In the foreground is an artificial sea with dragons swimming across, bearing on their backs a very ornate rectangular boat, so covered as to obscure the masquers from view. Back of the sea is a large hall erected temporarily of foliage, elevated about three feet above the water, and enclosed on three sides, the fourth being open to the view of the spectators. Across the platform in front are the torches and sconces. The room is brilliantly lighted by nineteen large candelabra each containing eight large wax tapers. A door in the center of the back gives a view of another room. Two torches are placed in the center, several feet back from the center of the doorway. On either side, center against the wall is a table piled high with gold plate. Chairs are placed along the side and back walls. This is identical to the description of the early sixteenth century masques.
This engraving, as far as is known, is the earliest depicting any stage. The engraving of a scene of "The Princess of Morocco", produced in Charles II!s time, is generally supposed to be the earliest and very rare.

torches are nine in number, and are placed at regular intervals across the platform in the front.

Beyer indicates that in 1513 there was a fixed building for the masque. A definite hall provided a place for more elaborate productions, consequently many innovations were introduced among which was the use of reflectors. They are first mentioned in an account by Holinshead in 1520.[1]

> "On the seventh daie of Maie prepared a disguising, and caused this great chamber at Greenwich to be staged, and great lights to be set on pillars that were gilt, with basons and the roofe was covered with blue sattin set full of presses of fine gold and flowers."

Records show that vast sums were expended upon the lighting of the masques. It is difficult to differentiate between supplies provided for the lights of the hall and those that adorned the scene itself. One thing is certain, that the masques were given at night and most of their effectiveness depended upon skilful arrangement of the lights.

In 1527 movable and fixed scenery were combined; but not definitely so. There was no perceptible change in lighting, except an increase in elaborate effects.

In 1603 the employment of Ben Jonson as poet of the revels and of Inigo Jones as court architect, marks the beginning of a great epoch in court performances.

1--Holinshead. Vol. III Page 635

Inigo Jones had received his training in Italy and had returned to England fully equipped with adequate technique and knowledge of the Renaissance stage.

Their first joint effort "The Masque of Blackness" presented in 1605 established the principles of concentrated scene, the elevated stage at one end of the hall, the use of a painted curtain, and a roof over the whole masque. I quote only those parts of the description given in Jonson's works which show the effect of lighting.[1]

> "The masquers were placed in a great concave shell like mother-of pearl, curiously made to move on those waters and rise with the billows; the top whereof was stuck with a chevron of lights....on the sides of the shell did swim six huge sea-monsters, varied in their shapes and dispositions, bearing on their backs twelve torch bearers, who were planted there-on in several graces, so as the backs of some were seen, some in purple, or red, other in pale; and all having their lights burning out of whelks, or murex-shells."

Later on,

> "...the moon was discovered in the upper part of the house, triumphant in a silver throne, made in a figure of a pyramid. Her garments white and silver, the dressing of her head antique, and crowned with a luminary or sphere of light; which striking on the clouds, and heightened with silver, reflected as natural clouds do by the splendour of the moon. The heaven about her was vaulted with blue silk, and set with stars of silver, which had in them there several lights burning."

The masque "The Hue and Cry After Cupid" presented in 1608 marks a very important development in the matter

1--Jonson--Works Vol. III Pages 3-10

of stage lighting. Previously, all of the lighting was necessarily done by means visible to the audience; but in this masque the introduction of the proscenium arch, made possible the art of invisible lighting.

The friezes of the proscenium arch, both above and below were filled in with various colored lights, like emeralds, rubies, and sapphires. In order to reflect these upon the setting they were placed in concaves. Jones devised elaborate transformation scenes in the "Hue and Cry After Cupid." A cliff which served as an important part of the scenery "parted in the midst and discovered an illustrious concave, filled with an ample and glistering light, in which an artificial sphere was made of silver eighteen feet in the diameter, that turned perpetually."

Unfortunately no records have been found which disclosed Jones' technique of lighting. That he must have experimented with lighting devices until he had developed a highly efficient technique is shown throughout the descriptions of masques. In the "Masque of Queens"---

> "The part of the scene which first presented itself was an ugly Hell, which flaming beneath smoked unto the top of the roof...in the place of it appeared a glorious and magnificent building, figuring the "House of Fame," in the top of which was discovered the twelve masquers, sitting upon a throne triumphant erected in the form of a pyramid and circled with all store of light."

Jones reached an exceedingly modern use of lights

when he employed them in Farriel's "Tethy's Festival" given in 1610, to obscure the machanism of the changing scenes. This alone shows a highly developed technique which required considerable skill.

> "First, at the opening of the Heavens, appeared three circles of lights and glasses, one within the other, and came downe in a straight motion of five foote, and then began to move circularly, which lights and motion so occupied the eye of the spectators that the manner of altering the scene was scarcely discerned."

That Jones used transparencies as early as 1611, is shown by the description of the masque "Oberon, the F Fairy Prince." In the first scene nothing could be discerned but a dark cliff. Over the edge the moon began to show, than the scene disclosed a palace of transparent walls and gates. The palace opened and a fairy world was disclosed. A description of "Lords' Masque" written by Campion shows another use of scene changing by a bright transparent cloud which came from the side and covered the whole stage; the cloud broke as by a wind and disclosed a scene. This scene was divided into two lateral parts which were revealed separately by two curtains. This foretells the sky borders and border bights.

The appointment of William Davenant as poet-laureate in 1638 and the collaboration between him and Jones, marks a grand climax in the history of English stage technique, which was never equalled before or since.

Their production of "Salmacida Spolia" in 1640 shows a definite development in the use of shutters, and the corresponding change in the construction of the heavens. Four side shutters, on each side run the grooves; each shutter which is not quite and flat, is overlapped by a cloud which hangs from the rook and runs in a groove also. The back stage is divided by back shutters corresponding to the side shutters, and making four different scenes to be disclosed.

An essay by Bacon "Of Masques and Triumphs" leads us to believe that coloured lights were used profusely. He adds at the end of a dissertation upon the technique involved, "Let the scenes abound with light, specially coloured and varied."[1]

In his mastery of stage mechanism, Inigo Jones is second to none. He went to the classic authorities for his ideas, adapted them to meet the need of the English court stage, and developed them far beyond any architect of his time. He contributed more to the development of the physical stage upon which lighting is so dependent than any other one in the history of the stage. He concentrated the scene to one end of the hall, elevated it upon a platform; placed it within its "picture frame" or proscenium arch; developed the use of shutters, the

1--Lord Bacon--Of Masques and Triumphs. Printed in 1625 edition.

later stage wings; and the construction of the heavens. The later sky border, with all the accompanying change of lighting from which developed the use of border lights, side lights, and proscenium lights.

He continued to have the stage brilliantly lighted, and to achieve instant lighting or instant darkness. He did not make use of either footlights, or hanging candelabra so frequently noticed in prints of contemporary play houses. He made considerable use of gold, silver, gems, and bright colors to reflect as much light as possible, and in one masque "Cheoridia" he employed lighting from above only, as can be interpreted, "over all a serene sky with transparent clouds, giving a great lustre."

The Stage of the Schools and Universities

There is considerable that is of interest regarding the theatrical productions of the Tudor schools and universities. All of the earlier playwrights were either school masters or courtiers and were undeniably influenced by the classical revival. Their knowledge of the classical plays and mode of presentation as set forth in books by Pollus and Vitruvius, was incorporated into the academic productions. The most elaborate of these were occasioned by visits of the royalty. As they were necessarily magnificent, the expense incurred was generally assumed by the court. This intercourse between the uni-

versities and court undoubyedly served to establish similar methods of stage production.

As early as 1512 Latin plays were used in the grammar schools as a method of teaching Latin. William Lily, who had been a pupil of Pomeponeius Laetus and Sulpitius, the first editor of Vitruvius and the first scholar to arrange Roman plays according to the precepts of Vitruvius, made use of this method of teaching Latin at St. Paul's, as did his successor and son-in-law, John Ritwise. There is a record of a performance given at St. Paul's in 1527 in honour of the King and French ambassadors. No mention is made of lighting; but a fountain was used as the center of the setting with a silk hawthorne tree, and a silk mulberry tree on either side, and the lights were probably reflected upon the silk.

In the Universities, records of dramatic performances date back as early as 1482; but not until 1541 is there any mention of staging. In accounts found in Magdalen College, Oxford, in 1541, there is an item, concerning the purchase of candles. Judging from the numerous mentions of torches, lynches, and candles which constantly recur, the lighting of these performances was a large item in the general expenditures. In 1547 is an item "great round candle stick 4s 6d for the stage" and in another "iif stone and a halfe of pyche 4s 8d."

The first detailed account of a university performance is given in 1564 concerning the production of "Aulularia" by Plautus in honour of Queen Elizabeth's visit. This account describes the stage as being built across one end of the King's College Church in order that the chapels on either side might serve as houses. [1] This stage arrangement called "decoration simultanee" or "multiple set," in which all the houses required during the play were on the stage throughout the performance, was borrowed from the medieval drama nad the classical revival in Italy.

In Steele's splendid compilation of dramatic performances at the English court (p.18, Plays and Masques at Court) Is an account of the lighting of this play from the pen of Matthew Stokys, University Registrar:

> "When all things were ready for the plays, the Lord Chamberlayn and Mr. Secretary came in, bringing a multitude of the guard with them, having every man in his hand a torch-staff for the lights of the play (for no other lights were occupied) and would not suffer any to stand upon the stage, save a very few upon the north side."

Nicholas Robinson gives another account: [2]

> "On account of the darkness, the royal attendants wore lighted torches in their hands to the sides of the stage. In truth, nothing was more ample than lights."

Unfortunately, these stage lights were not always de-

1- Boas--"University Drama" p.90
2- Ibid p.91

pendable. At a show acted by Cambridge students at Hinchenbrook, the Queen became angry because of implications thought to be directed against the crown, and at once left the entertainment using strong language. The torch bearers also departed hastily, leaving the actors and audience in the dark.

At Christ's church Hall, Oxford, in 1566 there was a decided effort to represent an old Roman palace with all its magnificence. The occasion was a visit from Queen Elizabeth. The play, "Mareus Geminius" was probably chosen for its spectacular possibilities. Steele quotes a detailed description by John Bueblock in his commentaries. Lighting was worked out with some care and thought for artistic effect. The lights were varied and apparently of a stationary nature.

> "Cressets, lamps, and burning candles made a brilliant light there. With so many lights arranged in branches and circles and with so many torches, here and there, giving forth a flickering gleam of varying power, the place was resplendent, so that the lights seem to shine like the day and to aid the splendor of the play by their very great brightness."

As spectacle apparently received royal approval, that element was introduced in stage lighting. In 1582 Prince Ralaline of Poland visited Oxford and was entertained by a tragedy and comedy produced with a great showing of fire works and rockets. These were first used in 1572 when the Queen was a visitor of Warwick

Castle. As a special treat she was given a display of fire works.

Elizabethan players did not hesitate to use this new wonder on the stage. Marlowe's old tragedy abounds with devils running over the stage with squibs in their mouths, and spitting fire and brimstone. When squibs were covered with orsedue or some other shining substance and sent down an almost perpendicular wire to the accompaniment of stage thunder, they were quite realistic.

In 1592 when Queen Elizabeth visited Oxford the second time, great preparations were made for the presentation of plays; furniture and costumes were borrowed from the office of the Revels. This might lead one to conclude that realism in stage production was gaining a foot hold, and that lighting was worked out accordingly.

It is at Oxford in 1605, that there is the first account of the use of painted scenery. This was executed by Inigo Jones for the tragedy "Ajaz Flagellifii." The stage was built at the upper end of the Hall and was enclosed by a movable proscenium, composed of stately pillars which turned three times in the acting of the play. From the description given, there was a painted back drop and drops from above, which were lowered to the point of vision. These were lighted according to the precept of Sabbatini.

In 1636, the tragi-comedy, "The Floating Island" by Wm. Slade, was given, at Christ Church, Oxford, in hon-

our of Charles I, with all the machines and scenic devices probably known. It is worth while to record part of the account by Anthony A. Wood, included in Steele's "Plays and Anthony Court Masques" as the narrator makes the statement:

> "All these representations being the first (as I have been informed) that were used on the English stage, and therefore giving great content. I have been therefore the more punctual in describing them, to that end that posterity might know that what is now seen in the Playhouses at London belonging to his Majesty and the Duke of York, is originally due to the invention of Oxford Scholars."

Whether or not this was pure propaganda, is uncertain, but if the statement is correct and the play houses referred to were the public Theatres, we have every reason to suppose that they are deeply in debt to the University Theatre.

The performance is described as being acted on a large stage at the end of the hall, with three or four wings instead of houses, on each side, resembling in one scene, desks or studios in a Library, and the actors came out between the wings or "partitios" as they are called. These wings or partitions were apparently on grooves and were changeable to other scenery representing churches, dwellings, houses, and palaces. The set was covered at the top with a painting of the sky and clouds. At the back part of the stage there were two huge leaves that opened and shut without any visible aid.

> "Therein was the perfect semblance of the billows of the Sea rolling, and an artificial Island with churches and Houses waving up and down and floating, as also rocks, tues and hills. Many other fine pieces of work and Landscapes did also appear at sundry openings thereof, and a chair also seen to come gliding down on the stage without any visible help."

The next day, "The Royal Slave" by Will Cartwright was presented. The setting for this play was in charge of Inigo Jones and the same account given by Wood. The settings resembled those described in the "Floating Island." In the account given, mention is made of the sun shining over the scene:

> "Within the streets were seen a curious Temple and the Sun shining over it, delightful forests, and clouds, and other prospects. Within the streets mentioned before, were seen villages, and men visibly appearing in them, going up and down here and there about their business."

After reviewing the splendor of the Court and University stage with careful lighting and elaborate machinery, it is a somewhat rude awakening to read about the public theatres contemporary to these times producing plays by the light of day and the private theatres by a mere row of candles. It is difficult to believe that Shakespere's "Mid Summer Night's Dream" or "The Tempest" was produced in the crude manner that is generally attributed to the production of his plays; especially difficult to apprehend, when one sees the records of his performances at court which undoubtedly were given with all the equipment to make splendid productions. Records

of Shakespere appearing at court have been discovered.[1] Surely he was familiar with Jones and his work, and would undoubtedly attempt to copy that great Master.

As the primary purpose of this paper is to discuss the development of stage lighting, the question raised must be left to future work, when records newly-found will prove, unquestionably, that Shakespere's plays were given with all the magnificence of court performances.

From now on the technique of stage lighting will be discussed in connection with the public theatre as it developed in England and later in America. From now on records regarding the lighting of the stage are not so scattered, and the conclusions regarding the lighting of the stage not so vague and problematical.

1--Steele

CHAPTER IV

The Lighting of the Public and Private Theatres (to 1642)

Theatrical history from the creation of the first public theatre to the beginning of the eighteenth century can be divided into three definite periods corresponding to contemporary political situations by which it was greatly influenced: (1) The Elizabethan (1576-16420 with its experimental theatre. (2) The Commonwealth or Pre-Restoration (1642-1660) with the transition theatre, and (3) the Restoration (1660-1700) with the modern theatre, a development of the other two. The experimental theatre maintained a glorified medieval stage, the transitional, a modified court style, and the modern combined a modified medieval platform with the proscenium arch and scenery of the court.

The Elizabethan Stage

Two stages totally different in structure and purpose were introduced with the erection of "The Theatre" in 1576 and the "Black friars" in 1596. "The Theatre" was an unroofed public playhouse constructed for daytime performances while the "Black friars" was a roofed private house used only for rehearsals of court plays and night performances.

"The Theatre" which was typical of "The Curtain," "The Globe," the "Red Bull" and many others of the period was round in shape (some were rectangular) and constructed with covered galleries and an open pit for the spectators. An elevated platform extended into the pit and was divided at the back by a proscenium wall into an inner and outer stage. One large curtained doorway and two smaller ones connected the two. Above the doors were windows used by actors and spectators. At first the outer platform was uncovered; but for protection of properties and costumes, a "heavens" or "shadow" was later constructed over it. The heavens were used to send down thunderbolts, lightning, fire, ghosts and all such spectacular devices so dear to the Elizabethan audience. Nicoll includes a drawing of a Reconstruction of an Elizabethan Theatre by Mr. S. B. Maiston which shows one large curtained center opening, and two windows. A door on each side in front of the proscenium wall opens onto the stage. The decorations are similar to those in the Testio Olimpico.[1]

There are several theories regarding the lighting of these stages. Many dismiss the subject with the statement that since the performances were given by daylight, artificial illumination was not needed. Lawrence goes more

1--Nicoll--The Development of the Theatre. Page 125

thoroughly into the subject.[1] He believes that while day light was intense enough for visual perception in the front stage, that the obscurity of the inner stage was necessarily relieved by a window at the back admitting reflected light. Lights were not brought in for the purpose of assisting the vision; but for the heightening of illusion.

The degree of illusiveness and signification of the exterior scenes were in accordance with the nature of references to night walkers, "the cobbler with his lantern, the merchant or lawyer with his link, and the courtier with his torch." Lawrence concludes that realism was the only purpose fulfilled in the bringing-in of the lights. To realism might be added, symbolism.

He finds that the lights were brought on the rear stage as a matter of expediency, and that all the artificially-lighted rear stage scenes were either night scenes, scenes laid in churches before candle-adorned altars, or scenes laid in obscure places, such as tombs, and dungeons. He divided the Elizabethan night scene into three classes: (1) Scenes where the lateness of the hour was indicated by the bringing-in of lights; (2) scenes of wholly unrelieved darkness, whether real or imaginary; (3) scenes where the poignancy or humour of action depended upon a suggested darkness.

1--W. L. Lawrence--"The Elizabethan Play House and other Studies." Second Series Chapter I

Lawrence believes that actual darkness was realized in these theatres by emitting smoke through trap-doors, and quotes several references to prove his statement.[1] He disagrees entirely with John Corbin, who thinks that the public theatres used a velarium or a cloud of canvas to throw out from the surmounting hut, and extend over the theatres when needed.[2]

In the private theatres, as the Blackfriars, Cockpit, and Whitefriars, the performances were given at night by candle light. There are many references to the use of wax and tallow candles, torches, lamps, and cressets; but so far, the method of employing these must be left to conjecture.

A reconstruction of the Blackfriars theatre shows a rectangular auditorium, similar to a monastery chapel, with two balconies on either side. At one end is built up platform, lighted from overhead by two chandeliers each holding four candles, and from the front by a row of six shielded candles, used as footlights.[3] A frontispiece to the "Wits, or Sport upon Sport" issued in 1663 shows a performance of

1- W. L. Lawrence--"The Elizabethan Play House and Other Studies" Page 5
2- Ibid--Quoted--from "Shakespeare his own Stage Manager"--John Corbin "The Century Magazine" Dec. 1911 Page 267
3- A reconstruction of Blackfriars Theatre, by Topham Forrest. In a collection of E. O. Parker Slides of Playhouses, belonging to the library of Fogg museum, Harvard University.

Cox's "Drolls" with a similar arrangement. The stage is lighted by two chandeliers containing eight candles each. Along the front of the platform is a row of footlights, consisting of six oil-lamps with double burners similar to the boat-shaped lamps with beaks and wicks in each end, used by the Italian stage and favoured by Sabbatini.

The French stage, from which the English borrowed, used more chandeliers and no footlights as is indicated by a print of a setting for "La Princesse d'Elide" at Versailles. Here is shown six chandeliers pendent from a proscenium arch. On each side are four chandeliers suspended on the same cord, one above the other. A picture of the Theatre de L'Hotel de Bourgogne shows a very ornate stage, which extends through an opening in the back, as an inner scene. The fore stage is lighted by three chandeliers hanging from above on each side, and a row of six chandeliers in front from the proscenium arch. Each contains fourteen candles. [1] There is no little probability that these lighting arrangements were borrowed and adopted by the English stage.

Those interested in the English Theatre apparently recognized the value of stage lighting, and their inefficient method. Flecknoe wrote in 1664 concerning the art of the stage:

1- La Comedie Francaise 1680-1880 Orsene Houssaye

> "Of this curious art, the Italians are the greatest masters, the French good profidients, and we in England only scholars and learners yet, having proceeded no further than to bare painting, and not arrived to the stupendous wonders of your great urgeness, especially, not knowing yet how to place our lights, for the more advantage and illumination of scenes."[1]

From all accounts, the plays given at Blackfriars were almost as magnificent as those at court, particularly so when the royalty were among the audience. H. Barton Baker is of that opinion, and writes that it was said, the authority he could not give, that scenesused in "Aglaura" by Sir John Suelsling, amounted to the cost of three or four hundred pounds.[2] Also, it seems that the productions would mount to some pretentiousness of the court, since the theatre was originally used for rehearsals of plays presented at court, and there must have been considerable exchange of properties and scenery.

Spectacular lighting effects, conflagrations, lightning, and fire works were very popular on these early stages, and were made similar to those mentioned in the second chapter. Blazing stars were especially favoured. Probably the idea originated in 1580 when Stowe records as having seen a comet for a week or ten days in October. Shortly after, stage directions and textual allusions are frequently found concerning the "blazing star." Lawrence cites several

1-

2- History of the London Stage--H. Barton Baker

references which he has found.

The Pre-Restoration Stage

The theatres were closed in 1642 and remained officially so throughout the rule of the Commonwealth. There were a few performances given in London, the more notable ones at the Red Bull Theatre, but these were of inferior class. "Drolls" or Farces cut down from the Elizabethan Dramas were presented frequently. Performances were still given in the Provinces; but on the whole seventeenth century English drama had been dealt a terrible blow from which it has not yet recovered. The enthusiasm and interest that the great artists displayed in the court performances disappeared and dramatic efforts fell far behind those on the continent.

During this period occurred one notable event which marked an epoch in stage history, the performance of the ope opera "The siege of Rhodes" at the Rutland House in 1656 under the management of Sir William D'Avenant, with all the court elaborateness of scenery and lighting. According to records this is the first time that scenery was introduced upon the stage for the benefit of the general public. The scenery was made by John Webb, the heir and nephew of Inigo Jones. A number of his drawings and prints of sections of Rutland House, and scenes for "The Siege of Rhodes" have been preserved. These show that the scenes were sim-

ilar to those of "Salmasida Spolia" employed by Jones.

A number of farces or Drolls were given during this period at the Red Bull. There is an interesting picture of the interior of the theatre. Boxes appear to have run around the entire house, even including the side now devoted to the stage. This stage projected well into the hall. A door, with curtains underneath the boxes led off to the green room. The actors were not in a picture frame, but on a stand in the middle of the audience. Two branches hung at the back, while five little lamps, each with two flames, were placed on the edge of the flat form as footlights.

The Restoration Stage

The granting of the two patents by the King to Sir William D'Avenant and Thomas Killigrew marks the end of the Elizabethan stage as well as the court. The most practicable characteristics of both were combined and adopted to suit the needs of the patent theatres. In 1662 the King issued patents to D'Avenant and Killegrew under which they and their heirs were allowed to operate over one hundred and eighty years in London. It is around these two companies, one at Covent Garden, the other at Drury Lane, that the history of the English stage centers for almost two centuries.

D'Avenant organized his players under the name of the

Duke's Company, and began to play regularly at the Salisbury court playhouse. From there the company moved to a new theatre built by Christopher Wren in 1671, in Forest Garden. D'Avenant died before the company occupied the theatre; but everything was left in charge of Thomas Betterton. He had been previously sent to France in order to seek the latest inventions by which their theatre could be improved. He must have been successful, for records show that the spectacles almost surpassed those of the continent.

In 1660 Killigrew organized his group under the name of The King's Company, and played first at the Red Bull. Later he moved to a new playhouse in Vere Street by Clare Market. Then two years later, in 1663, he occupied a new theatre built by Wren, The Theatre Royal in Drury Lane.

Prints and engravings of the Restoration stage as built by Wren have been preserved, and show that the stage was inclined from back to front and divided in two parts. The front part was an apron, which extended as far forward from the proscenium arch as did the stge proper behind, and was flanked by two proscenium doors on each side. The back part was arranged for shutters or flates after the fashion of Jones' stage. The apron and proscenium doors distinguished the English stage from that of the continent.

Accounts of the Restoration stage lighting can be gathered from many sources. According to Samuel Pepys, the faithful diarist, the lights of the stage were far from satisfactory. When they were not too bright, they

were arranged to prevent the best visibility. In one entry, Pepys is tried by the light of the candles set in hoops or branches which hung from the ceiling over the stage, especially when he sits in a side balcony, a bad place for the eyes since the lights must have been on a level with it, or directly in front. On another page he complains that the brightness of the lights hurt his eyes as his blindness comes on.

That the theatre owners were attempting to better the lighting is shown by another entry of Pepys, February 12, 1667. He relates a conversation with Killigrew:

> "He tells me that the stage is now by his pains a thousand times more better and glorious than ever here-to-fore. Now, wax candles, and many of them; then not above three pounds of tallow, now, all things civil, no rudeness anywhere; then as in a bear garden."

Even the wax candles must have lighted the stage very dimly, for Pepys records a visit to the tiring rooms at the Royal Theatre, and was amazed at the tawdriness of the costumes, "to think how fine my show on the stage by candle light, and how poor things they are to look at now."

Malone, judging from a plate prefixed to Kirkman's "Drolls" printed in 1672, concluded that the stage was lighted by two large branches of a form similar to those now being in churches. [1] He further writes that the

1- Edmund Malone--"Historical Account of the Rise and Progress of the English Stage."

branches were found incommodious, as they obstructed the sight of the spectators, and gave place at a subsequent period to small circular wooden frames furnished with candles, eight of which were hung on the stage, four on either side. The body of the house was lighted by cressets or large open lanthorns of nearly the same size with those which are fixed in the poop of a ship.

Apparently the Restoration stage made no use of footlights and did not attempt special lighting effects with tragedies and comedies for which they had stock sets which were used over and over again. All effort was centered upon the opera, and it is here that we find mention of splendid spectacles and brilliant lighting. All spectacular effects as murders, storms, conflagrations, fire-works which terrified and delighted the audience, were incorporated into the productions.

The English borrowed frequently from the French and German theatres, where methods of lighting were also in transitional stages. Nicoll includes a print of a German setting in 1655 taken from an exemplar in the Darmstadt Laudesbiblicthek which shows the stage illuminated partially by a reflected light. The candelabra are arranged with a silver ball in the center. Around it are eight candles, the light of which is reflected upon the scene, admitting a little more illumination. Dr. Heinrich Stumke tells of the lighting inventions of German Josef Furtten-

back of Ulm in 1663, who used oil lamps of glass which he placed in the soffits and in two "graben" hollows, in front and behind the stage. He describes the effects:

> "At night it seems in the theatre as if the purple colour matuto were bringing with her through the dense clouds, the so much desired day." [1]

Furttenback and Sabbatini preferred lamps, but candles seemed to be used in most of the theatres.

Many inconveniences arose from the use of chandeliers spiked with candles which were hung above the stage and in the center of the auditorium. The lights were dim, consequently most of the action had to take place in the space provided by the apron. Lines were spoken with exaggerated facial contortions and accompanied by wide gestures. The actors suffered from the molten wax which frequently dropped on bare heads and shoulders. Imagine Romeo stopping in in the midst of his amours to damn a burn, or dead Ophelia squirming livelily under a drop of hot tallow.

Odell describes the stage lighting adroitly:

> "Hoops or rings of candles hung above the stage. They hung in dripping radiance over a forest, a public square, or hall, generally in six hoops. They threw down soft pleasing light, as well as quantities of hot grease or wax on the actor's bare shoulders or velvet attire." [2]

The candles were frequently snuffed and trimmed by the

1- Licht und Schaubuhne--Dr. Heinrich Stumcke--Zeitschrift fur Beleuchtungswesen, Heizungs und Luftungstechnik. Jahrg 20, 1914 pp.93-53
2- Odell--"From Betterton to Irving"

"candle snuffers" who performed their duties regardless of the action of the play and frequently interrupted the action of the performance to pull down the hoops in order to trim, and remove the sloping candles.

The chandelier which hung over the middle of the house left the reserved seats and boxes entirely in the dark, and the stage compared with the pit, seemed insufficiently lighted. Giovanni Servandoni, while at the theatre in Paris, attempted to make the illusion more forceful. At the rise of the curtain he had the chandelier pulled up by a counter weight into a cavity of the ceiling. This practice was soon discontinued because the ceiling which was marvelously painted, soon became so black that it obscured the beauty of the painting.

The inflexibility of the stage lighting of this period determined to a certain extent the form of the Restoration play. Because of the stationary nature of the lights, the curtain was lifted at the beginning of the performance and lowered at the end. Changes of scene were effected before the audience. Actors could remain in front of the apron while all alteration in setting was made behind, so without moving a step, could pass from one setting to another. In this manner the audience could be hurried from one scene

to another, and this practice gave rise to the large number of acts and scenes of the Restoration play.

Chapter V

The Age of the Development of Oil Lamps

(1700-1817)

A review of the two patent theatres of the early eighteenth century, reveals the presence of a bitter rivalry which directed the policies of the two theatres and established a precedent, the influence of which is still in evidence. For a number of years the theatres had operated in a spirit of friendly rivalry until Charles Davenant discovered one day that the King's Theatre had become far more popular than his own. Something had to be done, and he did the inevitable, he appealed to the popular mind by producing operas, as well as dramas, with all the lavish decorations and machines of which he was master.

According to Downes, he produced "The Tempest"as an opera with elaborate new machines and scenes. One scene displayed myriads of Ariel spirits floating around in the ether. In another, a most intricate machine flew away with a table furnished with all sorts of viands, just when the Duke Trinculo and his companions were going to dinner. [1]

Davenant's procedure was felicitous and shortly the whole town was attracted from the King's Company. Controversies arose, the town became divided in opinion as to whether or not the elaborate productions inquivated the

1- Quoted by J. Fitzgerald Molloy--"Famous Plays"

drama. In order to defend itself though, the King's Company followed the Duke's lead and each attempted to produce the most ostentatious display. This rivalry continued for years and became the subject of many literary letters and pamphlets. Previously Dryden referred to the innovations of the Duke's Company.

> "I would not prophecy our house's fate
> But while vain shows and scenes you over-rate
> 'Tis to be feared--
> That as a fire the former house overthrew
> Machines and tempests will destroy the new."[1]

Thus in the early part of the eighteenth century, while every effort of the theatres was directed towards invention of intricate machines for lavish productions, little progress was made in the matter of lighting them. Indeed there was small scope for lighting experiments while candles and oil were the sole sources of illumination, except in the matter of number, size, and grade of the candles, their position, and use as embellishments.

The lack of sufficient light placed the acting area in front of the proscenium arch, and the stage was illuminated for the primary purpose of visibility, and the secondary purpose of displaying the actor's art. The chief sources of light came from the chandeliers pendant from the proscenium arch, and from the candelabra placed in brackets on the sides of the stage boxes.

The positions of the chandeliers varied according to

1- Quoted from J. Fitzgerald Molloy--"Famous Plays"

the policies of the theatre and the type of play. A copy of an illustration in the 1709 edition of Rowe's Shakespere shows a stage lighted by two candles in brackets on the walls. A print in Colley Cibber's "Apology" of the interior of Covent Garden shows a rectangular auditorium which is illuminated by twenty chandeliers of candles. Six chandeliers project from the pillars supporting the boxes on the stage- three on each side- and two chandeliers containing twelve candles each were suspended from the proscenium arch. These chandeliers lighted all of the scenes and no one thought it odd to view a forest scene and an interior scene by the same lights. The candles in the auditorium also aided in illuminating the stage.

The Covent Garden as opened by John Rich who rebuilt it in 1732, contained a small stage without footlights and illuminated by candles in four circular frames. Boxes on each side of the stage in front of the proscenium were supported by pillars upon which were fastened twisted double branches for candles.[1]

In a manuscript list of properties at Covent Garden in 1743 are two items which give the impression that the front lights or chandeliers were raised and lowered in order to be properly attended.[2] One item refers to "the lamp in front, fixed with barrel, cordage, weights," and another "counterpoise to front lamps, 170 pounds." We have it from

1- Wyndham--Annals of Covent Garden p.4
2- Ibid p.158

various sources that Garrick was the first manager to have the lights let down as a signal that the show was over. Odell draws the conclusion from these two items that they refer to the footlights, and that a contrivance must have been used which could lower the lights into the stage floor out of the audience's sight.[1]

In the same manuscript are listed items concerning theatrical properties, among them references to lighting apparatus:

41 sconce candlesticks
5 tin blinds to stage lamps
115 three corner turn lamps
192 turn candlesticks to do
14 lamp posts for stage out of use

Odell finds that these items "certainly smell of wing lights." He found in addition references to scene ladders, "12 pair of scene ladders fixed with ropes," also "24 blinds to scene ladders, 192 tin candlesticks to do, 9 single blinds, with 48 tinn candlesticks, 12 doz. candlesticks fixt to a post with five canoppys." In the light of the Barry Crow street inventory of 1776 which Odell finds quite in line with this earlier collection and explaining it, is an item which succinctly calls for "Seventy-six wing-lights." Odell draws the conclusion that not only were wing-lights in use then, but that they could be darkened with the blinds mentioned. He also finds that being fixed with ropes they might have been suspended.

It also seems possible that the blinds might have

1- Odell--"From Betterton to Irving"

been reflectors used to make the scene brighter, used either with the oil or candles. Metal reflectors were in use very early and were quite common. The Goulds found that sconces with back plates to reflect candle light were used very early in public and private buildings.[1] The brass back plates were followed by the use of mirrors. Even chandeliers had small reflectors for each candle. These reflectors were shaped like bowls or saucers and above them were small shaped reflectors sometimes elaborately decorated with piercing.

Protectors to steady the flame were in use very early. King Alfred's lanthorn of transparent horn has already been described. In the eighteenth century the candle lantern was encased in glass, open at the top, and fastened to the wall by brackets. Some increased the light by using convex lens which opened outwards. It seems very likely that these different devices for increasing the candle light must have been applied to the theatre.[2]

So far there has been no other reference discovered explaining the next two items, "115 three corner turn lamps" and "192 turn candlesticks to do." The three corner turn lamp might have been a device used for throwing different coloured lights upon the scene, and made in a shape of a triangle, each side covered with a coloured

1- Gould--"History of Lighting Fixtures" Page 168
2- Ibid Page

silk, and made to revolve when a change of colour was desired. Loutherberg later used a similar plan which might have been based upon this one.

Odell believes that the chandeliers were arranged to be drawn high into the flies. He bases this conclusion on a picture of the last act of "Fitzgiggo" which shows that the chains or cords by which the hoops were suspended came from a height above the borders. He finds in the Wren plan for a theatre, presumably the second Drury Lane, that the floor of the second story was high over the stage. Thus he thinks that when the stage needed to be darkened, the footlights could be lowered into the stage floor, the wing lights were covered with blinds, and the chandeliers were drawn on high.

Another list of items under the title "candle room" gives rise to the impression that the theatres must have manufactured their own candles:

46 copper pans
12 iron pans
5 candle baskets
2 doz. wood boxes for pans
2½ doz. hanging candle sticks
8 dozen brass sockets

The tallow candles were made by dipping loosely twisted cotton yarn into the tallow. These were less expensive and used for ordinary purposes. The more expensive wax candles were made of beeswax and gave a clear, white light. Spermaceti candles were best of all, and considered much superior to wax, as their light was pure and steady.

The candles needed constant care throughout the per-

formance and the men, there were generally two in number, who attended them were called "candle snuffers." They drew their share of the attention during a performance and frequently rivaled the actors. There was a current expression of the time "not fit to be a candle snuffer" to which many actors who formerly held that position, objected. The duties of the candle-snuffer if not very honourable, were somewhat arduous. It was necessary for him to be exceedingly nimble, as the gallery people considered him a butt, and hurled insulting vegetables down at him.

Goldsmith's strolling player explains how he began his theatrical career in this humble capacity:

> "I snuffed the candles, and let me tell you, that without the candle snuffer, the piece would lose half of its embellishment."

Foote puts the following words, evidently born of experience, into a speech of Shift's, a character in his comedy "The Mirror":

> "I did the honours of the barn, by sweeping the stage and clipping the candles. Here my skill and address were so conspicuous that it procured me the same office the ensuing winter at Drury, where I required intrepidity, the crown of my virtues..... For I think, sir, he that dares stand the shot of the gallery in lighting, snuffing, and sweeping the first night of a new play, may bid defiance to the pillory with all its customary compliments."

The candles sometimes played an important and amusing part in the action of a play. Dutton Cook tells the story which Mr. Richard Jenkins relates in his "Memoirs of the Bristol Stage."1

1- Dutton Cook--"Nights at a Play"

"One Winstone, a comic actor, appeared upon a special occasion as Richard III. He played his part so energetically and flourished his sword to such good purpose while demanding, 'A horse! A horse!' in the fifth act, that the weapon came in contact with one of the hoops of tallow candles which was suspended. The blazing circle (not the golden one he had looked for) fell around his neck and lodged there."

Foote relates another similar episode:

"The company was performing "Pizarro" when, during the hymn to the sun, the lights being too close to the transparency representing the luminary it unfortunately took fire. The manager, who was playing high-priest, observed the occurrence just after singing the words, "Oh Power supreme--' then cried out in consternation to the stage manager, 'The Sun's on fire!' then proceeded, 'Oh Power supreme--etc.--d3m your eyes, put out the sun, I say!' The sun continued to blaze--and notwithstanding their fears, the actors were convulsed with laughter. The conflagration was at last put out and the play proceeded."

In spite of the many inconveniences, candle-light reigned supreme for many years after oil lamps were in use. The evolution of a satisfactory oil lamp extended over many years. Fifteen centuries preceding the Renaissance, a primitive oil lamp existed. The Phoenicians burned oil, while the Greeks and Romans used an open vase lamp of oil, into which cotton or flaxwick was dipped. From this evolved the open oil-pan with a floating wick. In the seventeenth century it was called a "Betty" lamp, probably a corruption of the German word "Besser" meaning "Better", so applied because the open pan was covered with a handle on one side, and a lip for the wick on the other. Later the Betty lamp was supplied with a combination of spike and hook for convenient hanging.[1]

1- Gould--"History of Lighting Fixtures"

Oil was also used in chandeliers. In the place of the spike and hook for candles, the hoops were pierced to hold small conical glass oil cups. Later the chandelier was replaced by the oil lamp, generally double and boat shaped, with two spouts which supplied the place for the wicks. These oil lamps were invariably unsatisfactory because of the red, smoky flame which gave off disagreeable fumes.

A number of experiments had been made to produce a satisfactory lamp. As early as 1675 Richard Reeves describes his invention: "Arte of casting and spreading of light by a new and unusuall figure of foiled glasse to hold candle or lamp."[1]

In 1781, Lavoisier, a famous Parisian chemist, much interested in theatre lighting, announced that he had constructed a new lamp which he called "Reverbere." It was an oil lamp with a wick and a moveable reflecting metal mirror. In order to obtain colcur effects with this lamp, he advised the attaching of different coloured gauzes to the Reverberes and recommended that the inside of the scenes be painted white as possible in order to strengthen the effect. He especially desired to light the auditorium with Reverberes of elliptic shape let into the ceiling; but the idea was not practicable because the thick wicks, when smoking, completely spoiled the effect of the metal mirror.[2]

In 1785 Argand, a Genevan chemist, invented an oil lamp which contained a double air passage circular burner,

1- Patents for Inventions--abridgements of Specifications Relating to Lamps, Candlesticks, Chandeliers" Boston Public Library--in files of newspaper room
2- Stumke, von Dr. Heinrich--"Licht und Schaubuhne" Zeitschrift fur Beleuchtungswesen usw. Jahrg 20,1914 pp. 43-53

and glass cylinder and was so successful that it settled the matter of theatre lighting for the next quarter of a century.

Argand discovered the value of the glass chimney, the first to be used, quite by accident. He was heating a bottle over a flame when the bottom cracked and fell out. The bottle was hot and Argand set it down quickly, quite by accident over the flame, which then became steady. From this incident he conceived the idea of a chimney which caused the flame to burn higher and brighter with less smoke. These lamps were manufactured under the name of Parisian Quinquet in great quantities and were soon used over the whole world.[1]

The Paris Opera first installed the Argand lamp, and by the beginning of the century the stage was lighted by fifty-two Argand burner footlights, and ten scene lights behind each wing. The chandelier in the house which hung from the center of the ceiling, blazed with ninety-two lamps. The Berlin Opera House used seventy-two lamps in the footlights sixteen behind each side scene, and sixty in the house, not including the orchestra. The National Theatre of Berlin used forty-eight lamps inthe footlights, ten behind each of the sixteen side scenes, and thirty-two in the chandelier over the house.

According to a contemporary newspaper article, the

1- Stumke, von Dr. Heinrich--"Licht und Schaubuhne" Zeitschrift fur Beleuchtungswesen, Heizungs und Luftungstechnik. Jahrg 20,1914 pp. 43-53

Drury Lane stage was the first lighted with "Patent" lamps in February, 1785. The account states that "The effect of this light is brilliant beyond description. We doubt not the very sensible advantages which scenes, dresses and decorations of this theatre must derive from this improvement, will instantly induce Covent Garden and the Opera House to follow."[1] As the English were quick to adopt advantageous inventions of the French stage, there is little doubt that the "Patent " lamps mentioned were the Argand lamps.

In order to keep the light steady and of good colour, the lamps needed to be kept clean and regulated. This necessitated the employment of one lamp lighter for every one hundred and twenty lamps. During the course of the play the lights in the house could not be lowered; but at least the snuffing of candles and lowering of chandeliers during the performance were avoided.

About this time many shops thrived by selling oil to the theatres. Charles Lamb recounts an episode of his early life in connection with an oil shop kept by his godfather, who supplied Drury Lane. In return for his services he was frequently given tickets, and it was on one of these passes that Lamb saw his first theatrical performance in 1781 when he was but six or seven years old.

"We went with orders which my godfather Featherstone had sent us. He kept the oil shop (now Davies's) at the corner of Featherstone Building on Holborn. Featherstone was a tall, grave person, lofty in speech, and had preten-

1-Sharpe

sions above his rank. He associated with John Palmer and Sheridan.

"From either of these connections it may be inferred that my godfather could command an order for the then Drury Lane Theatre at pleasure; and indeed, a pretty liberal issue of those cheap billets, in Brinsley's easy autograph, I have heard him say, was the sole remuneration which he had received for many years nightly illumination of the orchester and various avenues of that theatre."[1]

After having reviewed briefly the contribution which science and invention made to the eighteenth century stage lighting, it is exigent to return to the middle of the century to study the application of this contribution to the stage.

In 1747 David Garrick, one of the most famous of actors and managers of the English theatre, took over the managership of Drury Lane. He possessed great organizing ability and by his efforts the stage was raised to a new plane of culture and art, which was worthy of criticism and discussion among those of authority. Mantzius declares that with the Garrick period theatrical criticism begins, and literary men for the first time find it worth their while to interest themselves in the theatrical art as such.[2]

Many and interesting were the reforms and innovations with which Garrick achieved his fame, and not of the least importance were his contributions to stage lighting. At the time Garrick assumed the management of the theatre, the

1- Charles Lamb--Dramatic Essays
2- Karl Mantzius

chief source of illumination came from the footlights, chandeliers, wing lights, or "Ladder lights", and incidental lights on the stage as properties, as, candles, lanterns, and oil lamps suspended from the ceiling. According to Odell the footlights were removeable from the sight of the audience, the chandeliers could be hoisted into the flies, and the wing lights could be dimmed at a moment's notice by an arrangement of blinds.[1]

The first alteration Garrick made was in relation to the audience, probably as a hint to that austere body to make a more rapid departure in order to facilitate the work of the candle snuffers. How different the exit made by theatre goers now, who anticipating the end of the play, are halfway down the aisle or on the street before the final curtain. Whatever the reason, Garrick in 1763 ordered the lights lowered to indicate that the play was over. The lights referred to were the chandeliers or hoops which hung over the stage.[2]

In 1763, Garrick went to France, and upon his return in 1765 he introduced the French system of invisible lighting.

> "Wilkinson tells us that previous to the return of Garrick, there were six chandeliers over the stage, every one containing twelve candles in brass sockets, a heavy iron was joined to each bottom, large enough for a street palisade."[3]

Under the new system, the chandeliers were removed and the stage was illuminated by lights placed behind the proscenium

1- Odell--"From Betterton to Irving" p. 406
2- The Harlequin Magazine--1763, February 24--A print of the Riot at Covent Garden shows no footlights, there are four hoops of candles suspended over the

(Foot-note continued on page 70)

arch. Three hundred patent lamps were used for this purpose, while the house was lighted by two hundred and seventy wax candles. The candles being rather insufficient, Garrick later added a large center chandelier which hung from the ceiling.[1] Two evils of stage lighting were eliminated by these measures, the unreality of stage illumination, and the nuisance of glare and obstruction caused by the chandeliers.

Many authorities have stated that at this time Garrick introduced footlights which were new to the English stage. They have certainly disregarded many proofs that footlights were used many years before.[2] Sabbattini originated them, and there is little doubt that the English stage adopted them soon after. There are many early references to the footlights of the early private stages of Shakespere's time. Ludovic Celler thought that the origin of the footlights was due to the small plain theatres which could not afford chandeliers, and so placed their mean candles on the floor in front, thereby establishing the practise.[3]

Odell found a contemporary account of Garrick's innovation in the Universal Museum, dated September, 1765, which does not mention footlights. He quotes it at length:

> "One very considerable improvement introduced by Mr. Garrick on the stage this season is the removal of

(Note 2, p. 69--continued) stage, and branches of candles in brackets on the pillars supporting stage boxes. A note explaining the print states definitely that the system innovated by Garrick was used now.

1- Genest--Some Account of the English Stage, Vol. 5, p. 86--Quotation from Wilkinson

2- Molloy--Life and Adventures of Peg Woffington--p.86 Print of Kirkman's Drolls

3- Karl Mantzius p. 349

> the six rings that used to be suspended over the stage, in order to illuminate the house. The French theatre is illuminated by another method, but the light cast on their stage is extremely faint and disagreeable; our English improver has availed himself of the hint from the French and given to the Drury Lane Theatre to see the stage illuminated with a strong clear light, and the rings removed that used to supply it, though to the great annoyance of many of the audience and frequently the actors themselves.
>
> "The managers of Covent Garden have attempted the like improvement but not with the same success; instead of wax, they have given oil, and their lights may be said to smell too much of the lamp."[1]

Another account quoted by Odell in the Annual Register dated September 1765, speaks of the stage as:

> "Illuminated in a strong and clear light...this is done by the disposition of the lights behind the scenes, which cast a reflection forwards, exactly resembling sunshine, greatly to the advantage of the performances."

From an extra-illustrated edition of Garrick's Life and Correspondence in the Harvard Theatre Collection is a clipping from an unknown newspaper dated September 25, 1765, on which is given a most effusive account of the new arrangement:

> "...the Drury Lane managers have absolutely created an artificial Day; or to vary my expression...they seem to have brought down the Milly Way to the bottom of the Stage, or, to vary once more, they have given us a perfect Meridan of Wax."

Garrick was particularly fortunate in his choice of scene painter, Philippe Jacques de Loutherberg, a Dutch painter of considerable note, who was a member of the Academy of Painting, Paris, and later became an A.R.A. and R.A.

1- Odell--"Shakespere from Betterton to Irving" Vol.1 p. 407

Loutherberg came to England about 1770, and his ability was soon recognized. Watson says that when Loutherberg came to England, stage art in the modern sense may be said to have begun north of the channel. He found the British scene a mere flat, and stage lighting, a candle.[1] He is regarded as the first English scene painter in the modern sense of the word--though not a Briton--and he paved the way for such noted 19th century scene painters as Stanfield, Telbin, Grieve, Finley, Hollogan, and Beverly.

Though primarily a painter he introduced many stage reforms despite the little scope offered by a stage half proscenium, non-adjustable, and lighted by candles. Encouraged by Garrick, he introduced set scenes, raking pieces, head and border lights, coloured lights, transformation scenes, theatrical gauze, and by these means lifted the general status of stage settings to one of artistic importance.

Before Loutherberg's arrival, the back scene was one broad painted flat the whole breadth and height of the stage. This he broke up into several pieces and brought it all into perspective. The raking pieces which were low fragments, he used to mark the incline of the mounds, and behind these he concealed lights to heighten the effect of distance.[2]

Here-to-fore, the actors were obliged to go far forward on the apron out of the scene, in order to be visible to the audience. Loutherberg remedied this by introducing

1- Watson--"From Sheridan to Robertson"
2- Matthews, Brander--"Evolution of Scene Painting"

head and border lights, which eventually reduced the size of the apron and resulted in the picture-frame stage with which we are familiar. These changes were probably the results of experiments he made in an attempt to find more suitable means of bringing out the art of his scenery.

Loutherberg conceived the idea of using different coloured lights to change the colour of the scenery. After a great deal of experimenting with different materials he found that silk and tiffany which cast a uniform diffusion met his purposes best. These he arranged in screens and placed in front of the foot and side lights. He arranged a contrivance for Garrick's production of "Christmas Tale" which made a sudden transition from green to blood-red. This was managed by placing different coloured silks in the flies and side scenes, which could be turned on a pivot, and with the lights behind the silk, so illuminated the stage as to give in terms of the day's expression, "an effect of enchantment." A picture from the Harvard Theatre Collection, also included by Odell, of a scene from the "Christmas Tale," shows a most interesting and artistic study of light and shade. The stage resembled a Rembrande painting in which the main figure stood out in relief and the remaining scene was in varying degrees of light and shade.[1]

Later, Loutherberg substituted stained glass for the silk medium previously used, and obtained in addition to the

1- Odell--"From Betterton to Irving" p.436 vol.1

red and green colours, yellow, blue, and purple. By changing and combining these he was able to tint his scenes to represent various hours of the day, and different actions and degrees of light.[1]

The first to discover the value of theatrical gauze, Loutherberg used it first in a Harlequin play to produce the effect of Harlequin in a fog. This he achieved by hanging many folds of dark gauze between Harlequin and the audience, and obtaining the right intensity of light for that effect. He used the gauze also to represent the effect of running water. This he did by using sheets of metal and gauze overlaid with silver threads and illuminated.

The invention of transparencies, scenery painted on linen with lights reflecting through, has been attributed to Loutherberg;[2] but from descriptions of early stage produces, I am inclined to believe that transparencies were really used in Italy very shortly after the Renaissance, and used by Inigo Jones in England. I am inclined to believe that Loutherberg adapted them to suit the needs of the theatre of his time. At any rate he used them differently. Instead of securing brighter light for illumination or to glorify celestial beings, he used them to represent moonlight, sunlight, conflagrations, and volcano flames.

1- Odell--"From Betterton to Irving" p. 436 Vol.I
2- Brander Matthews--"Evolution of Scene Painting"

From 1776 which marks the retirement of Garrick, to 1817 the date gas was first used on the stage, little was accomplished to improve stage lighting. Indeed some authorities find a return during Sheridan's management to pre-Garrick conditions. Mantzius writes that during Sheridan's management the only remains of the lighting used before Garrick's innovations were a pair of magnificent drop chandeliers about the proscenium. A print of Drury Lane in 1795 shows that the auditorium is lighted by twenty-four chandeliers about the house and two large center drop chandeliers. This condition may be attributed to the fact that Loutherberg confined most of his lighting experiments and innovations to the pantomimes. For this reason they may not have been carried over to the legitimate stage.

Considerable interest, however, had been aroused by Loutherberg's efforts, and scattered articles in the current magazines and newspapers can be found, commenting on the various phases of lighting. In 1790, John Saunders wrote a Treatise on the theatres in which he includes a few suggestions on lighting. He proposes an entirely new method of lighting, probably taken from his observations of the French theatre. In order to avoid the glare of house lights, he suggests that lights be placed above a cornice to be reflected by inclined reverberators fixed against the cor-

nice. He proposes also that Monsieur Patte's method of lighting the "Avant scene"with reverberators at the extreme end of the boxes instead of the line of lamps (footlights) at the front of the stage, be adopted.[1]

George Coleman in "Random Records" describes an amateur performance in which footlights were dispensed with (1780) and a row of lamps were affixed to a beam overhead. He wrote that when theatres sprung up like mushrooms, lighting might be better.[2]

It seems a coincidence that the greatest progress in stage lighting has been made near the end of the centuries, by men, who gifted with a higher artistic sense, foresight, and ability, have taken advantage of the failures and successes of their predecessors , and have, thereby, established certain principles of lighting. Garrick and Loutherberg delved into the past and brought forth theories and devices of the older artists and applied them to their inventions and to contemporary discoveries.

It is interesting to note changes of purpose in stage lighting from time to time. In the seventeenth century it was used mainly to aid the actor's art; in the eighteenth century it was employed to enhance the scene painter's art; and it was used by Loutherberg to indicate the change of time.

A summary of the chirf characteristics of eighteenth century lighting shows that although Garrick and Loutherberg

1-George Saunders--"A Treatise on Theatres"
2-George Coleman-- "Random Records"

had developed stage lighting to the highest degree possible with oil and candles; there were still in existence far more disadvantages than advantages. There was no connection between the lighting of the stage and the pit which made necessary the burning of house lights throughout the play; no atmosphere could be projected except with the clumsy device of the screens, because light was not variable, but burned with a steady flame until extinguished; house lights aided in lighting the scene and consequently spoiled the illusion and fatigued the audience by their steady glare; the smoky fumes from the oil lamps were most disconcerting and uncomfortable and emitted a most insufficient light; for the most part the actors still stepped out of the stage picture in order to be seen better. Light had been increased in quantity and quality, which had been advantageously used; but until the advent of gas very little more progress could be made.

Chapter VI

Theatre Lighting by Gas and Lime

1817 - 1881

With the advent of gas, there began an entirely new era on the English stage, an era of painted scenery. The characteristic qualities of the gas light, rendered it peculiarly fit to enhance the effect of painted drops and flats. Thus we had an age which produced great scene painters as Roberts, Stanfield, Grieve, Telbin, Beverly, Calcott, Craven, and O' Connor, who painted scenery worthy of preservation.

Lighting was studied carefully, to bring out the art of the scene painter, With a few exceptions it was used in this fashion until the time of Henry Irving, who discovered that lighting was an art in itself and could be used to aid in the dramatic action.

To start at the beginning of the "Romance of the Gas Industry" as Oscar E. Norman terms it,[1] it is necessary to go back to 1610, the date that Van Helmont of Holland discovered aeriform to which he gave the Dutch name "gas".[2] Eighty years later, Dr. Clayton produced gas distilled from coal in a retort, He termed it "spirit which burns."[3] Apparently little more was accomplished until 1774 when Lavoisier invented a gas holder.[4]

It is significant that the first use of gas in a public building should be in a theatre, and the Lyceum. In 1789 Mr.

1- Oscar Norman--"Romance of the Gas Industry" p.7
2- Henry O'Connor--"Gas Manufacture and Lighting p.15
3-Ibid 4-Ibid

Diller, a natural philosopher from Holland gave an exhibition of "New Invented Philosophical Fireworks" and also displayed an "Aeropyree Branch" which illuminated the saloon. It was suspended from the cupola by a chain, and "A light is produced in an instant, changes its colour, and is extinguished without any visible means whatever. This extraordinary effect was due to the new illuminant, gas."[1] A few years later, in 1792, William Murdock gave a demonstration of the first practical use of gas.[2] In 1803 a Moravian refugee by the name of Winzer or Winsor, began experimenting with Lebon's gas apparatus at Hyde Park, London, and lighted the Lyceum Theatre experimentally with gas the same year.[3] Winsor also made a second experiment in the Lyceum Theatre in 1804. The following is an amusing report of the experiment by a reporter of "The Times,"[4]

> "Sir Joseph Banks, ever indefatigable in examining and promoting useful discoveries, went last Thursday evening, for the second time to the Lyceum, to witness the incredible effects of smoke. The whole theatre was lighted with the same in a novel and pleasing manner. The arch of lights above the stage had a striking effect and from the English grate on the stage, issued a very brilliant and powerful light."

The first public building to be lighted permanently by gas was the extensive James Watt factories which Murdock illuminated in 1798 with gas manufactured from coal.[5] Oil for

1-Notes and Queries, Series 11, vol.8, p.10-11
Willoughby Maycock
2-Gas Manufacturing and Lighting--Henry O'Connor
3-Notes and Queries, Series 11, vol. 8, p.10-11
4-"The Times" July 2, 1804
5-"Licht und Schaubuhne"--von Dr. Heinrich Stumke
Zeitschrift fur Beleuchtungswesen, Heizungs, und Luftungstechnik--February 10, 1914 pp.43-53

the manufacture of gas was not used until 1819; Covent Garden was the first theatre to be lighted by oil-gas manufactured on the premises.

In 1807 Winsor tried the experiment of lighting the stage by gas, and later he achieved the illumination of part of Pall Mall, the first street in London to be so lighted.[1] In 1809 Murdock came before the House of Commons Committee and was asked:

> "Do you mean to tell us that it will be possible to have a light without a wick?"

To which he replied:

> "Yes, I do."

And was answered:

> "Ah, my friend, you are attempting to prove too much."[2]

The accounts of the first application of gas lighting to the stage are most interesting because of the varied and contradictory opinions. Stümke writes that Drury Lane stage was the first to be lighted in 1812.[3] Watson finds that gas did not replace candles and oil until 1815.[4] While Odell states that only the Grand Hall and staircase were so lighted.[5]

In a collection of handbills of Covent Garden Theatre dated September 16, 1816-1818 is one dated September 8, 1817 which proves conclusively that this was the exact date that

1- Notes and Queries, Series 11, vol. 8, pp. 10-11
2- "Gas Lighting and Gas Fitting"--W. Paul Gerhard
3- "Licht und Schaubuhne"--Stümke--Zeitschrift fur Beleuchtungswesen, usw. Feb. 10, 1914, pp.43-53
4- Watson--Quotes from "Theatrical Inquisitor," Oct. 1815--p.329
5- Odell--"Betterton to Irving" pp. 157-158

the first stage and auditorium were lighted by gas.[1]

The Play-bill announces a performance of Hamlet, and at the top is the following notice:

> "The Proprietors respectfully inform the Publick that a new method of Lighting and likewise a new method of Ventilating the Theatre has been adopted. The first has been affected by a magnificent chandelier which from the centre of the ceiling diffuses a soft and brilliant Light around, without obstructing the View of a single Spectator. In its effect, the Body of Light is equal to 300 Argand Lamps, and the Heat is directly carried away through a Tube, communicating with the open air."

A later handbill dated September 10, announces with pride

> "The Proprietors are extremely gratified to inform the Publick that a new Method of Lighting and Ventilating the Theatre has succeeded even beyond the most sanguine expectations. The Grand and Magnificent Chandelier from the centre sheds its soft and brilliant Lustre without dazzling the eyes of the Spectator."

Some objection was raised to the minor lustres as interfering with the view of the stage. The Lustres had probably been arranged similar to the old chandeliers which hung from the proscenium arch. The defect mentioned was remedied, and the playbills for Thursday, November 20, 1817, announce:

> "Several additions have been made to the universally approved method of lighting the Theatre. The Grand Centrical Chandelier has been rendered still more effective and three auxiliary Lustres which were complained of as impeding the Sight and destroying the contour of the Theatre, have been removed, and Grecian Lamps have been substituted, which range around the back

1- A collection of the Play Bills of the Performances at Theatre Royal Covent Garden from Sept. 16, 1816 to July 16, 1838. Vol.I Collected by Henry B. H. Beaujoy F. R. S. London 1816-1818 This collection is at the Robert Gould Shaw Dramatic Library of Harvard University.

> of the Dress Circle, and shed a soft medium Light without obstructing the view of the Stage. The Ventilation has likewise been completed and the Callorifer Stoves keep the house to any degree of warmth in the most severe weather."

The "Examiner", September 7, 1817, reviews the innovation:

> "-has wonderful chandelier of gas- it makes a light very bright throughout the house- only one big chandelier from the ceiling, and small ones around the first row of boxes."[1]

Odell finds that Drury Lane installed gas about the same time as Covent Garden. He quotes the "Examiner" September 7, 1817 which gives a most interesting account including a description of the use of the gas light on the stage, and also a criticism of footlights:

> "-the gas is used not only in front of the stage, but in the various compartments on each side. Their effect, as they appear suddenly from the gloom, is like striking daylight...It is as mild as it is splendid-white, regular, and pervading."

Later on,

> "- The lights are enclosed in glasses, and blinded from the audience by side-scenes and reflectors; but the result in every other respect is excellent, and a very great improvement; and if it is managed as well as we saw it on Friday, will enable the spectator to see every part of the stage with equal clearness. If the front light could be thrown, as daylight is, from above instead of below (and we should like to hear the reasons why it cannot) the effect would be perfect."

Another account explains that there were twelve perpendicular lines of lamps on each side, each line containing eighteen lamps, and that the foot-lights before the proscenium contained eighty gas lamps. The account also comments

1--Quoted by Odell--"Shakespere from Betterton to Irving" Vol. II pp. 157-158

on the advantages gained by the use of the gas, which enumerates as flexibility of control in the intensity of light.[1]

The chandeliers, emitting such brilliant light were used in many instances to aid in the lighting of the stages, especially in depicting time element. An account of the installation of a new chandelier in Drury Lane Theatre in March 1818 comments on that special phase:[2]

> "- It also occasionally adds to the delusion of the stage, it is rendered sparing or prodigal of its light as the passing scene requires."

The smaller theatres in London were quick to adopt the new method of lighting, with the exception of the Haymarket which continued to use candles and oil until around 1840. Other countries were slower to adopt the new method. France even though claiming the rights of priority of the invention of gas for its citizen, Philippe Lebon,--and indeed it was with his apparatus that Winsor experimented,--did not use gas until February 6, 1823, on the evening of the opening performance of "Aladdin or the Wonderlamp" in the Theatre Lyrique when the stage and orchestra were illuminated with gas.[3] The German theatres used the Argand burners until about 1840 because of economical reasons. The uniform lighting of the rooms by coal gas was first introduced in 1847 by Gottfried Semper in his rebuilding of the Dresden Court Theatre. The Berlin court theatres used gas the same

1- Theatrical Cuttings--Barton-Ticknor Collection-Boston Public Library. An account from an unknown newspaper, dated September, 1817
2- Ibid
3-Stumke--Licht und Schaubuhne--pp. 43-53

year, and the Munich Court Theatre in 1853.[1]

Disadvantages accompanied the new method of lighting; many of which could be partially remedied, and a few not at all. The adjustable defects were limited chiefly to acting, make-up, and costume. The old acting with all the brilliant tricks, the exaggerated facial expression, voice, and gesture, which had accumulated for centuries in the murky atmosphere of oil and candles, was killed. The actors found it expedient to temper their acting from the broad to the subtle in order to appease the critical audience which wondered at the exaggerated faces, extravagant gestures, and loud tones of the actors.

The brilliance of the footlights cast an unnatural glare on the faces of the actors which created hollows, distorted t
the features, and gave a ghost-like tinge to the features. To counteract these defects, the art of make-up had to be studied carefully in order to preserve a naturalness to the features. The physicians insisted that the amount of make-up necessary for effect weakened the optic nerve, red especially affected it. They also claimed that powder, pearl, paralyzed the muscles of the face, particularly the upper lid.[2]

1- Stumke-- Licht und Schaubuhne pp. 43-53
2-Effect of Gas on Audiences--Chiro-Medicus--Bolton Row. The Dramatic Magazine vol.1, Nov.2, 1829 p.312

The spangles, glitter, tawdriness, and general cheapness which characterized the costumes, became ludicrous, overdone, and theatrical, and made necessary revolutionary methods in costuming. This change gave rise to new materials, new colours, and general study of appropriateness and effect.

At first, because of the inflexibility, of gas, the productions were accompanied by a great blaze of light throughout the performance with no attempt at concentration, which made the whole stage most unnatural. All of the faults in scene painting, the joinings of the flats, and the unreality of the boards were revealed. Illusion, which before could be created with a few lamps and flats was gone, and an entire revision of the method of producing it had to be devised.[1]

The fumes, heat, and light given off by the gas affected the audience, the actors, and the stage hands. The entire lighting could be reduced to a minimum, but could not during the performance, be entirely extinguished, and the lamps, temporarily out of use would send off dangerous, combustible gases. This condition the technicians sought to aid, and succeeded partially, but not until the end of the century just before the use of gas was discontinued for that of electricity.[2]

The heat was especially unbearable, except in the real cold weather, and then a certain asset as the house did not have to be heated. The actors suffered weariness and bodily ailments from the highly raised temperature of the large

1-Theatrical Observer. No. 1491 Sept. 15, 1826
2-Ibid

number of foot and side lights. The spectators, towards the end of the performance suffered likewise, and the stage hands found their positions almost unbearable, back up in the flies where the heat even partially dried the paint and varnish of the flats.[1]

The steady glare of the light fatigued the audience as well as the actors. One doctor asserted that the strong vivid light caused apoplexy and numerous eye diseases.[2] Certainly the effect of so much light would tend to make the audience restless and inattentive, which might have accounted for the productions with large number of scenes, and the spectacles, with all the elaborate machinery.

The danger of conflagration was always pre-eminent. The gauze dresses of the dancers at ballets and fairy dances, invariably caught fire. To prevent this, many protective measures were taken. The footlights were screened in by wires supported by small standards and stretched across in front of the footlights.[3] The New Paris Opera House reversed the footlights so the jets would burn upside down. One of the dramatic magazines published a recipe to protect dresses against the flame. This consisted of the use of chloride of zinc, tungstate of soda or sulphate of ammonia, mixed with starch, or dissolved with water.[4]

1- Theatrical Observer. No. 1491 Sept. 15, 1826
2- Effect of Gas on Audiences--Chiro-Medicus- Bolton Row. Dramatic Magazine, vol.I, Nov. 2, 1829 p. 312
3- Cook
Fitzgerald
4- Era Almanack 1869. p.41

There was always the danger of a general conflagration caused by explosions of the principal conductors, the blocking of pipes and tubes which led to the inflammable side scenes Constant danger was incurred by the lamp-lighter when he l lighted the high-mounted lamps by means of small alcohol-flames attached to bamboo canes. The catastrophe of the Vienna Ring Theatre which cost eleven hundred lives, was caused by the careless handling of the bamboo-cane light. Stumke quotes Reinrich Haube, the famous director of the theatre, who was questioned in the criminal procedure following the fire.[1]

> "What I still have to say may be of no interest but I would add, that I am, on principle an opponent of lighting by gas. It is absolutely impossible to gain complete safety,when so many pipes containing fire, run through the whole house. One always sits as on the top of a volcano. I am an adherent of lighting by oil. I was told to use gas, but I was always against it."

The abrupt change from the use of the dim light of the oil and candles to the brilliant gas light with its untold possibilities acted as an intoxicent to the theatrical producers. They were as children with a new toy and they wished to discover all the novelties which it might possess. Their aim was to produce light, and more light, and still more light. Every sort of stage spectacle which would give scope for a new light thrill was produced. Consequently, this period was replete with stage battles, nautical spectacles with shipwrecks, great conflagrations, equestrian

1-Stumke--pp.43-53

performances, tank spectacles, extravaganzas, burlesques, and pantomimes, which were brought to a high degree of excellence.

This desire for spectacle was the cause of the decline of the legitimate drama in the first half of the nineteenth century, and by themiddle of the century drama was considered to be at its lowest ebb. There were, however, during this period, a few great actor-managers who loved the classics and strove to produce them as correctly and artistically as possible. They were men such as Macready, Phelps, Charles Kean, Henry Irving, and Beerbohm Tree, whose great revivals of Shakespere make the study of this period an interesting and an instructive one.

The "Gas Age" as it might be termed can be divided into three periods, 1817-1837, the second 1837-1881, and the third 1881-1900.

The Experimental Age

1817-1837

The first period can be considered one of experimentation in regard to stage lighting. New lighting units were to be invented; position and number of lights to be determined; theintensity of the light to be regulated; changes in the proscenium to be made; and the regulation of the lights from one central place by the prompter to be worked out.

There was considerable perturbation over the proscenium lights, that is, the cluster which hung in some in-

stances above the proscenium door, and which aided in illuminating the acting area. They were originally placed there above the boxes which had formerly been built on the stage, for purposes of general illumination. When the stage doors took the place of the boxes, the lights were retained as chandeliers over the doors and in some instances were placed on elaborate tripods which succeeded the proscenium doors.[1] There is an interesting engraving of the proscenium of the English Opera House in 1817 showing a glass cluster above each proscenium door, which lighted the front part of the stage.[2] In some instances these lights were used to express the time of day in which the action of the play was taking place. Disapprobation was expressed in an account concerning a production of "Romeo and Juliet", in which the stage lights and lustres over the stage doors were extinguished and in some time after, the great light in the center of the house was put out to denote night time on the stage.[3]

Apparently the increased intensity of the gas light caused these proscenium lights to be extremely annoying to the audience for we learn in an account of the opening of Covent Garden, September 6, 1818, which comments on the even distribution of light. The explanation of this improvement was given as the return to oil in the footlights to lessen the dazzling light which disturbed the visibility of the

1- W. C. Oulton--A History of Theatres of London, vol.1
2- Edward W. Brayley--Theatres of London. vol.1, p.43
3- W. C. Oulton--A History of Theatres of London, vol.1

audience and annoyed the performers; and the removal of the chandeliers in front, which relieved the glare complained about by the audiences of the preceding year. The great chandelier suspended from the center had also been improved as the account states that it now emitted a mild and steady light free from heat and odor.[1]

In "The History and Illustrations of London Theatres" by Charles Dibdin, published in 1826, are contemporary descriptions of the Covent Garden, Drury Lane, and the English Opera House with illustrative plates of stage views. Covent Garden used one hundred footlights. The auditorium was illuminated with a large centre lustre of lights, and fourteen chandeliers which hung in front of the first row of boxes around the auditorium, each containing from eight to ten gas lights.

In the account of Drury Lane is the statement that the stage was principally lighted by gas. The pipes were arranged below the flooring and their extremities partially inserted in grooves, so as to admit of their being moved in accordance with the play of the machinery. The accompanying plate shows the footlights to be only fifty in number, and the auditorium to be lighted with twenty-eight lustres around and two on each side of the proscenium.

Apparently the center chandelier and lustres around the auditorium were assailed from the beginning and were most undesirable because of heat, fumes, glare, and interference

1- Quarterly Journal, vol.22, p. 371

with the stage. The Theatre "La Fenice" at Venice was the first to light the theatre indirectly. The new lighting system is described in the Quarterly Journal Volume 22, page 371, which was copied from the new Monthly Magazine, Volume 18, page 467.

> "By the aid of parabolic mirrors, the light of many lamps is concentrated over an opening made in the middle of the theatre, and reflected down on a system of plano-concave lenses of a foot in diameter, which occupy the aperture and convey into the theatre the rays of light which arrive at them, and depart from the divergent. From the pit the lenses are alone perceived, which resemble a glowing furnace, and although the luminous focus is sufficient to light the whole of the theatre, it does not dazzle, and may be viewed without fatiguing the eyes."

The controversy over the desirability of footlights, increased with the use of gas. At first they were placed with reflectors a few inches apart, around the curve of the apron and were visible to the audience, as they stood several inches high from the floor, thus obstructing the view of the lower part of the scenery from the audience. The gas was too brilliant for the comfort of the spectators and actors, and for a time there was a return to the use of oil.

A contemporary account of the different units of stage setting for ordinary purposes gives an idea of the scenery used and the lights needed to illuminate it.[1] Four kinds of scenes were enumerated, drops or cloths, flats, set scenes and adjuncts. The drops upon which scenes were painted constituted the chief part of all stock scenery until about 1835 when they were superseded in London by flats. They were still used in country scenes. Flats, except close to the proscenium where they were lowered to conceal the set-

1- L.T. Rede--"The Road to the Stage." p.20

ting of a following scene, were pieces upon which a picture was painted on a flat surface. They never extended beyond the middle of the stage from the footlights. Set scenes included bridges, stair cases, scenes for machinery and all other similar which were not painted on flat surface. The wings and the side pieces were called the adjuncts.

With these units of scenery and with gas and oil illuminants the managers proceded to astonish the theatre-going world of that time. Contemporary journalists gave considerable space to glowing descriptions of some of the productions. William Hazlitt wrote an interesting account of "The Vampyre" given at Drury Lane, 1820, under Elliston's management; Stanfield was probably responsible for the scenery.

> "The scenery of this piece is its greatest charm and it is inimitable. We have seen sparkling and over-powering effects of this kind before; but to the splendour of the transparency were here added all the harmony and mellowness of the finest painting.....so much of the representation of the effects of moonlight on the water and on the person of the dying knight. The hue of the sea-green waves floating in the pale beam under an arch-way of grey weather-beaten rocks, and with the light of a torch glaring over the milder radiance, was in as fine keeping and strict truth as Claude or Rembrandt, and would satisy, we think, the most fastidious artist's eye. It lulled the sense of sight as the fancied sound of the dashing waters and soothed the imagination. In the scene where the moonlight fell on the dying form of Ruthven it was like a fairy glory, forming a palace of emerald light, the body seemed to drink its balmy essence and to revive in it without a miracle."

Puckler-Muskau in his "Travels of a German Prince" described a production of Oberon in London. It is of value

as it gives an excellent description of a typical opera set in the decade of the twenties.

> "Huge rocky caves which occupy the whole stage; every mass of rock then suddenly changes into some fantastic and frightful form of face, gleaming with many colored flames and lurid light, out of which, here and there, a whole figure leans grinning forward, while the fearful thrilling music reechoes from every side from the moving chorus of rocks." (Letter H)

In Letter 10 he writes an interesting description of a Covent Garden pantomime:

> "At the rising of the curtain a thick mist covers the stage and gradually rolls off. This is remarkably well managed by means of fine gauze. In the dim light we distinguished a little cottage, the dwelling of a sorceress, in the background a lake surrounded by mountains, some of whose peaks are clothed with snow. All as yet is misty and indistinct, the sun then rises triumphantly, chases the morning dews, and the hut with the village in the distance now appears in perfect outline. And now you behold upon the roof a large cock which flaps his wings and plumes himself, stretches his wings and greets the morning sun with several natural.."

Aside from the regular lighting units, special effects were introduced in the stage fires, storms, and volcanic eruptions, which were difficult and hazardous to make. In his dioramas, Clarkson Stanfield made free use of conflagration to heighten the natural effect. One of his productions, "York Minster on Fire" proved disastrous and ended in a real fire.[1] In order to increase the effect, he used mimic sparks and flames to represent the actual conflagration. In producing the strong red glare, probably by strontian and spirits of red wine, a current of air blew the flame upwards towards the canvas of the scene, which being

1- The Harlequin. Saturday, May 20, 1829, p. 24

transparent was immediately ignited, and in less than two hours, the whole of Oxford St. Bazaar and premises were destroyed.

Most of the conflagrations were made after the following recipe found in a book which was published in 1830:

Red Fire

40 parts of dry nitrate stronthian
13 do. finely powdered sulphur
10 do. nitre
 4 do. sulphur of antimony
When fire burns low, finely powdered charcoal or lamp black will make it perfect.

Green Fire

13 parts of flour of sulphur
77 do. nitrate barytes
10 do. nitre
 2 do. metallic arsenic
 3 do. charcoal

> "These fires are burnt at the sides and back of the stage behind standards to produce strong tints. The red to aid the effect of conflagration, and the green that of infernal or super-natural appearances--as spectres rising or sinking. These effects are further heightened by silk shades of the respective colours before the side and footlights of the stage. The beautiful effect of moonlight is thus produced."[1]

All of the criticisms written at this period were not complimentary to the stage. In a humorous, satirical vein, a contemporary scene painter, writing anonymously, described a production which was replete with storms, shipwrecks, and volcanoes. The article gives a fair idea of the many incongruities which accompanied the current spectacles, particularly in the lighting of them.

> "The third scene disclosed a storm at sea. The solemn impressions which arrend elemental warfare were

1- History of the English Stage--Published by Jordan MDCCC Author not given p.80

> a little weakened at the first moment by the detection of the hinder portion of a belated stage carpenter, who scuttled off to the wing as the tableau opened. There was no end of lightning. It worked away indefatigably. But gleaming as it did, through a transparent jig in the background it necessarily seemed to be self same individual flash repeating itself an indefinite number of times. So that at last one almost felt inclined to exclaim, "Aha! there you are again my friend.' Then came a shipwreck, after which, as I need hardly need tell you, the people saved were drawn from the deep in white dresses, which a livid light, resulting, no doubt from the combination of a sheet of green silver paper with a bull's eye lantern, brought into startling relief....
>
> "Then a volcano burst forth so fiercely that it was obvious that in the event of the piece having any prolonged run, the demand for sulphate of copper and lycopdium, for the coloured fires, would spur the trade in those articles to a feverish state of animation."

By 1830 the public became surfeited with so much spectacle that a reaction set in. Many criticisms of stage productions are to be found concerning the incongruities of them: the ludicrous mechanical effects; the unscientific management of the hydraulics in nautical scenes which sometimes spilled water on the stage extinguishing the lights; the unreality of painted scenes of waterfalls on canvas worked on rollers and unaccompanied by the imitation of falling water, in fact there was a general expression of discontent and a general condemnation of the cheapness and tawdriness of spectacle.

Considerable criticism was leveled at the stage lighting, particularly the footlights, the disposition of other stage lights, and the discomfort of the audience from the chandelier and lustres in the auditorium. There was a complaint that the footlights and lustres in front reduced the features of the actors to an unmeaning blank, and cast

upward shadows which made the finest facial expression mere contortions, ludicrous and unnatural.[1]

Pictorial effects were considered necessary to aid poetical imagination and essential to drama; but on account of the stage lighting they were detrimental to dramatic art. A great glare of light was spread evenly over the stage without a flicker of a shadow. Concentration of lights on the various parts of the stage would have given lights and shadows to the stage picture, would have brought out one feature here and toned another there, gaining thereby beauty and harmonious effect as is found in any work of art.

The glare of the light on the stage combined with that from the chandeliers and lustres offered no relief to the audience which became fatigued, extremely restless during a five hour performance. As a result, audiences were frequently noisy and obstreperous; there were frivolous and unruly interruptions of the performances, drunken scuffles and gallery brutalities which ruined the show. All of this was absent from the French theatre noted for its decorum, where the auditoriums were indirectly lighted.

The first reactionary, or better evolutionary manifestation against spectacle, was the building of realistic stage settings in interior scenes. Curiously enough, it can be traced to J. R. Planche, a man noted for his production of extravaganzas. In 1834 he constructed a ceiling for his interior set of "Minister and Mercer." This is significant

1- Theatrical Observer-No. 1491, September 15, 1826
Quoted by Watson

for two reasons; it ushered in the "upholstered" or "Tea-cup and saucer" drama of the middle and latter part of the century, and it changed the purpose and mechanism of stage lighting. Obviously a drawing room fitted up as such, would necessitate natural lighting, the sources of which must appear from windows, fireplaces, reflected walls, and so forth. Border lights could not be used with a ceiling and a special bridge was therefore constructed just inside the proscenium with floods and other lighting units which would create natural and sufficient illumination.

In 1841 Madame Vestris and Planche introduced what is known as the box set in this production of Dion Boucicault's "London Assurance" which marks the beginning of the drawing room drama with its realistic settings, properties, and lighting.[1]

1837 - 1843

Macready and Stage Lighting

This evolutionary period of stage lighting reveals a two-fold purpose, entirely at variance yet fundamentally the same, each attempting to arrive at the same goal. The one, was to produce magnificent revivals of Shakespere with correct archaeologically settings, which employed light and colour to insure that correctness and magnificence which bordered on realism, later to be developed to such an extreme by Belasco. The other dealt with extravaganzas of

1- I have three dates for the first performance of this play--1837, 1839, 1841--and am inclined to take 1841.

great beauty, made possible by lighting effects which revealed unreal fairy worlds of moving light and colour, which might be considered as a herald of lighting effects as now employed by Reinhardt and Craig. The one was sponsored by Macready, the other by Vestris and Planche.

Although the duration of Macready's theatrical managership lasted only six years, the duration of the influence which he created during that time has covered a century, and established a precedent followed by such distinguished managers as Samuel Phelps, Charles Kean, Henry Irving, and Beerbohm Tree. All of his productions showed the result of careful scholarship research to obtain archaeological correctneww and artistic harmony of stage settings. Contemporary accounts of his productions reveal nothing but praise, and his diary and letters reveal nothing but hard labour, agony, ill-health, and financial ruin, out of which his magnificent productions were built.

Macready accepted the management of Covent Garden Theatre in 1837 and immediately made plans for Shakesperian revivals. Marshall and Stanfield were his most famous scene painters. Stanfield was especially noted as the inventor of dioramas, which were scenes painted on canvas attached to cylindrical rollers. The effect when in motion was similar to the well known travel-logues. Stanfield was interested in the lighting of these dioramas as well as the lighting of ordinary stage productions.

References in Macready's letters reveal his admiration of Stanfield and his confidence in Stanfield's judgement of

matters relating to stage lighting. Macready records his first negotiations with Stanfield, and with the gas-man for Stanfield Pantomime.[1]

> "October 23. Called on Stanfield....asked him to paint me a diorama for the pantomime. He almost promised....
>
> December 14. Received the estimate of the gas alteration which though very expensive, I ordered in justice, as I thought to Stanfield and the work he is engaged on for me."

An entry for January 15 discloses a most valuable account of his employment of lime-light which settled beyond doubt that it was used previous to 1855 stated by many authorities to be the date it was first used.

> "Went to the theatre where I was attended to business, was detained long by Mr. Gye, who wanted to argue with me, that I ought to retain his light through the run of the pantomime, which he charged 1.10s per night with no stipulation or statement as to the expense."

Mr. James R. Anderson, relating the incident to W. L. Lawrence in 1889, gives a somewhat different version.2

> ".....one particular kind of lime-light was the exclusive property of Mr. Frederick Gye, afterwards recognized as Italian Opera impresario. From him Macready hired it to give extra effect to Stanfield's diorama of Continental views in the Covent Garden pantomime, 'Peeping Tom of Coventry'. Notwithstanding his extreme gratefulness in moonlight views, Macready thought the expense of hire, 30 shillings a night, too great, and made use of it only a week. But that was the man all over, to argue with him was useless."

Lime light which greatly aided the development of lighting in the nineteenth century, was invented in 1801 by Robert Hare, who discovered that a piece of chalk played upon

1- Macready's Reminiscences and Selections from his Diaries and Letters--Edited by Sir Frederick Pollock Vol. II, p. 92-98

2- Notes and Queries, Series 7, vol. 8, 1889. pp.225-226

by a burning mixture of oxygen and hydrogen produced a brilliant light.[1] It was improved by Lieutenant Drummond in 1826 who brought the chalk to a white heat by an oxy-hydrogen blow pipe. This proceedure was very dangerous and probably prevented an early extensive use of it. Stumke gives the date as 1826,[2] but the Quarterly Journal 1827 makes the following note:[3]

> "The experiment of Lieutenant Drummond upon the light of lime and other earths when highly ignited were interesting. M. Pleischal repeated the experiment."

Ward Leonard gives the date as 1816;[4]

> "Henry Drummond in 1816 discovered that by raising a piece of lime to a high temperature it became incandescent, and gave out a brilliant white light."

Because of its concentrated and localized nature, lime-light was very early used as a spot-light to follow the important actors around the stage. It was also employed for any incidental lighting, as moon-light, sun-light, or fire-light. Frequently, the stage was illuminated solely by the use of several lime-lights used as floods placed at various points throughout the house and focused upon the stage."

Forbes-Robertson wrote that the lime-light in the sixties was produced by gases brought to the theatre in two huge rubber bags. He considered it a very soft, beautiful light far superior to the electric lights then in use. Lime-light made valuable contributions to the evolution of theatre lighting. The principle of the lime-light, led to

1- Romance of Gas 2- Stumke--pp.43-53
3-Quarterly Journal 1827, vol. 2, new series, p. 201
4- Theatre Lighting Past and Present-Ward Leonard Electric Co. p.17

the invention and development of incandescent gas mantle in the latter part of the century, which greatly increased the efficiency of gas lighting. The mantles were used in the footlights, proscenium lights, border light and bunch lights. They also decreased the fire hazard. Because of its concentrated nature lime-light provided a means of lighting the stage artistically, to bring out the plasticity and to aid in dramatic action.

References in Macready's diary show his continued effort to improve stage lighting.

> "August 31, 1838. Went to the city with Bradwell and Brydon to see the newly invented liquid gas.
>
> "February 2, 1842. Business with Mr. Faraday (Brother of the great philosopher) about the concentric burner which he brought."

The entry for February 21, 1842 is most significant as it marks the very early discovery of the effect gained by throwing coloured light on pure white. This is considered a very modern development of colour in lighting. Macready missed the chance of introducing this innovation on his stage, because of the danger involved; but from various entries the financial difficulties which he was experiencing were of greater persuasion. The following entry and note by Pollack concerning the lighting is made:

> "February 21. Received a note from Babbage about a rainbow dance. I am in the dark about it."
>
> "Note. Mr. Babbage in his "Passages from the life of a Philosopher" London, 1864, relates how he devised a rainbow dance for the ballet of the Italian Opera House. Various coloured lights were to be thrown on

> groups of danseuses dressed in pure white. The oxy-hydrogen light passing through different media was to have been employed to produce the most brilliant effects. Mr. Babbage arranged a ballet "Alethis and Iris" but the danger of fire was alleged by Mr. Lumley as reason for not using it. Babbage made several philosophical contributions to ballet."

Macready's lighting effects were quite remarkable in effect judging from contemporary accounts. There is a description of a moon-light scene, in his famous production of "Acis and Galatea" produced with Handel's music and Stanfield's superb scenery.[1]

> "The scene of Sicilian moonlight is beautiful with the seas swelling to the audience, and breaking the last billow actually tumbling over and over with spray and foam upon the shore and then receding with the noise of water over stones and shells, to show hard, wet sand."

While Macready was engaged with his carefully prepared production in which he worked for harmonious effect of text, scenery, and action, Madame Vestris and Planche were beginning to produce their extravaganzas and drawing room dramas. Madame Vestris was the first woman stage manager in the history of the theatre, and she left many notable contributions Her production of London Assurance and its significance has already been noted. The box set used in this performance was very similar to the modern ones. It was composed of walls made of canvas pieces stretched over light wooden frames lashed together at the back with ropes; a ceiling similarly constructed in two parts, hinged together to facilitate handling, and when the whole was up, resembled a room.

With a ceiling and enclosing walls, borders and wing lights were necessarily abolished in interior sets. Grooves which were used for wings disappeared as the side walls of the

1 Sharpe, A Short History of the English Stage. p. 131

box sets directly cut across them, the slope was taken out of the stage floor; the size of the proscenium cut down to provide more strategic positions for the first border and proscenium lights, individual spot lights and floods. It was necessary to construct special bridges for the lights to hang just inside of the proscenium. The room was fitted with real lace curtains instead of painted ones, real pictures, real furniture, and lighted similarly to a room of that description.

It was sometime after Madame Vestris' innovation that Robertson wrote the first realistic drama, which started the swing of drama towards realism. It had been instigated by stage lighting which made the realistic settings of the drawing room drama box set possible.

Madame Vestris showed marked artistic ability in her outdoor scenes as well, as can be gained from her scenic version of "A Midsummer Night's Dream," which she produced in 1840. The following are her directions for Scene 1, Act III:

> "Moonlight--transparent wood--platform colored and rising ground crossing from the back-R. Water piece joining it and running off left--(In the course of this scene occurs the stage direction) The moon sinks very gradually, the rays disappear from the tops of trees; daylight continues to increase until lights are on full.
>
> "Act 1. Sc.3, Same as above which changes to sunlight."

The extravaganzas, versions of Madame D'Aulony's Fairy Tales by J. R. Planche, which Vestris sponsored reached a high degree of perfection under the supervision of Beverly,

the famous scene painter noted for the invention of the transformation scene. The English architects very early recognized the beauty of Beverly's work, and expressed the wish that the architects would take lessons from him and now and then give precedent to their imaginations. It was early in 1849 that Beverly introduced the first approach to a transformation scene. It was left for him to supply the last scene in "The Island of Jewels." This he did by arranging the leaves of a gigantic cactus tree to fall and disclose six fairies or nymphs, each supporting a coronet of jewels.

These productions of Vestris, Planche, and Beverly were really marvels of intricate design and colour. It is here we find the development in brilliant light effects, which were probably carried over to their productions of the legitimate drama.

Fitzgerald gives a description of a typical extravaganza with transformations and light effects.[1]

> "First the gauzes lift slowly one behind the other, perhaps the most pleasing of all the scenic effects--giving glimpses of the "Realms of Bliss" seen beyond in a tantalizing fashion. Then is revealed a half glorified country; clouds, banks, evidently concealing much-always a sort of pathetic and at the same time excellent steam rises, and is repeated as the changes go on.
>
> "Now we hear a faint tinkle, signal for those aloft on the bridges to open more glories. Now some of the banks begin to part slowly, showing realms of light, with a few demure beings, fairies, more breaks, more fairies rising. Thus it goes on, lights streaming on full, in every colour and from every quarter in the richest effulgence. Finally, a most glorious paradise of all will open, revealing the pure empyrean and some spirit the apex of all."

1- Fitzgerald--"The World Behind the Scenes"

The brilliant transformation scenes were effected by the use of many lime-lights, with different coloured glasses in front of the lamps. The colour changes were generally from mauve to faint green and blue, then to other tints. Many effects were gained by crossing the rays from the lime-lights blotting out some here, and increasing some brilliance there, a moving panorama of colour. The effect of the extravaganza depended on the play of light and the use of much gauze.

1843 - 1879--Phelps and Kean

If a chart were to be made of the period extending from 1817-1881 showing the progress of the science of stage lighting, undoubtedly the greatest curve would occur between 1843 and 1879, for the conditions of this period were most propitious to the development of stage lighting from a scientific, artistic, and dramatic viewpoint. The reign of spectacle with the indiscriminate use of light was almost over; Macready with the noted scene painters, Marshall and Stanfield, had acted as pioneers in the field of artistic settings and pointed the way for their successors. The licensing act which had limited the productions of legitimate drama to Drury Lane and Covent Garden, was revoked in 1843 allowing all the smaller theatres to rush to produce Shakespere and other dramas, thereby stimulating competition which resulted in a higher type of performance. The use of gas, lime-light and to a small degree, electricity, had changed the type of stage settings and lighting, and opened a vista of vast possibilities to the producers.

In this period such skilful artists as Beverly, Grieve, Telbin, Fenton, Fetcher, and Foucault applied their brushes diligently to stage scenery. They realized the deficiencies of the lighting and contributed various devices and inventions for improving it. Their efforts and accomplishments aroused the interest of architects and scientists who began to see possibilities in stage settings. "The Builder" one of the oldest English architectural magazines became actively interested in the theatre and published in each issue accounts written by able men of productions with constructive criticisms on technical details of scenic perspective, lighting, and stage mechanisms. Many of the suggestions were utilized by the theatres.

The two most noted producers of this period were Samuel Phelps, manager of the Sadler's Wells from 1844-1862, and Charles Kean, manager of the Princess. These men fostered the ideals of Macready which they modified, expanded, and developed, far surpassing anything which he had achieved. In this period, too, Vestris and Planche continued their productions of extravaganzas and realistic dramas, which were brought to a high degree of excellence.

The scientific advance of stage lighting and machinery aided the managers greatly in their progress. At this time the stage was lighted mainly by footlights, border lights, wing lights, in some instances proscenium lights, and occasionally by lime lights, floods, and spots. The footlights because they were a continual source of danger, unnatural effect and discomfort to the audience, received the largest number

of criticisms and underwent the greatest metamorphosis.

As early as 1817, when the gas floats were first installed in Drury Lane, one observant man, an able reporter, objected to the unnatural light as coming from below instead of above, and suggested: "That if the front light could be thrown as daylight is, from above instead of below," and he challengingly added "and we should like to hear the reasons why it cannot, the effect would be perfect."[1] Thirty years later Mr. Dwyer, an architect and contributor to "The Builder" sought the abolition of footlights. He suggested that they be replaced with a central congeries of lights in the very body of the house to illuminate the stage, and another congeries just inside the proscenium at an angle of 45° or just above the range of actors' heads, in order to give the dioramic effect.[2] Twenty years later his suggestion was carried out most successfully. Forty years later we find many of our best theatres adopting a modification of his plan.

In the meantime various ways were sought to improve the footlights by modifying them to a certain extent. In 1847 they were still of primitive construction. Each gas jet had an individual reflector which stood several inches above the level of the apron obstructing the view of the spectator who was obliged to peer around them to see the lower part of the stage. To remedy this, the stage floor had been sloped

1- Examiner, September 7, 1817
2- Builder, 1847, vol. 5, p. 216

toward the footlights with a most unreal effect.

Mr. Dwyer objected to the reflectors of the footlights because of their appearance, and suggested means of concealing them below the stage by using modifying reflectors arranged to carry off the noxious odours.[1] Ten years later this plan was also adopted by the theatres. Apparently the objections raised and suggestions offered were ignored at that time, for ten years later appeared a similar plea in The Builder for a modification of

> "those hideous objects, footlights. What occupant of the pit or stall has not often felt annoyed that he could only see the heads of the actors (when half-way down the stage) over or between those unshapely obstacles which, though sometimes 18" high, barely shelter his eyes from the flaming smoky glare of the gas argands, and which form a harsh background."

Then followed a suggestion that the footlights consist of a close continuous bright line of jets, an inch apart, not more than 4" or 5" above the level of the stage and shaded from the audience by one shallow rim running in an unbroken line along the whole front.

The Builder credits the Paris Opera House with first encasing the row of flames of gas in a long tube framed on the stage side by ground glass, and the audience side with a continuous reflector. The chamber so constructed was ventilated by pipes which carried the fumes from the side of the proscenium. The new footlights increased the visibility of the stage as the smoke, often seen by spectators in the pit, was

1- Builder- 1847, vol. 5, p. 191
2- Ibid

carried away, and reflectors were lowered.[1]

In 1863, Mr. Fechter settled the question of footlights for most of the theatres, by sinking those at the Lyceum below the surface of the stage so they would not interfere with the spectator, and beveling the stage in front in order not to cut off the light from the stage.[2]

The new Prince of Wales Theatre at Liverpool followed the example of the Paris Opera House in 1866 and installed an elaborate new float patented by Messrs. J. Defries and Son, which closely resembled the modern compartment lights. This system enclosed the jets of gas within a box formed by a series of compartments two feet in length and joined together with ventilating and cooling system at the back. There were six jets of gas to each compartment which was encased towards the stage side with glass. There were two rows of gas jets, one which threw the light at angle of 45^{o}, and one which threw it almost vertically. There was an arrangement for coloured lights consisting of coloured glass and which worked from the prompter's box. The whole float was only three inches above the stage level. A note states that the Prince of Wales Theatre was the first to adopt this new system.

From the first, footlights were a source of considerable danger to the flimsy dresses of the actors and ballet dancers. In 1866, to lessen the danger, Mr. Stoakes of the Theatre Royal, Brighton, reversed the flame of the row of Argand burn-

1- Builder, vol. 20, p. 888
2- Builder

ers and sunburners, which then burned downwards. The combustion was carried off by iron pipes, and the reflector was only six inches above the stage.

Some of the more ingenious managers discovered that footlights could be used to gain the effect of colour and distance and colour effects which the brush could not give. Charles Kean and Fechter at the Princess Theatre were the first to make use of a second row of footlights to give the effect of distance to oblique backgrounds. Fechter carried across the middle of the stage some species of rampart or scene for which excuse was often hard to find. Behind this low rampart, the height of which seldom came above the middle of the human figure, a second row of footlights was placed easily at disposal for modifying the light on the farther scene, which gave distance.[1]

Mr. Dwyer reported a new scenic arrangement and new use for the footlights in artistic lighting, used at the Adelphi Theatre in a production of "The Flowers of the Forest." Here the back-drop was dispensed with and a number of flats represented the sky and extreme distance, while the foreground was broken into perspective forms. Footlights were placed behind these parts to give the brilliant effect of sunny spots on the landscape. Mr. Dwyer reported that no colouring could attain the effect gained.[2]

Dion Boucicault at the Theatre Royal, Westminster, was

1- The Theatre, New Series, vol. III--Show and its Value--Godfrey Turner
2- The Builder, 1847, vol. 5, p. 216

probably the first to utilize the footlights to gain concentration of light on the stage. He obtained extra light to the extent of seven or eight feet, in the center, by placing the burners closer together.

Wing and border lights were not subject to as much criticism or change as the footlights. The chief difficulty encountered with them was the control of the intensity in accordance with the shadowing on the scenery. Frequently the light was not sufficient to counter-act that from the front.[1]

In 1847, the Greenock Theatre abolished the wing and border lights substituting a most modern method of lighting the entire stage. The manager used a central congeries of lights in the place occupied by the chandeliers, with a very powerful reflector which flooded the stage at an angle of about 45^{o}. He placed a second congeries of lights at the same elevation just above the general range of actors' heads, within the proscenium.[2]

Very early the wing and border lights were encased similar to the footlights to prevent combustible material from becoming ignited. Originally they were encased with hoops of galvanized iron. Those installed in the new Princess Theatre Royal, Glasgow, were composed of gas battens, a quarter circle in their section and about a foot in width. Their lengths suited the height and width of stage openings. Each batten was lined with galvanized sheet iron, and hooped across the front

1-The Builder, vol. 5, 1847, p.281 E. E. Dove gives the account in a letter.
2- Ibid- vol. 7, 1849, p. 74

to prevent contact with the open jets of gas. The gas pipe was placed in the hollow of the circle.[1]

The Olympic Theatre lighted the stage from the top, avoiding the use of wing lights, from which there was always the danger of conflagration. The manager used five battens, with seventy lights each and employed leather connections to raise and lower the battens ten feet.[2]

A few years later, most theatres encased the wing and border lights with glass and reflectors similar to those of the footlights. This eliminated the danger and facilitated the use of coloured glass slides for artistic lighting.

One of the most important aspects of gas was the flexibility so necessary to the art of stage lighting, and many devices were invented to increase it. As early as 1849, the gas was placed wholly under the control of the prompters by a system of taps and stopscocks on a control board. Considerable credit is given Charles Kean for improving the control boards, as under his management the changing of lights on the stage was accomplished with ease and variety of effects, especially in the ghost scenes.[3]

In 1866 a system was invented by which the prompter could control all the lights of the stage and house, and could turn them entirely out. An electrical device enabled him to relight instantly every burner in the house.[4] This

1- The Builder, vol. 7, 1849, p. 74
2- Ibid vol. 7, 1849, p. 619
3- Theatrical Journal, Dec. 13, 1849
4- The Builder, 1866, Oct. 27

This invention proved invaluable though not utilized until Henry Irving's time. It was he who discovered that the best visibility could be secured by turning the house lights entirely out during a performance.†

As a result of the progress in lighting, a new type of stage, a fore-runner of Reinhardt's and Fortuny's was built at a new theatre not far from London. The Builder most jubilantly gave a detailed account and hailed it as an innovation which would revolutionize future stage technique.[1] The stage was Curvilinear in shape. The curtains and back scenes were on cylinders made to drop or raise scenes as if t hey were flat. Transparent and opaque scenes with gauze and light were used to obtain effect of perspective and distance. Vertical as well as horizontal cylinders were employed, and the powerful illusions created by simultaneous rolling and unrolling of partly opaque and partly transparent scenery left that of the ordinary theatre far behind. This new stage called for an important modification of the lighting. There were no footlights as the whole space was illuminated from above by an ingenious combination of lights and reflectors. The house was so constructed that theatrical representations could be given by the sole aid of daylight transmitted through panes of coloured glass.

Mr. Dwyer praised the new stage very highly in a paper

†- Sabbatini discovered the law of optics several hundred years earlier.
1- The Builder, 1851, p. 406

read at the meeting of the Decorative Arts Society.[1] He recommended the use of painted canvas on rollers sufficiently lofty so as to dispense with the series of curved, scalloped, and straight fly borders, ordinarily representing the sky. He commented upon the use Macready made of colour and drew attention to the force with which the varieties of colours in dresses could be developed by having regard to the background and to the position of the actors. He paid tribute to Macready's use of it in the artistic arrangements which he frequently showed in groupings and tableaux.

The introduction of indirect lighting of the auditorium of the Theatre du Chatelet is very important as it aided the visibility of the stage and the scenic illusion, thereby.[2] The system consisted of a semi-transparent ceiling of ground glass through which the gas jets arranged in a concentrated mass, poured down a flood of softened and equalized light, the intensity of which could be heightened or diminished at will. When the performance began, the auditorium light was reduced to exactly that point calculated to give just the proper amount of due predominance to the lighting of the stage.

It is to be noted that the magic lantern invented a few years previous to 1877, was used that year by scenic artists to gain effects by projecting photographs on scenery. At first they used it as an aid in the painting of landscapes.[3]

1- The Builder, vol. 5, 1847, May 8, p. 216
2- American Gas Light Journal, Jan. 1, 1863
3- Scientific American Supplement, 1877, April 21, vol. 3, no. 68

> "The artist instead of drawing on his imagination for a group of medieval houses, procures a large photograph of the actual locality. This is done by means of the ox-hydrogen light he throws upon the canvas, the image being suitable enlarged in size. He then follows the outline with his brush and has an accurate picture."

With the results of the experiments made by scientists and architects at their disposal, Phelps and Kean made considerable progress in the art of scene lighting. Of great interest are the accomplishments of Phelps at the Sadler's Wells Theatre. In the early days, Sadlers Wells was a fashionable watering "Spa" to which the Londoners strolled on pleasant Sunday afternoons. Eventually, the Spa added an amusement hall which was finally converted into a theatre with the original spring underneath the stage to serve in the great nautical dramas which reigned supreme for many years.

When the licensing act was revoked, Phelps assumed the managership which lasted eighteen years. He began immediately a succession of classical revivals noted for their superiority of production. All of the reviews in contemporary periodicals were most effusive in their praise of Phelps' work.

He eliminated the spectacular aspects of production and substituted the artistic. A good illustration of this change is found in "Mid-summer Night's Dream", which had always been produced as a spectacle. One critic paid the following tribute:[1]

> "The scenery is very beautiful and wholly free from the meretricious glitter now in favour; it is not so remarkable for costliness as for the pure taste in which it and all stage arrangements have been found."

1- The Builder, 1855, Oct. 15

A similar criticism was made of his production of "Pericles, Prince of Tyre" in which the splendour of the production was tempered by rare pure taste. Praise was also given to his combinations of colour which added quaint and picturesque effects.[1]

Phelps' masterpiece was probably "Coriolanus" which might be considered as a climax in his producing experience. One critic claimed that Phelps had fulfilled in this one production all of the conditions which Freiherr Von Wolzogen considered necessary to the honorable progress of the drama. He acted the national plays in a house small enough to allow all to see the subtlest and most delicated shades of the actor; he had trained his cast to support each other steadily and to present the play as an effective whole; he employed no music. Of great significance are the two remaining conditions of Von Wolzogen, which are an expression of the true purpose of stage lighting and settings. It is interesting to note that Phelps' production appeared to have approached those two. "His scenic display was capable even to a remarkable degree, expressive of poetical intention." And, "The scenic effect of the view of the antrium by the light of the rising moon contrived to give colour to poetry."

Are not the artists in the present field of dramatic production attempting to fulfill the last two conditions? It is most interesting to find the same attempt made by a producer a half century earlier. To Phelps may be given the

1- The Builder, 1855, Oct. 21

honour of arriving at a fundamental truth of stage production. He attempted to unify colour, light, action, and text. He refined and tempered the garishness prevalent in most productions by a delicacy and pureness of taste.

Of a more experimental nature were the lighting effects produced by Charles Kean and Fechter at the Princess Theatre where Kean was manager for some years. Kean was more didactic than poetical in his productions. He realized the value of stage art, and attempted to educate the audiences to an appreciation of it, by appearing before the curtain and explaining the lighting, settings, and costumes of his productions, which consisted mostly of Shakesperian revivals. During his management he produced fifteen or sixteen of Shakespere's plays which he mounted with great care in regard to historical accuracy.

Kean was especially interested in using light to create supernatural effects. He discovered in his Macbeth scenes that the abundant use of gauze and proper placement and intensity of lights would give weirdness to the witches and many solemn effects to the large groups. He retained the supernatural atmosphere in the changing of scenes by lowering the lights and using many gauze drops which gave the effect of scenes dissolving from view.[1]

The value of light and shade was also appreciated by Kean, who made extensive use of it. He gave preponderance of light to certain features of the stage picture, a group here, a figure there, while keeping the remainder in rel-

1- Illustrated London News, Feb. 19, 1853, p. 142

ative darkness. The ghost of Banquo in the banquet scene occupied the center of the stage at first, and the head Kean illuminated very strongly with lime-light spot. Later the ghost appeared in the interior of a pillar, which had been made transparent and highly illuminated.

Kean has been credited by many authorities as having been the first to introduce lime-light on the English stage in his production of Henry VIII in 1855.[1] This statement we know to be incorrect.

For the purpose of gaining plasticity to the stage, Kean frequently made use of incidental lights, that is, a candle, brazier, fire-light. He did this most effectively in the production of Richard III, where in one of the scenes he used the light from the embers of the fire-place to illumine the rich hangings and the coverings of the couch.[2]

Watson is inclined to believe that Kean did not alter the general lighting effects or increase facilities beyond those of Macready or Phelps;[3] but it was at Kean's theatre and under his sponsorship that Fechter made so much progress. It is to be remembered that the innovations which he made by subduing and sinking the footlights and beveling the stage in front were copied by all the theatres and used until the present day. Kean and Fechter introduced oblique background as a peculiarity of perspective, and employed the second row of footlights to gain the effect of colour and distance to the

1- Illustrated London News, Feb. 19, 1853, p. 142
2- Builder, 1857, vol. 15, p. 161
3- Watson

back scene.

Fechter also made many improvements in the stage machinery. He abolished the ancient grooves in which the wings had been placed; the trap doors from which supernatural beings generally emerged, and the sticky flats. He constructed a floor that could be taken apart like a child's puzzle; and introduced the bodily raising and sinking of scenery, all of which he managed from the mezzanine stage beneath. Following the innovation of Vestris and Planche, he established the precedent of using solidly constructed ceilings and walls in interior sets.[1]

1- Goethe in his autobiography says that in his youth, French theatres used interior sets formed by real walls and ceilings.

CHAPTER VII

The Transitional Period of Stage Lighting and the Introduction of Electricity on the Stage 1881 - 1900

This period can appropriately be termed a transitional one in the history of stage lighting; for it records the highest development and the culmination of the use of gas, and the introduction and development of electricity. It indicates the end of the art of scene lighting and the birth of the art of stage lighting. Henry Irving and Beerbohm Tree serve as links between the two. From the heritage they possessed and the scientific knowledge they obtained, they made practicable a theory old in conception, but new in realization.

By the time Henry Irving became manager of the Lyceum Theatre in 1878 stage scenery had become highly complex and cumbersome. The stage was crowded with painted scenery, plastic sets, and stage hands, made necessary by the magnificence with which drama was set forth. There were cloths, borders, wings, ground pieces, traps, sliders, gas battens, gas tubing, and ladders. There were fly men, stage men, and cellar men, numbering into the sixties, to work the complicated ropes and pullies in manipulating all of the scenery.

In order to illuminate the billows of painted cloth and the maze of wings and ground pieces, an elaborate lighting system had gradually evolved, attended by many "gas"men. Two rows of footlights were generally used fitted with white

and green globes. The number of ground rows had been augmented by the ever increasing number of ground pieces. Where four or five wings had formerly been considered sufficient, ten to fourteen were now deemed necessary. Behind each wing were three or four "Wing 2" lights on vertical standards, fitted with white and green globes and protected by wire netting. The wing lights prevented the shadow of one wing from falling on the other and aided in illuminating the scene. As the number of borders increased with the number of wings, so did the number of gas battens or border lights. The gas batten consisted of a row of three or four hundred open jets protected behind by a long curved metal trough or reflector, and in front by wire netting. "Bye" taps were used to prevent the gas from going out entirely when the lights were lowered. The bunch lights or portable suns consisted of several lights ten or twelve in number placed in a special bowl reflector, resembling a bright tin pan, and mounted on a portable standard. A large number of lime lights were also used which necessitated a large number of extra attendants.

Such a large number of lights required a great deal of equipment dangerous as well as cumbersome, which appropriated almost as much room as the scenery. Gas mains sometimes more than twelve inches in diameter were laid, and many thousands of feet of feeder pipe, fixed and flexible, trailing in all directions across the stage and wings. Every rising moon and sun dragged its gas tube behind it as it creaked andwobbled towards the scenic heavens by means of an ingenious system of pulleys. In the French Opera House there were twenty-eight

miles of gas piping, and the control board contained eighty-eight stops and cocks all collected on one screen and controlling nine hundred and sixty jets.

An improvement had been made in the lighting of the borders and wings. Formerly every individual jet was lighted by a man with a rod, but a second row of jets or "needle points" as they were called, placed close together, had been invented. These needle points ran close to the more scattered jets, and a flame applied to one end traveled along from jet to jet.

With such accoutrement of scenery and lighting, considerable time and effort were expended by the scene painters, gas men, and manager in combining the two and converting them into a desired effect. Light and shade were supplied by the painter's brush, and the light was directed to bring out the light and shade to form an illusion. This effect was accomplished at the light rehearsal, the last thing before a production of a new play. Generally the rehearsal took place at night after the audience had departed from the theatre, and lasted until morning.

The scene painter sat in the center of the auditorium, and observed minutely every part of his scene under the glare of the gas. The gas men took copious notes and translated them later to the technical lore of the "gas" board.

It was in the power of the gas men to ruin the most beautiful scene ever painted. Ground lights turned too high upon a moonlight scene, would spoil the effect; calciums with glass not properly tinted would do likewise; the shadow of a straight edged border drop, thrown across a delicate sky would call

down the censor of the less observant.

Coloured silk-cased lights were hoisted to the flies, lime-lights were placed to regulate colour or travel with varied effects the number of lights increased in some of the battens and decreased in others, and bunch lights were placed to give the best effect.

So all through thenight, the artist, the gas men, and the manager changed colours of lights, lowered the intensity of light in one place, raised it in another, added different battens, changed positions of bunch lights until they were satisfied with the effect.[1]

Aside from the lighting of the scenery, many special spectacular effects, as moonlight, conflagrations, storms with much lightning and thunder, starlight, sunlight, and volcanoes were attempted.

Moonlight had long been the most favorite stage effect attempted and undoubtedly the most successful of all. It had developed through a long series of evolutions like Darwin's monkey. At first the effect was made by green glass chimneys over the oil, and then the gas lights. The moon itself was early represented by a lantern, candle, or oil lamp mounted on a stick behind a transparent disk. At first the moon was stationary, just a simple hole in the back drop covered with muslin or oiled silk and light behind it. Then came the demand for a moveable moon. This species of the heavenly orbit was constructed with a moon-box of tin somewhat like a milk-

1- Building News. 1881, July 29, p. 151

pan, covered with oiled paper or silk through which shone the light of three or four candles. It swung on wires and slowly moved up behind a gauze drop. The milk-pan was later replaced by a box similar to the photographic camera with a bull's eye, a gas light and flexible tube behind it. Lime-light was also used to project moon-beams and sun-rays. From the simple beginning there gradually evolved a very elaborate system for depicting moonlight including the scenic artist with his brush, lighting through coloured mediums, with special effects of moonlight on water.

The artist always painted a special scene for moonlight.[1] It was done in cold grays and greens, in which Prussian blue and burnt amber played an important part, while the lights were put in with white slightly tinged with emerald green, all making a ghastly sight in daylight in daylight. The scene was lighted by a three-fold method. In the foreground a strong moonlight produced by calciums was thrown upon the scene through green glass. In the back ground a fainter light upon the scenery for distance was thrown upon the lower part of the scene at the back of the stage from a row of Argand burners with green chimneys. These were placed in front of the main scene and were masked in from the view of the audience by a ground piece. A row of the burners was suspended from the flies in order to light thetop part of thescene and leave no shadows. The upper row was masked by sky borders, and the light thrown upon the scene through the medium of green glass.

1- Secrets of the Stage--Richard K. Fox, P. 25
(By an old actor)

A favourite scene was that of moonlight on the water because of the charming natural stage effect of the ripple.[1] For the ripple effect the main scene was always painted on a back drop. The position of the moon being determined, immediately under it, beginning at the horizon, a number of small irregular holes were cut in the drop. These were covered over with muslin and painted to match the rest of the water. Behind these holes was placed an endless towel, about eight feet in height running around two cylinders, one at the top and one at the bottom. On the lower cylinder was constructed a crank by which the towel was turned. In this towel was cut a number of holes similar to those cut in the drop. A strong gas burner was placed between the two sides of the towel. When the machine was turned, the flashing of the light from the passing holes in the towel produced the ripple effect. The towel was generally turned upwards to impart the illusion of wavelets dancing upwards to the sky.

Moonrise was generally depicted with a muslin drop and a moon-box. The muslin drop was painted to represent the sky, the clouds were painted on strips of canvas cut to the required shape and sewed on. The moon-box was drawn upwards by wires and pulleys giving the effect of rising behind the clouds By having another piece of muslin painted red and imperceptibly fading to white, placed at the back of the drop, the moon appeared red at the horizon and, then changed to pale yellow. Sometimes floating clouds were made by gauze drops upon which

1- Richard K. Fox. p. 30

muslin or canvas clouds were sewed, suspended in front of the sky drop and moved slowly along.

Stars were made of spangles hung upon a pin bent upon a double hook. The slightest motion of the drop caused the bangles to shake, and the flashing of lights on them produced a twinkle. Another means of giving the effect of starlight was to perforate the sky drop and replace by a blue gelatine held in place by a light wire frame. Magic lanterns were used later to flash stars on the drop.[1]

A favourite effect was the change from day-light to night and vice versa. To represent this change, the back drop was double the usual size with the upper half which was hung to be visible painted to represent the sunset sky, while the lower half, which at first was invisible, was painted for moonlight. The distant scene was generally a cut-out placed immediately in front of the sky-drop, and painted to represent distant horizon of trees, mountains, etc. A few feet in front hung a cut gauze drop, the sides and top painted as scene required and the center filled with fine gauze which lent an aerial effect to distance.

A red medium was used to give the soft, sunset glow to the scene. When the change was desired, the backdrop was slowly hauled up until the night half with the moon made on it came to place. At the same time the red mediums were slowly turned off and the green ones gradually turned on, and the calciums were brought into full play.

1- Sidney Childly, Scenic Artist--Scene Painting for Amateurs

Frequently a torrent of water was required to roll down from mountains and hills. This was contrived by arranging a piece of transparent material in the shape of the stream, while behind a metal cylinder revolved with the surface cut into a number of irregular holes lit by gas jets.

The rising or setting sun was represented by a combination of a machine andelectric light. The machine was an extinguisher-shaped funnel the front of which was formed with open bars, which spread from the center, with each bar growing broader at the circumference. The light was increased in intensity and was cast upon a calico screen properly painted in front, and the bars intercepted the light which took the shape of spreading rays.

Storms were most interestingly worked out. Rain was depicted in various ways. In one instance an idea of a deluge for a scriptural play was attempted by streaking a large gauze with silver foil and flashing dimmed light upon it. Metalized taps were sometimes used to represent rain. These were hung from the flies, and lights flashed upon them produced the effect of rain.[1] Lightning was produced by blowing powder through a long tin tube into a spirit lamp at the end, which gave a vivid flash. Frequently zigzag strips of imitation forked lightning were cut out, covered with calico and painted to resemble the rest of the scene; the flash was made by flashing an electric light off and on.[2] Another

1- Childly
2- Fitzgerald--The World Behind the Scenes

method of making lightning was by using magnesium forced over a brazier of cotton wool soaked with methylated spirit and lighted.

Conflagrations which were favoured quite late in the century were most elaborate with livid effects of falling beams, smoke, and fire. The effect of livid smoke was given by limelight projected through a red medium upon moving vapour. Braziers with powdered lycopdium were kept in the wings with a forge bellows, each blast produced a sheet of flame and smoke. Tiny rows of jets screende from the audience followed the beams and rafters and made them stand out in the blaze.

Considerable criticism was directed against the method of lighting during the period, and particularly against the limelight. There were many complaints that thelimelight projected a blinding glare and when projected through a medium bathed the stage in profuse unnatural colouring. The strong glare and over-abundance of colouring revealed the flatness of the profile trees and the cut-out borders and the barren nakedness which destroyed the illusion. It destroyed the illusion of the painted drops, built up scenery, andmade the stage boards and joinings of the scenery all too plain to the view.

Footlights came in for their share of criticism because of the unnatural source of the light. Even Fechter's innovation did not correct that. Besides, a shadow was cast on the lower part of the actors, as the light played upwards; apparently counteracting floods or bunch lights were not used to correct that fault.

Many critics disliked the vulgar display so much in evidence at the ordinary productions. Theatre managers were tempted to dazzle the eyes of the vulgar public by introducing large quantities of glass foil, white metal, and many other materials which came into use because they were effective in the strong lime-light.

Even the productions of Phelps and Kean were for having attained an archaeological correctness in which the dramatic effect was swallowed, and the play could not be seen for the gorgeousness of upholstering, costuming and lighting.

Such were the conditions advantageous and disadvantageous which characterized the stage when Irving became manager at the Lyceum. It would be over-emphasizing the matter, should credit be given him for erasing all the faults of which the stage was accused; but he did a great deal to establish a certain amount of artistry and as Macready, serve as a pioneer for those to follow.

A perusal of dramatic criticisms from the beginning of Irving's management to the end is very instructive as it shows the gradual change from the influence of Kean and Phelps, through Irving's own experiments to a decided policy of his own. He studied the art of his predecessors, therefrom gathered their best efforts, added his originality, created and maintained an artistry in his productions which such men as Craig, Appia, Reinhardt, Jones, and many others, recognized, and with the advance of stage appliances, developed to a higher degree.

Passages from two accounts of Irving's productions, one

in 1879, the other, 1889, show the advance he made in ten years. The first concerns his production of Hamlet and shows the influence of Kean, the over-"upholstered" setting; the other, his production of Macbeth, reveals the change to simplicity of setting. Both are taken from "The Theatre", Volumes two and thirteen.[1]

> "The scenery, or to speak more accurately, the decoration, marks a distinct advance....The ghost stands among a number of mossy rocks, and proceeds to speak. The soft light of the moon falls upon the spectral figure. Faint first flushes of dawn are stealing over the immense expanse of water."

An account of the same performance is given by a French critic, Jules Clarithe:

> "The spectre appears with the effects of electric lights under the stars...The limelight projected like a ray of the moon on his contracted face as he pleads for his life, excited nothing less than terror."

The following is an account of Macbeth given ten years later:

> ".....As for the scenery, all previous efforts have been excelled. A new drop scene has been supplied representing simple amber draperies, hanging in rich folds, the work of Telbin, an admirable artist. There were no less than nineteen distinct scenes...I could dwell on the scenes of fine characteristic landscapes, set off with a strange atmospheric effect...witness the patch of water on which the light shows. More remarkable in these efforts is the absence of the conventional treatment of landscape. The scenes painted on cloth are even more effective and realistic than the modelled or built-up structures."

Every production of Irving's was greatly admired by all the critics. While praising Irving's artistry, many of the accounts reveal indirectly the tendency of the period to over-

1- The Theatre, vol. II and vol. XIII

load the scene, thereby detracting from dramatic action. The following account of a revival of "Romeo and Juliet" is an example.[1]

> "The superb character of this revival cannot be sufficiently appreciated...It was impossible to concentrate the attention on the acting when the background was so beautiful and so constantly changing. All the scenes were worthy of close and renewed study as are the pictures in a gallery of painting."

Concerning his revival of "Much Ado About Nothing", the extreme confidence in Irving's taste is manifest.[2]

> "Of the scenery and dresses at the Lyceum, there is no occasion to say much, for every play-goer knows that Mr. Irving's taste in these matters is irreproachable."

In a criticism of "Twelfth Night" is revealed the recognition of Irving's ability, and the fact that he was the power behind all productions.[3]

> "The scenery would reconcile anyone to the interior of a theatre during the almost tropical heat. The artists who painted so exquisitely the various scenes, would be the first to acknowledge how much they owed to the suggestions of the actor-manager."

In his review of the "Merchant of Venice" it is significant that Mr. Cook did not mention scenery until the end as "a background which is at once striking, natural, and unobtrusive is supplied and from this, the action receives added intelligibility."[4]

Bram Stoker declares that the history of the Lyceum Theatre during Henry Irving's management is the history of stage lighting, for Irving spent many hours experimenting on light-

1- The Theatre, vol. 5, p. 242 2- Ibid vol. 18
3- Ibid, New Series, vol. 4, August, 1884, p. 90 by F. A. Marshall, Scene Painter
4- Austin Brereton--Life of Henry Irving

ing devices.[1] He invented a system by which all the lights could be worked from the prompt side, and placed the house and stage lights on two separate mains instead of one. He then innovated the lighting of the auditorium between acts only, and darkened it when the curtain was raised.

Irving recognized the value of using lengths or "strips" which were battens of any size, and ground rows of any special form or size to suit particular pieces of built scenery. The strips he used where special lighting of theimmediate acting area was needed, as over the doors to accent the actors' entrance or behind tables or pieces of furniture around which the action took place, to accentuate the light on the actors' faces. These were called "furniture strips."

Irving is also accredited with the honor of using in a novel way and effectively, electricity, for the first time on any English stage.[2] In his production of Faust in 1885 he arranged with Colonel Gourand, Edison's partner, an electrical installation for the fight between Faust and Valentine. Two metal plates were screwed to the stage, to either of which the current of one pole was applied. One had a metal plate screwed to the stage, to either of which the current of one pole was applied. One had a metal plate screwed to the sole of the right shoe. From this a wire was brought to the palm of his right hand, where on a rubber glove was fixed a piece of metal, this being in contact with the metal handle of the sword. A similar device was arranged for Mephistopheles, a direct com-

1- Bram Stoker--Irving and Stage Lighting. 19th Century Magazine, vol. 69, p. 903
2- I found this information in several accounts, but will have to discredit it, as subsequent readings have proved otherwise.

munication was established as soon as the demon's sword struck the weapons of the other, and sparks were emitted.

Before Irving's time, colour effects were gained by colour mediums of woven films of cotton or silk which were drawn between the lights and the stage. This method reduced the stage to one colour only at a time. Irving applied transparent lacquers to glasses of lime-light, and later to electric bulbs. With infinite care and patience he proceeded to work out fine gradations of light andshade. He then began to produce and alter effects of combinations of coloured lights, to use the media of coloured lights as an artist uses his palette.

Irving's contributions to stage lighting were recognized in other countries as well as in England. Stephen Fiske summed up Irving's influence in America in the form of a tribute. He wrote that when Irving came to America, America learned for the first time what could be done with dramatic lights and shades to heighten the impressions of voice, gesture, and movement. Until Irving came to America, stage managers knew comparatively nothing of the exquisite simplicity of the artistic completeness of his arrangements of scenery properties, and lighting.[1]

Fiske commended Irving's use of lime-light and electric light to make scenery prominent or obscure, as may be the most appropriate to the action, and to show or to conceal facial expression. An instance was given of Irving's use of

1- Irving's Influence in America--Stephen Fiske
The Theatre, vol. 27, p. 75, Feb. 1, 1896

lime-light in the performance of "The Bells." When the ruddy light of the fire revealed his crime, and when the changing lights in the court scene half concealed, half revealed the judges and the mesmerist as in the flickering vagaries of dream.

THE INTRODUCTION OF ELECTRICITY

Again to the English Stage goes the honour of introducing a new method of lighting; again was the introduction effected in a London theatre, where in September, 1881, Mr. D'Oyly Carte, the first theatre director in the world to use electricity, installed a complete system of electric lighting in his new Savoy Theatre, He had the same year attended the London Electric Exhibition where the electrically lighted stage model previously displayed in Germany by Karl Lautenschlager, the maker and owner, was on exhibition. D'Oyly Carte was immediately impressed and engaged Siemens Brothers and Company to install the Swan System in his theatre.[1]

Electricity had long been in use on the Continent as well as in England for producing the spectacular effects of lighting, rainbows, sun-light, and moon-light. As early as 1846, an apparatus in the form of an electric arc located at t the focus of a parabolic mirror which profected a beam of parallel rays upon a silk screen, was used to represent the sun in a production of "The Prophet" at the Paris Opera.[2] In 1860 the Paris Opera in a production of Moses" made use of the

1- Stumke p.43-53
2- Ward Leonard p. 13

electric current to produce a rainbow.[1] Light from an arc passed through an arc-shaped slot, after which the rays were concentrated by means of a lens and passed through a prism which produced the spectrum. In the same production electricity was used for realistic lightning. This was done by means of a parabolic mirror with an electric arc at the focus. An electro-magnet operated by a thumb switch permitted the carbon-electrodes of the arc to be snapped together at will, thus producing flashes which resembled lightning. In the same production was employed the first electric spot light which was used to bring out Moses in his white robes. Another spot light was used to light only a definite point on the scene and not to follow the players.

The earliest instance, so far, to be found of the use of electricity on the English stage is recorded as being in the ballet "Electra" produced at Her Majesties Theatre in 1849.[2] In the course of the performance, six pleiades rose amongst the clouds, each with a light made from an electric battery concealed in her garments, and made to flash on or off at will. From that period electricity was used for various scenic effects, from fire-flies on the stage to advertisements on the top of the building outside.

A brief review of the scientific development will show that as rapidly as new inventions for increasing the value of electricity as a mode of lighting were announced, the theatres eagerly tested them in their efforts to improve the lighting

1- Ward Leonard p. 13
2- The Builder, vol. 7, p. 188 1849

situation. In 1810 Davy, an Englishman, exhibited the first electric arc in England, and in 1810 he discovered a practicable application of electricity to making light.[1] The earliest arcs were operated with direct current, the arc being formed between two carbon rods connected in an electric circuit, it was started by bringing the tips of the rods together and then separating them. The light was emitted by the positive carbon which became white hot at the point where electricity passed from this carbon to the opposite one. In operation the carbons were slowly consumed and in the beginning frequent adjustment by hand had to be made.[2] James R. Anderson states that the electric arc was used as early as 1837 or 1838.[3]

In 1844, Foucicault applied the use of electricity to the scientific laboratory.[4] In 1861 Concordia Square in Paris was successfully lighted by electricity. It was then that Figurier suggested the introduction of a general lighting system to the theatre.[5] But there was no practicable possibility of that until 1867, when Werner Siemans invented the dynamo-machine.[6]

Paul Jablochkoff invented an electric candle in 1878. This candle consisted of two carbon rods mounted side by side and separated by an insulating compound which would melt away, once the arc started, just fast enough to permit the continuous burning of the arcs across the upper rods. He installed fifty-two of these candles in the Bellecour Theatre at Lyons,

1- Ward Leonard p. 19
2- Ibid p. 20
3- Ibid
4- Ibid
5- Stumfke
6- Ibid

France, with twelve of them on the stage.[1] The Thames Embankment in England was also lighted the same year by the Jablochkoff candle and Brush light; but the candles did not come into general use.

John Hollingshead illuminated the outside of the Strand Theatre in London in 1878 for advertising purposes.[2] This has been stated to have been the first time that electric light had been used in England in connection with the theatre. Indeed, John Hollingshead in his book "The Gaiety Theatre" states that he introduced electricity into England at this time. This is, however, an erroneous statement.

When Thomas Edison invented the incandescent lamp in 1879 he removed the last obstacle which prevented electricity from being put into general use.[3] In just two years the Savoy and Covent Garden were using it, and many theatres followed their example. The Berlin Theatre installed electricity in 1882; American theatres in Cuba and Boston introduced it the same year. By 1888, eighteen theatres had installed electricity through the Universal Lighting Company only, and by 1891, the electric lighting of theatres was considered the only safe and convenient mode of lighting.[4]

Three different systems of illuminating the stage in order to gain diversity of colours were employed. Lautenschlager at Munich and Bahr at Dresden used the one-lamp system. For coloured effects they employed the revolving drum made of coloured gelatine, covered with a net work, which

1- Ward Leonard p.20
2- Hollingshead--The Gaiety Theatre
3- Stumke
4- Ibid

could by means of a pulley, be revolved around the single lamp groups. Fritz Brandt at the Berlin Imperial Theatre employed the three-lamp system the same as the Savoy Theatre. Sometime later the four-lamp system came into general use in connection with the arc lamp.[1]

Individual lamps were fitted with revolving screens to change colour. Generally, the footlights were fitted with the revolving drum or screen. One section gave the natural colour, one blue, and one, red. The transition was made by pulling a cord connected so as to turn the screens. The battens were fitted similarly; but the wing light coloured screens were hoisted and lowered.

Eventually all of the stage lights were controlled by dimmers which greatly increased the flexibility of the switch board. The first recorded use of a dimmer is found in the April issue of La Lumiere Electrique for 1884, which contains a circuit diagram of an open coil type of dimmer rheostat.[2] In the use of a dimmer in the Earls Court Exhibition Theatre, in 1896, special attention was given to the changing of colours. Experiments were made to decrease gradually one colour in brilliancy, and simultaneously increase the brilliancy of the succeeding colour. It was the invention and perfection of the dimmer that made the art of stage lighting possible.

From 1881 to 1900 many inventions and improvements of the various lighting effects added considerably to the efficiency and flexibility of electric lighting. In 1892 the

1- Stumke p.43-53
2- Ward Leonard p. 21

Electrical Engineer records the first use of projecting machines to gain effect of natural phenomenon.[1] The reflection of the sun, moon, or stars on surfaces of water was achieved by means of three glass plates having a wave-like picture upon them and which were progressively rotated in front of the lenses by means of a clock work and an eccentric lever. The inventions, stereoptican, sciopticon, gallery reflectors,[2] open box lamps, and spot light dimmers[3] so increased the possibility of stage lighting that by 1900 there arose a new conception of stage lighting.

When electricity first came into use, the possibilities so suddenly thrown at the directors fairly staggered them, and they behaved similarly as their predecessors with the gas lamps. All sorts of novelties and trick lighting were introduced to the public; but as novelty followed novelty, the newness began to wear away, and directors began to consider the lighting as an integral part of drama.

The contributions of Irving have already been discussed, how he developed gas lighting to its highest degree of perfection and then turned his attention to electricity. With his retirement, the development of theatre lighting, in which England had so long led, passed to other countries, chiefly European and American. From then on, the English stage, in regard to the technique of production has followed rather than led. Because the man who made electrical lighting a practicable reality, and because the next producer who con-

1- Electrical Engineer. vol. 13, Mar. 9, 1892
2- Electrical World. May 7, vol. 31
3- Ibid vol. 67, no. 26, June 24, 1916

tributed largely to the art of lighting, happened to live in New York, the history of stage lighting passes from England to America.

Before continuing further it would be interesting to consider briefly the relation of stage lighting to the development of the drama of the 19th century. A great deal has been written about the new movement in the theatre as heralded by such playwrights as Ibsen, Shaw, Galsworthy, and by such producers as Belasco, Craig, and Reinhardt. The new movement is considered a revolt against artificial conventions, traditional standards, and general stagnation of the theatre. It first took the form of realism or naturalism so exploited by Belasco in America and Tree in England. As a reaction against realism, Craig and Reinhardt developed the "aesthetic theatre" in which simplicity, and symbolism through lighting, was the keynote. A great deal has been written about the development of this new movement in all of its phases with the exception of one, which in view of a close study of the history of stage production stands apparent, and that is, the relation of the new movement to the development of stage production, particularly, stage lighting.

That there must be a close relation is obvious, that the relationship has been paramount in directing the current of dramatic development is at least interesting to conjecture. Did the advent of gas make realism possible on the Mid-Victorian stage? Did electricity develop realism and introduce two more elements, suggestion and symbolism? Did realistic productions lead to the movement of realism in drama, and the

suggestive and symbolic productions to the symbolic in drama?

The first record of realistic tendencies in stage productions is to be found in spectacle and dates back to 1811 when "Bluebeard" was produced at Covent Garden with real horses on the stage. Twenty years previous, Argand invented his patent oil lamp which greatly increased the visibility of the stage beyond the mere acting area thereby increasing the scenic possibilities. In 1823 just six years after the introduction of gas a most elaborate spectacle "The Cataract of the Ganges" with real horses and real water was produced at Drury Lane. A comment of the spectacle was then made that the managers of the two patent theatres had to fall back on spectacular effects and used real horses to pull an audience into the theatre. The next step in the advance of realism is found in the use of furniture on the stage. This innovation was introduced by the "Classic" Kembles. They were the first to use real chairs and real tables.[1] In 1841 Vestris went considerably further in introducing realism in the productions of her comedies. It must be remembered that she was the first to use a box set fitted as a real room with real lace curtains, instead of painted ones, a Brussels carpet, and furniture of the period. Planche was known as the "upholsterer of the drama" and worked out to an even greater degree the ideas of Vestris.

Realism was introduced in out-door scenes for the first time in 1844. In "The Road of Life" or "The Cabman's Career"

1- Godfrey Turner--The Theatre, New Series, vol. 3 March 1884, p. 126

by E. L. Blanchard, a real cab and horse appeared on the stage.[1] As far as is known this is the first time that a horse appeared on any stage. It is needless to add that the comedy was unusually successful.

In 1866 just twenty-five years after theintroduction of the box set, Thomas Robertson, the playwright who exerted the most influence on the Mid-Victorian drama, wrote and produced what can be termed as the first realistic drama, "Ours". He h had written his first drama "A Night's Adventure" in 1851. The play was however, a failure as were a few subsequent attempts, with the exception of "Society" produced in 1865.

"Ours" has been chosen as representative among Robertson's early dramas, because in the stage directions for the setting is found the first realistic details characteristic of modern production. One must bear in mind that the realism of the '60's differed somewhat from that of today, and the details given below were most revolutionary at that time. The stage directions are for the setting of Act I.

> "Scene--an avenue of trees in Shendryn Park; the avenue leading off to R.U.E. Seat around tree in foreground, R. Stump off trees L.G. and L. The termination of the avenue out of sight. Throughout the Act, the Autumn leaves fall from the trees. Chalcot discovered asleep on ground under tree L.2E. A handkerchief over his face."

It would have been impossible to carry out these minute details on a stage dimly lighted with candles and oil.

In 1866 a realistic setting was used in another out-door scene in "The Great City" by Chatterton, and again a real horse

1- Planche--Extravaganzas, vol. 2, p. 291

and cab appeared on the stage. From then on, across the stage went a procession of real fires, real trains, real snow storms, real rain storms, until the value of a production was apparently determined by its reality.

The chronological aspect of realistic development reveals the fact that the introduction of realism in stage technique, and the realism of stage technique preceded the introduction of realism in the drama.

Realism in stage production was considered by many contemporaries to be of value as long as it aided the author and actor, and did not smother the words of the actor or stifle the work of the playwright.[1] Many were of the opinion that realism was overdone. Such was the comment of John Hollingshead who wrote that the solid built scenes were usurping the place of the stage picture. He considered the stage carpenter a necessary evil, but the stage brick layer a worse one. One writer in the Era Magazine protested against realism because it had reduced comedy to "Talkee-talkee" scenes in drawing rooms, and he longed for the productions of Shakespere's day when audiences preferred fine thoughts to fine furniture.[2] Walter J. Allen, another critic, complained that realism tended to distract the attention of the audience from the play.[3] He praised Macready, Phelps, and Kean for brilliant effects, and conceded the fine taste and right method of Irving but protested that their plays were over-loaded.

1- Is Realism on Stage Overdone--Arthur W. Beckett
The Theatre, vol. 28, 1896
2- The Era, 1877, May 18, P. 12 Stage Realism
3- Ibid 1879 March Art on the Stage, W. J. Allen

The great master of realism in stage technique is David Belasco, who has been experimenting and producing for over fifty years. He has probably contributed more to the development of stage lighting than any other person in America. Belasco produces his plays with photographical exactness of detail. The comment has been frequently made that one is too busy looking at the delightful settings to give the proper attention to the acting and the play. However, no one can deny that each of Belasco's productions is a masterpiece and the result of patience and thoroughness in preparation.

Symbolic tendencies, the antithesis of the realistic, in stage production, strangely enough, has developed simultaneously with realism, and, though it seems a broad statement, from practically the same source. In the nineteenth century the first signs of symbolic representations occurred in the works of a man who originated a distinct species of drama, and who has had too little regard from the dramatic world. This man is James Robinson Planche. Planche's writing period extended between 1818 and 1872, during which he wrote one hundred and seventy-six dramatic compositions. Of these, one hundred and four were adaptions from the French, Spanish, Italian, and German; seventy-two were original, ten of which were written in conjunction with Charles Dance.

Partly because minor theatres were restricted from acting regular drama, and partly to encourage an audience, Planche's one hundred and seventy-six pieces were given at least thirty-odd dramatic titles, by which they were advertised.[1]

1- Planche--Extravaganzas, vol. 5 Appendix

These appellations included such terms as extravaganzas, burlettas, interludes, classical burlesques, operettas, dramatic reviews, military spectacles, and some nineteen others, in fact any name which would insure no risk and allow the piece to be produced under the existing law.

As a matter of fact, the underlying current of the majority of Planche's "Pieces" as he termed them was serious. In a preface to "The Seven Champions of Christendom," which was produced in 1849 and advertised as "a comic fantastic spectacle" and which was really "a dramatic political allegory," he wrote:[1]

> "....I had always contended that the mission of the dramatist was of a higher nature than the catering to the mere amusement for the million.....I therefore determined with the sanction of the management to hazard another step in advance and render the "Seven Champions of Christendom" really deserving of that glorious title by flinging over their fabulous adventures the veil of allegory, and representing them attacking and destroying Tyranny, Superstition, Falsehood, Ignorance, and all the plagues of humanity in the semblance of gigantic ogres, witches, sorcerers, demons, and dragons...Thus while I preserved for the amusement of the general the familiar features of their old nursery acquaintances, I gratified my own 'vaulting ambition' by writing a drama with a loftier purpose in the hope of its being appreciated by those who had the best interests of the stage at heart.. I also desire to do justice to the memory of Madame Vestris by showing how far she was above that class of'commercial managers' (to use Boucicault's felicitous designation of them) who care little for the character of the pieces they produce if they will only draw houses."

Planche wrote in the preface to the first edition of his plays, the following comment regarding his dramatic experiment "The 'Birds' of Aristophanes" produced in 1846. It is of

1- Planche--Extravaganzas vol. 3

value as it reveals his attitude towards his work.

> "An experiment (as it is called on the bills) undertakes with the view of ascertaining how far the theatrical public would be willing to receive a higher class of entertainment than the modern Extravaganza of the English stage, or the Revue of the French. To open the field--not for myself alone--but in which much abler men might give reins to their imagination and their wit in a dramatic form, unfettered by the rules and conventionalities of a regular comedy, and assisted to any extent by music and decoration."

A great many of Planche's works contain elements of symbolism particularly his extravaganzas. He considers the year 1836 to be the turning point in the history of extravaganza as it was then he visited Paris and witnessed "Folie Feerie" and was so delighted by the wit, satire, and general charm of the fairy tale that he proceeded to translate and adapt the "Contes de Fees" of Perrault and Countess D'Aulnoy. In producing these, he followed the plot, brought out all the points, kept the interest, the playful wit, the subtle satire, and moral lessons of the originals. Of his productions he considered "The Prince of Happy Land or The Fawn in the Forest" the best of his extravaganzas which he always conscientiously constructed and carefully wrote.

Not a little of the effect of these extravaganzas depended on stage decorations and lighting. The manner in which they were produced by Vestris and Beverly has laready been discussed; that these productions were a fore-runner of modern stage technique can only be emphasized. Ernest Watson wrote concerning Madame Vestris and her productions.[1]

1- Theatre Arts Monthly- Nov. 1928, p. 785
Vestris, an Actress-Manager of 1830--E. Watson

> "Her stage spectacles at the Lyceum were astonishingly suggestive of present day effects. An unfolding tree of jewels; a pineapple that nearly filled her stage expanding to reveal in every division a female figure in silver tinsel, lighted brilliantly by quantities of gas jets."

Planche appreciated and admired Beverley's ability as a scene painter. He commented favorably on a simple drop Beverley painted for the last scene of the first act of "Fan-sea Islands" as being so exquisitely done that the most elaborate set could not have awakened more enthusiasm.[1] Again, regarding the scenery Beverly painted for "The Seven Champions of Christendom" he made the comment that it was so cleverly painted that it was admired and applauded as much as Beverly's elaborate and gorgeous transformation scenes. Planche much preferred the simple setting and deplored the elaborate setting into which Beverly's transformation scenes evolved; for he recognized that true art must necessarily include the unity of the whole production of which no one factor should be overwhelming. Planche deplored the fact that Beverly's transformations became main attraction and all the rest, to the audience was "inexplicable dumb show and noise."

Nevertheless, Beverly managed to give true symbolic atmosphere to Planche's extravaganzas with his clever painting and lighting, and if in his enthusiasm over his new found power, he over-stepped the boundaries, he cannot be censored too highly. There were many imitators of Planche and Beverly, who lacked the true dramatic instinct and their imitations became mere vehicles for buffoonery and gross indecency.

Symbolism in the modern sense of the word, was not in-

1- Preface of "Fan-sea Islands"

troduced until the latter part of the mid-Victorian era. In 1893 Farquaharson Sharp wrote "symbolism is on the town, proof whereof we can turn to modern writers and painters abroad. A recent conspicuous attempt to have us believe in the introduction of symbolism into modern drama is found in Ibsen's"Master Builder".

Ibsen, the first symbolic playwright to introduce symbolism in the 19th century drama, wrote his first play in 1852 at the close of Vestris' reign. It is interesting to conjecture just what inspiration he received, if any, from Planche's productions. Ibsen was followed by Maeterlinck, Symge, Yeats, Dunsany, and Barrie. Did Maeterlinck found his drama "The Bluebird" on Planche's extravaganza "The Bluebird" adapted from Countess D'Aulnoy's story of "L'Oiseau Bleu"?

About this time Gordon Craig, a son of the late English actress, Ellen Terry, began to introduce ideas of reform into stage technique. The keynote of his setting is simplicity and symbolism. This he achieved by reducing the stage setting to simple lines and by making an extraordinary use of lighting. He recognized even more than his teacher, Henry Irving, the great power of light in dramatic action and setting. With this recognition, light assumed for the first time a definite important place of its own.

It must be remembered that light could not be used to any great extent in dramatic action until it had become more flexible; and that flexibility occurred with the advent of the electric switch board; that Electricity was introduced in 1881

and preceded the introduction of symbolism in drama.

In summarizing the last few pages, it can be said that the present stage is dominated by two very contradictory dramatic movements, realism, and symbolism which apparently developed from two very contradictory movements, the production of extravaganzas, and of the drawing room dramas, introduced by Vestris, Planche, and Beverly. The development of these movements has been influenced to a great extent by the advance made in stage lighting.

A BRIEF HISTORY OF AMERICAN STAGE LIGHTING

Previous to the advent of electricity in 1881, America contributed little to the development of the theatre, and records reveal that the American stage was nothing but a crude, tardy imitation of the English stage. Subsequent to the invention of the incandescent bulb by Edison, American producers began to take the initiative and the status of the stage, particularly the lighting, began to equal and even to rival that of the English and the European.

The first theatre to be built in America was opened in 1766. It was entirely lighted by candles, as were all theatres for several years. It has been said that as England was the land of the candle, so was America the land of the oil lamp. Very early sperm oil was introduced and used with the candles in the footlights and candelabra above the stage, to insure brighter light. Auditorium lights were generally of the sperm oil variety on account of the difficulty of getting at them to trim the wicks during the performances.

The first attempt at regulating the footlights occurred with the introduction of the "Floats". These were footlights arranged on a separate wooden strip or on a long platform which could be lowered--generally with a clumsy and creaking noise--into or below the front of the stage, thus reducing the illumination on the scene, and at the same time giving a chance to trim the wicks. In some instances the lights were separate wicks arranged in one long reservoir. It was customary to hang these over the apron of the stage in front of the

curtain line, or project them from the side boxes in one, two or three clusters of oil lights, to help illuminate the scene.[1]

Groups of oil lamps were hung from above the stage or placed at the top of tall ladders set in the wings to aid in lighting the acting area. Candles were also grouped in reflectors off the stage entrance. These were known as bunch lights and added considerably to the brightness of the scene. In spite of these efforts at illumination, the following description of the bery fashionable Park Theatre in New York in 1821, does not give a very promising situation:[2]

> "The house was excessively dark; oil, of course, then was used in common brass Liverpool lamps, ten or twelve of which were placed in a large sheet-iron hoop, painted green, hanging from the ceiling in the center, and one, half the size, on each side of the stage.... Later, glass chandeliers were purchased to supply the place of the iron hoops."

Gas was not introduced until 1820, and then did not come into general use until 1850 or 1860. The first attempts at lighting the stage with gas were very crude. Royall Tyler in his vivid description of his first professional appearance in 1863, as a notary in the opera "The Child of the Regiment" gives an amusing account of the scenery and the lighting.[3]

> "The picture was supposed to be the palace of the Marchioness de Berkenfeldt in the suburbs of Paris. For the pictorial and historical correct reproduction of this gorgeous domicile of Bourbon luxury, we played before a pair of flats, technically known as a center door, fancy chamber--while two badly painted wings banked in the scene at either side of the stage, and two wilted borders above represented the ceiling. It was all bril-

1- F. Chouteau Brown--Lighting in Early American Play Houses. Theatre Magazine, vol. 28, July 1918, p.36
3- Crane--Some Developments of the American Stage During the Past Fifty Years.
2- Hornblow- The Theatre in America. vol. 1, chap.2 p. 48

> liantly illuminated by one row of fifteen or twenty exceedingly timid gas jets for footlights and a row of about half that number of equally reticent gas jets overhead."

Lime light was not introduced until a few years before the Civil War, and then its use was confined for a number of years to the theatres in the principal eastern cities. The use of it spread slowly because companies did not take their productions with them at that time, and relied upon the local scenery and effects. Later, when special scenes began to be painted for each production, calcium light spread more rapidly.[1]

Edwin Booth during his short reign as the actor-manager at the Booth Theatre erected by him in 1869, was probably the first to improve the condition of the American stage. He brought stage art to a high degree of excellence with the facilities at hand, and availed himself of the latest inventions and devices for producing scenic effects. Magnificent productions (for that time) were the result of his industry. He spared himself no toil in the study of all factors of stage production, lighting, setting, and costume in order to gain a harmonious effect. He installed the latest equipment in handling the scenery, and was the first manager to work it entirely by machinery, particularly hydraulic rams. So remarkable were the effects which he achieved that a lengthy, laudatory article with illustrations of the stage machinery appeared in Appleton's Journal under the title of "Booth's Theatre; Behind the Scenes."[2]

1- C. Brown--Lighting in Early American Play Houses
2- Booth's Theatre; Behind the Scenes. Henry L. Hinton Publisher

Unfortunately, Booth had no idea of monetary values and consequently after a most successful four years from the point of view of stage art, he went into bankruptcy and left the theatre to his brother in 1873. His chief contributions can be compared to those of Macready who served as a pioneer in the interests of stage art. To his influence subsequent improvement in stage productions in America can be largely traceable.

Of somewhat different character were the later contributions of Steele Mackaye, who attempted to reproduce natural phenomena by mechanical means. He was a prolific inventor of many stage devices, and a man of as many failures. Yet, he was the precursor of American stage realism, and the forerunner of diverse excellent theatrical innovations, of which most of them had to do with lighting.

Mackaye was one of the first managers to appreciate the value of lighting the stage from the top and sides without the footlights. There is an account of one of his productions in the Portsmouth, N. H. Journal, for November 7, 1874.

> "Stage lights were at the top and sides, an innovation which might well be copied with peculiar advantage."

In 1879 he invented a double stage on an elevator system to facilitate the change of scenery. This was the first movable mechanical stage to be used in America. At the same time appeared the first electric switch board also an invention of Mackaye's. Under the picture of the stage which illustrates the switch board and machinery, is a note, "Note the new

process of lighting." It shows a man working a switch board and throwing a bright bunch light on a back drop.[1]

Mackaye said concerning his invention that it was his desire to facilitate the speedy setting of the scenery and the concentration of light upon the stage with the least inconvenience possible to the audience. He located the orchestra above the proscenium with the stage lights hid beneath it, casting the light from above within, instead of below, upon the stage. This is probably the first instance in which footlights were abolished in America and the value of lighting the scene from above generally recognized.

In 1885 Mackaye became associated with the then New Lyceum Theatre of New York and his productions while there were notable ones. He installed a complete electric light system and made many experiments in stage lighting. Especially clever were his devices for changing the colours on the scene. William Winter wrote the following tribute to Mackaye's ability in the Tribune:

> "As long as Mr. Steele Mackaye is associated with its (The New Lyceum's fortunes) the theatre will be served with a sincere and resolute devotion to high ideals of art."

In 1893 he started to build a Spectatorium for the World Fair at Chicago. This contained thirteen devices for illuminating and coloring the stage and scenery by light. He had invented colorators, illumiscopes, rotary drums for sun, moon, sunset, and rain-bow effects. Yet this great undertaking of

1- Percy Mackaye--James Steele Mackaye. vol. 2

his fell into ruin; but it foreshadowed the modern Hippodrome and extended far-reaching influence in the matter of color in lighting. The same year Mackaye invented forty apparatuses for producing increased realism in stage effects. S Several of these are worthy of consideration. The "luxauleater" a device for throwing a curtain of light, behind which scenes were changed, has been used with creditable effect in many instances since. One notable instance of a modification of this idea occurred in the Lexington Pageant in 1915 when changing colored lights were thrown upon a curtain of steam. The result was a beautiful steam curtain rising thirty feet to forty feet in the air and constantly changing color, intensifying and then fading away, suggesting color without form.[1] The idea of Mackaye's nebulator or cloud creator has since been copied and used successfully in most of the modern theatres as well as his "wave maker".

Dion Boucicault was another revolutionary stage producer. He was an advocate of stage realism and introduced the box set on the American stage. Augustin Daly added further to the illusion of realism and built solid doors that banged, and windows of real wooden frames and glass panes which could be opened or closed. He also utilized real furniture.

It was as Boucicault's private secretary that David Belasco became interested in stage production and it was from him that he received the inspiration which carried him so far

1- Lighting Practice--L. C. Porter. Electrical World July 24, 1915, p. 209

in the technique of stage lighting. When Belasco became interested in this aspect of stage production, realistic stage lighting was in a very primitive state. Frequently a headlight of a locomotive held aloft by a negro boy served as an inconstant moon. Then there was the little cheese-box with its silvered surface, which did service for all the moons in all conditions of the poetic drama. Frequently the light of a silvery moon in which lovers were basking was supplied by a tired stage hand in shirt sleeves and overalls monotonously turning a reel on which were strips of silvered paper that flitted by slits cut in the canvas water and gave off the shimmer of moonlight.

Belasco began his experiments with locomotive head lights in San Francisco sometime before 1877. He had discovered the ease with which he could get certain effects by placing tin pans before oil lamps. Then it occurred to him that by means of colored silks, his forerunner of gelatine slides, that he could add further variations to colored lights, and after this experiment he began to pay particular attention to the charm of stage lighting, and to inventions which have been so wonderfully developed since.[1]

In one of his early productions it was necessary for Belasco to work out supernatural effects for a ghost scene. This he did by light and shade. He covered the stage with black velvet and placed a sheet of glass obliquely over a

1- William Winter--Life of David Belasco. p.97 vol.1

space beneath the stage--which was called the oven. Gas lamps were ingeniously concealed so as to give the impression of phosphorescent light from ghost like bodies. The characters in the play were obliged to enter the oven under the black velvet and lie on their backs, while their misty shadows were thrown like watery impressions upon the glass plate. As these shadows floated across the surface of the glass, the people in the oven could easily shake tables and move chairs to the hair raising satisfaction of the audience.[1]

Belasco was called upon to produce a conflagration scene in the first act of Gaborius' "Within an Inch of His Life." For flames he used a series of red and yellow strips of silk fanned from beneath by bellows and lighted by colored lights, instead of the usual lycopdium boxes. Some complaint was made in regard to the fire laws and authorities came upon the stage to investigate. They were much amazed at finding the fire nothing but silk and light.[2]

His success in the conflagration scene inspired Belasco to apply the same principle to other productions. Morse's "Passion Play" given in San Francisco in 1879 was most interesting because of two innovations which Belasco tried out. One was the abolition of footlights, the first attempt by any American producer to attain natural effects in lighting, and the other, a complete setting achieved by the use of fabrics and stage lighting. It was said that the whole performance

1- William Winter--Life of David Belasco. p. 97, vol.1
2- Ibid p. 112

was given with simplicity amounting to dignity and grandeur.[1]

A good illustration of the part that accident or chance plays in the success of stage lighting effects is found in Belasco's own story of how he achieved 'the River of Souls' in "The Darling of the Gods" produced in 1902 when he discovered the value of light and shade which could be gained by mere theatrical gauze and one or two strong calcium lights. The scene was especially difficult to work out, for, in spite of training, the girls resembled chorus girls and not souls. Belasco had worked all night, and at six o'clock in the morning the River of Souls was as bad as ever.

> "So I threw out my hands, 'Thank you, ladies and gentlemen, out goes the River of Souls.' I gave the order to strike--at that moment all set pieces were pulled apart, the gauze curtain was down, and two calcium lights were in the back of the stage. As the scene shifters drew up the back-drop, a carpenter walked across. His shadow was thrown several times on the shifting gauze in a most spectacular fashion. 'Stop' I called out, 'Stop where you are, don't move, don't move----" When we finished breakfast, I had the strong rays of the light and the gauze so arranged as to catch the shadows of the young ladies whose souls were supposed to be floating between heaven and hell."[2]

From the time Belasco opened his own theatre in 1902, his experimentation in lighting has been incessant. The lighting of his Stuyvesant Theatre in New York in 1907 was designed by Belasco in collaboration with his chief electrician, Mr. Louis Hartman, and was installed under their supervision. The lamps of the footlights and of the border light strips were arranged in seven sections, each section connected upon

1- William Winter--Life of David Belasco. p.124, vol.1
2- Ibid p. 84

separate resistance in order that any desired part of the stage or any figure or group of figures might be illuminated or shadowed as desired. There were five sets of border lights with two hundred and seventy lamps each. There were eighty-eight connections pockets in the fly galleries and upon the stage through which large or small bunch lights could be connected as required. The switch board, one of the largest if not the largest then in use in an American theatre, was equipped with seventy-five dimmers in order that the lights could be under perfect control.[1] Belasco considers dimmers to be vastly important in lighting control and much of the development in the perfectioning of this apparatus is built around the experiments conducted by him with Mr. Louis Hartmann.[2]

The next four years witnessed a great advance in stage lighting. Many principles of electric lighting had been established and various lighting units and apparatuses invented to support these principles. The value of the application of light to human psychology was recognized; and was given an important part in dramatic action. Because of this individual lighting units of varying increased candle power were used more and more in place of the borders and footlights. visitor to Belasco's theatre in 1911 on the eve of an opening production when the last changes had been made in the lighting cues, and all of the lighting units in place, would

1- William Winter--Life of David Belasco
2- Ward Leonard Electric Co.--Theatre Lights Past and Present. p.28

find considerable of interest. Every electrician would be in possession of his lighting cue; he would know the story of the play and how to calculate its emotional requirements in terms of the switch-board. Many lighting units, individual and in groups of various sizes and kinds and colors would be found in every available part of the stage all placed ready to make the scene live. There would be three branches of bulbs in the footlights of red, amber, blue, and white; light strips ready to be placed in the wings; baby lenses to counter-act any false reflection from the footlights, large lenses on bridges with lamps centered on particular stage accessories, or different acting areas ready to illuminate an actor or a group of actors; bunch or flood lights to aid the general illumination of the acting area or some back scenery; stereopticans for cloud effects during storm, sun, or moonlight.

In Belasco's laboratory many technical contributions to stage lighting have been originated and invented. It was there that the first experiments in horizontal lighting were made. Very early new types of gelatine screens were used until the now generally used Du Barry pink had been developed. The new screens were originally used because Mrs. Leslie Carter, a protegee of Belasco's, required special shades of light to bring out characteristic features. Belasco invented the special light bridge and false proscenium arch which followed the lines of the stage and hung just behind the proscenium. This bridge contained lights of varying power, backed by reflectors which would aid in illuminating the scene with-

out casting shadows. Mr. Hartmann, closely associated with Belasco for years, invented the incandescent spot light and the bowed silver reflector.[1]

One of the special results of experimentation in Belasco's laboratory was the system invented of interlocking and of dimming the flow of current in order to send a flare of lights across the footlights, one bulb fading and the other glowing. Belasco found that in following a person with a candle or light across the stage, the intensity of light must move across the stage with the character.

In 1917, Belasco abolished footlights entirely from his stage and substituted a contrivance placed in the front of the first balcony, which, while the curtain was down, appeared to be an ornamental glass panel about six feet long. When the curtain was raised, the front of the panel was opened by a device from the switch board, and a singular bright light was transmitted without casting any perceptible shadow, was diffused upon the stage.

Continuous experiments are being carried on in Belasco's laboratory, which is open the year around. In many instances his lighting rehearsals alone have exceeded the total of all other costs of the production. The most perfect example of stage lighting ever exhibited was provided in Belasco's "The Return of Peter Grimm" and that was the result of nine and a half months of persistent experimentation.

The advance of stage lighting has been given an added impetus the last few years by the development of a characteristic worker peculiar to this age, the specialist. Lighting special-

ists can be divided into four classes; the color specialist, the manufacturing agent, the stage electrician, and the lighting artist who applies the contributions of the first three to the actual production. One of the few men in this country who holds the unique title of color specialist is Mr. Monroe Peavear. He has done more than anyone to make mobile color and synthization of light possible. In 1911 he made valuable experiments in color and as a result manufactured color media of high spectral purity. He was the first advocate of color synthesis to commercial use and stage lighting, and was also the first to use the primary colors of red, green, and blue in connection with other tints to obtain any possible color of light.[1] Pevear applied scientific optical principles to the spot light and created the soft edge spot light used now almost entirely. He manufactured footlight bulbs for indirect as well as direct lighting and introduced the tormentor and teaser lens. He also introduced close operating color-mixing cyclorama units.[2]

Bassett Jones and M. Luckiesh have added valuable contributions as a result of their experimentations with color and light. Bassett Jones has done considerable research in the application of color to stage lighting. Of particular interest to him is the possibilities of mobile color. He has carried on experiments in analysis of color, intensity and tone of light, synthesis of color, pigments, dyes, and practical application to stage lighting.[3] M. Luckiesh has attained valu-

1- Fuchs, Theodore--Stage Lighting/ p.124
2- Ibid
3- Electrical World--July 31-August 21, 1915

able results from the research work in psychological studies of color, and color in lighting.

Such manufacturing companies as Ward Leonard, and Kleigal Brothers, are continually improving on the various lighting units and manufacturing the various lighting devices which aid in giving light the paramount position which it now holds. Ward Leonard was the first to design the spotlight dimmer, mounted on an upright standard. It contained fifty steps of control and could regulate a 1000 Watt tungsten lamp from full candle power to blackness.[1]

The stage electricians with their practical knowledge of stage lighting are continually improving different phases of lighting and inventing various devices which in time are manufactured and standardized. The contributions of Mr. Hartmann of the Belasco Theatre is a notable example.

With the aid of such specialized workers, lighting artists as Lee Simonson, Robert Edmond Jones, Joe Mielzener, Norman Bel Geddes, and Donald Genslager have made many experimental applications of light to stage settings which have resulted in the development of several types of settings all of which are characterized by their simplicity. The first step in simplification occurred when landscape drops went out of fashion, in favour of naturalistic set scenes. The cyclorama drop then came into use and was a great improvement because when lighted it gave the illusion of distance without attracting the eye from the foreground. The cyclorama is a circular

1- Ward Leonard

background of canvas or plaster placed back of a set scene and reaching on both sides of the stage almost to the footlights. It is either plain white in color or a bluish-gray tinted so to give the effect of the sky under bright light. Special cyclorama lighting units were then made to throw light upon the cyclorama from above and below thereby increasing the effect of distance.

Later, the Italian, Fortuny, invented for the German stage, the dome idea which dispensed with the borders and increased the possibilities of the use of light in the place of scenery. Fortuny made his cyclorama dome of a silk stretched tightly, because he discovered that he could obtain a special quality of light by reflecting it from silk. Later experiments proved that plaster domes were an improvement over the silk as a reflecting surface, as the light reflected from it has a beautiful effect of liveliness without any sheen or tangible objective interest. The plaster cyclorama serves as a perfect medium to both the realist seeking naturalness and the artist working with suggestive or abstract elements. Lee Simonson in America has experimented with the plaster dome and developed the use of projected scenery, on the principle of the stereoptican.

The increasing tendency to let light do the work of scenery hastened the process of simplification and resulted in the development of three types of stages: the formal stage which is a naked, outstanding carpentered stage; the space stage which minimizes the architecture or carpentry and attempts

to arrive as close as possible to a light void serving as a good background for abstract settings; and the constructivist stage with a skeleton construction in space designed purely functionally for each new play. The constructivist setting was originally anti-decorative, but it gradually achieved a decorativeness of its own growing directly out of its structure.[1]

Through centuries of evolution in which it has played the servant to all other factors of stage technique, lighting has at last emerged as the master. It not only serves to illuminate the scene; it is the scene. It is to the lighting artist what the palette is to the painter, and every combination of color is possible to it. The almost unlimited potentialities are being recognized. Already its power as a dramatic medium, and as a unifying force binding actor and setting together and harmonizing both has been acknowledged.

> "Suggestion, emotional intimation, dramatic pressure, mood, all reside in this thing that consciously or sub-consciously we all react to almost as did those deifiers of light, the Sun-Worshippers. Certainly there is no other God before this one in the scenic studies of the modern theatre."[2]

1- Sheldon Cheney--Stage Decoration. p. 140
2- Ibid

CONCLUSION

The peculiar dramatic efficacies and the utilitarian characteristics of natural and artificial light have made it indispensable to dramatic presentations for many centuries. In that capacity its character, purposes, and influences have been variable and have depended chiefly upon the advance of science.

The origin of stage lighting is interesting because it is identical with that of the drama. Evolving from the deification of light by the Sun-Worshippers, assuming the symbolic characteristics of the pagan religion, lighting developed in the early liturgical drama to dignify the scene, glorify the celestial beings, and give touches of realism and beauty to the performance. These purposes were accomplished by the simple means of natural light through the stained glass of many cathedral windows, aided by the artificial light of candles, cressets, torches, and coronas.

In England when the religious drama passed into the open air, lighting became a matter of spectacle concerning the events connected with the deity or the devil. Smoke, squibs, resin, gunpowder, and various explosives accompanied the appearances and disappearance of the Holy Ghost, and the antics of the devils who sometimes dared set fire to one of the mansions thereby adding conflagration to the scene. The civic pageant reached its greatest development in 1524 under the influence of John Rastell and added the

astronomical character to lighting first through painted zodiac signs and later the depiction of the various heavenly bodies by light.

There was no actual advance made in lighting dramatic representations until about 1600. Records reveal five periods in which the greatest development occurred. The first period extended from 1600-1656; the second, from 1760-1785; the third, 1834-1850; the fourth, 1881-1900; and the fifth, 1915-1929. All of these periods are characterized by a definite advance in the science of lighting; by the application of scientific discoveries to the stage through the work of one man or a small group of contemporaries; by a resulting change in the purpose of lighting; and by a direct influence of lighting on the other factors of stage technique and on the drama.

The first period is characterized by the existence of four contemporary theatres; the public, the private, the Court, and the University; by the use of sconces, torches, and candles for lighting; by the influence of the Italian REnaissance; by the contributions of Inigo Jones; and by the merging of the four theatres into one public theatre under two royal patents granted to William Davenant and Thomas Killigrew who continued to present two types of performances, the drama and the opera. The drama in the public theatres was given by daylight and did not need any special arrangement of lighting except for purposes of heightening the illusion and for such spectacular purposes as fire works, con-

flagration, and lightning. The performances in the private theatres were given at night and the acting area illuminated by candles used in footlights and chandeliers for visual perception mainly.

The lighting of the Court and University stages was influenced directly through Inigo Jones by the Italian Renaissance and its master architects, Serlio, Sommi, and Sabbatini whose fundamental precepts have ever remained constant. Jones erected the first permanent stage thereby fixing the lights to a stationary position. His architectural arrangement of the stage fixed the position of lights in the borders, wings, and behind the proscenium arch for the next three hundred years, and introduced the possibilities of invisible lighting. Jones used light in various ways to secure effect; in the proscenium border for decorative purposes, in transformations and transparencies, in screening the change of scene from the audience, to achieve instant darkness and lightness--thereby adding time element; and to color the scene.

The first acknowledged link between the court and public theatres occurred in 1656 when Davenant, who had been giving performances with Jones at Court, and John Webb, the nephew and heir of Jones, gave a performance, "The Siege of Rhodes" in a public theatre, The Rutland House, thereby establishing, according to authorities, the use of scenery and lighting on the public stage for the first time. In a single production of a few hours' duration, the public stage fell heir to an art of almost two hundred years' duration. It

was an art in which were embodied the precepts of master architects of several countries, and which Inigo Jones brought to a high degree of perfection before passing it on to his nephew who in turn bestowed it upon the public stage. It was fitting that John Webb should serve here as link between court and public theatres, for he had been thoroughly trained as a pupil of Inigo Jones and had assisted him in many productions, chief of which were a production of "The Court of Floremene" in 1636 and the production of "Salmacida Sjolia" in 1640. The two royal companies were organized and under a special patent issued by the King continued to give dramatic and operatic performances on the public stage. Opera was produced with all the lavish decoration and machines of the court theatre while the drama was set forth with the rather meager accoutrements of the public theatre.

The next important period occurred in the 18th century between 1760 and 1785 and was influenced chiefly by the actor-manager, David Garrick, and his scene painter, Martin Loutherberg. The introduction of patent oil lamps increased the visual perception of the audience thereby adding a new duty to stage lighting, that of illuminating the costume and the scene. More care was necessary now in preparing the actor's costume. Where shabbiness and tawdriness formerly existed, now appeared elaborate costly ensembles not exactly appropriate nor historically correct but in the fashion of the time. The new lights were of sufficient brilliancy to necessitate well painted scenery with appropriate lighting. These two factors of stage technique Loutherberg experimented

upon and developed. He was especially interested in color in lighting and by continued research obtained various tints to represent various times of day, and different actions and degrees of light, thereby using light to indicate time element and to aid in dramatic action. Loutherberg achieved instant change of color upon the scene, increased the number and uses of lamps, and improved the transparencies and other devices for effect handed down from the Renaissance stage.

With the introduction of gas and lime light comes the next important period of stage lighting from about 1840 to 1890. Because of the increased intensity and flexibility of gas light, scenery became of paramount importance on the 19th century stage. With the exception of the latter part of the century, all lighting units were invented and various changes made in the positions of them to bring out the art of the scene painter. Increased visual perception gave added stimulus for the historically correct archaeological stage of Macready, Kean, and Phelps; and resulted in the realistic and symbolic settings of Planche, Vestris, and Beverly, which influenced the later development of the drama.

The short period from 1881 to 1900 is a very significant one in the history of lighting because it is transitional and marks the beginning of a new art of stage lighting. Henry Irving developed the art of scene lighting to its highest degree and then through his various experiments recognized the potentialities of light and began to introduce an

occasional simplified setting, letting light assume a few of the duties of the scene. The greatly increased flexibility and intensity of electric light rendered it far more satisfactory in the study of the art of lighting. With that medium Irving worked out fine gradations of light and shade and began to alter and produce effects and combinations of coloured light. He recognized the value of these lights and shades to heighten impressions of voice, gesture, and movement. Gradually, he reduced the elaborateness of the scenery to simplicity and increased the effectiveness of light.

The final period of the development of stage lighting falls within the last few years and is of too recent occurrence to discuss at great length. The introduction of electricity with its highly scientific nature has placed the development of stage lighting in the hands of several specialists instead of one. The electric light has developed two types of stages; the highly detailed realistic stage of Belasco, and the utterly simple, symbolic stage of Robert Jones, Norman Bel-Geddes, and others. Out of the symbolic stage have developed three other types; the formal stage, the space stage, and the constructivist stage, in which lighting holds the pre-eminent position in the scene,-indeed it might be considered the scene.

The history of the English and American stage lighting reveals that it was greatly influenced by the Italian, the French, and the German stages; that it is closely related

to the progress of stage production and the drama; and through its various evolutions of inferior servitude has now reached the acme of its development, a paramount position on the modern stage.

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