Scenography International

ISSUE 1

The Changing Scenographic Aesthetic by Christine White

The role of the director in British Theatre has changed quite radically over the last half of the twentieth century. The advancements in, and use of technology within the theatre have resulted in some changes in directorial practice. As these advances in technology have changed the emphasis of the process of theatre production the prominence given to the director as sole 'auteur' of a piece of work has become diminished. The scenographic team is now more legitimately described as the 'auteurs' of a production. Another contributory factor for these developments has been the changes in theatre practice influenced both by European and Eastern European performance theories. I want to explore the nature of these changes and influences and discuss the theatre technology which has offered more scope for the manipulation of the stage image, in particular the use of lighting in late twentieth century scenography.

The director is no longer a specialist in every area, 'a man of the theatre'. S/he has begun to work more collaboratively with the other artists in the production team in a much more democratic process of production. Now more than at any other time the director works as another member of the team not only because s/he lacks knowledge but because the technology has allowed considerable flexiblity and the director's 'vision' can be translated into many forms, materials and theories. The contribution of scenography to these changes, changes in acting styles; and of what is expected within a performance space has transformed the way in which an actor uses that space. The importance which Brecht placed on Caspar Neher's designs for a cohesive performance structure, (based on his sketches of/for the rehearsal process), and the relation of the actor to light, (which Appia recognised as important), has resulted in stage technologies and scenography emerging as a partner of the actor and thus a new aesthetic.

At the most basic level developments in technology have changed how we actually 'see' in the theatre. Lighting design in particular, has affected the direction of a piece and led to certain precepts in the actors/directors mind as to where on the stage is a good place to stand or be blocked.[Greenwood:1982] In addition the technological development of the lighting rig in the late twentieth century has fundamentally affected the acting style of western performers. The importance of the actor's position on stage prior to the middle of this century had been determined by where that actor could be lit from they were consequently directed in relation to those instruments. Actor's entrances on the diagonal were lit by side lighting which illuminated the sets and screens whilst the strength of the down stage position as the brightest part of the stage was due to the proximity of the footlights and the throw of the follow spots, or limes. Modern technology has meant that the acting style can be a more intimate experience for actor and audience, as the technology allows the actor to be clearly seen anywhere on the stage from the auditorium. The lighting acts as a very strong medium for directing the audience's reception of the whole event, a role which has traditionally belonged to the director. As such the lighting of the actor's work on stage has changed quite fundamentally not just with reference to a theory of performance but also as a part of an aesthetic of the design and therefore the all embracing scenography.

Lighting - a part of the changing aesthetic

Lighting can be defined as a deictic as has been revealed through the discussion of aspects of scenography by the theory of semiotics however, its deictic qualities have become more apparent and useful in the theatre as the technologies used have also improved. Most of these new lighting technologies have been developed to aid their usefulness as deictic features.[Esslin; Elam] However, the manufacturer rarely considers this theory. Consequently, the direction, focus and indexing of significant moments in a production has been transformed by these developments. The rewriting of recent developments in lighting technology must be rooted in its deictic quality and in the developing importance of scenography for the presentation of the commercial product. The commercial product of scenography can be clearly seen in some cases as simply packaging. However, the importance and effects that lighting creates can now be

quantified as a necessary part of a top quality production. As the technology has increased and become more and more specialist so the expert has entered to take over this extremely influential and powerful role of directing the audiences' attention on stage. The obvious power of lighting has become recognised both by directors and the theatre industry. Where directors have designed their own lighting they have had to have a lighting consultant to act as an interface between them and the equipment for instance, directors such as Terry Hands in the UK, take on the task of lighting their own productions with the prerequisite lighting consultant. In addition the theatre industry has begun to award the aesthetic of lighting. Twyla Tharp, as a director and lighting designer received the first Olivier Award for lighting design in 1992. The link between her as not 'just' a lighting designer but a director who undertook the lighting has advertised the idea of the lighting designer as 'director' of the visual images which can be presented to an audience and directors have come to understand the amount of control that is possible over the audience's viewing and therefore their perception of the event. This position of control has evolved due to the advances made in the technology used to light productions.

For Appia the 'creative' light was a light that interpreted and expressed the inner rhythmic movement of the drama, its musicality. The developments of dimmers have enabled a vast range of possible transition in terms of the movement of light through intensity. Sophisticated lighting equipment can fade on or off using instruments not only as groups of actors but also as an isolated actor and lighting in the theatrical space has responded to changes in the spaces of performance. Simultaneous stages can be made to work due to the 'directing' of the lighting. We have begun to get closer to the *über marionette*, not due to the director as auteur but because lighting can pick people out and silhouette others allowing the montage to become more sophisticated, as light is used in a more expressive way. Different locales can be located on the same stage and identified to the audience through light. As scenic design of the late twentieth century has begun to use architectonic forms it has become necessary for the lighting to sculpt the images presented and in a greater sense to affect the audience through symbolic design and therefore to become part of the dramatic performance text.

The complexity of theatre lighting is highlighted by Judith Greenwood, "Lighting works on two levels: It can present one mood on stage which may produce a second complimentary or contradictory mood in the audience, as when a garishly bright lighting state, seemingly festive and indulgent, may provoke apprehension in an audience which senses rising hysteria beyond the lights' unreal edge..... for light can induce in people common states of happiness or sadness as well as more complicated attitudes of resentment, conviviality, introspection or unreasonableness." [Greenwood:1982] The naked face can reflect the psychological course of events, appearing in quite another way than was possible in the unfocused general light of the nineteenth century.

Over the last twenty years lighting design has become part of the scenography of any stage production. In his article 'A Scenography of Light', Brian Arnott describes both elements of light and movement as an integral part of The Architect and the Emperor of Assyria by Arrabal. This production was performed at the National Theatre of Great Britain in 1971. The play was directed by Victor Garcia and designed by Michel Launay, (Arnott describes him as also creating the scenography) he then refers to David Hersey as lighting designer. The title of this article suggests surprise at the malleable and flexible way in which lighting is not merely a single element to be later attached to a production but is in fact an imperative for the scenography of the theatre production. He goes on to describe, "Garcia's basic scenographic outlook", rather than that of Launay or Hersey or the team. This example of a theatre production as early as 1971, illustrates the use of moving lights before the automated systems we now have available, "the constant presence of the four black-clad mobile light operators who also worked on stage in full view of the audience throughout the performance."[Arnott:1973, p.74] It also illustrates the belief that the creator of the visual images is Garcia the director and that the designers facilitate this.

The performance arena was defined by light and light determined the method of performance. "The overriding visual image into which Garcia set these basic scenographic elements was both stark and disquieting. As the audience seated themselves they looked into the open box and saw the dark back wall and wing spaces. Above, were five electric pipes hung visibly. A long, highly polished metal floor stretching away from the audience was banded by bars of light emanating from two-hundred and fifty watt Reiche and Vogel beam projectors. These instruments were overslung four feet apart about a foot off

the floor on castered pipes that ran fence-like up and downstage just off the metal deck. The effect was vaguely reminiscent of an airport runway." The lighting instruments are not only placed to effect a look and style but in themselves become part of the scenography. "This was Garcia's principal scenographic image, and the metaphor was that of the theatre itself - the naked, unadorned proscenium stage with its mirror-finish floor proclaiming the triumph of theatricality over illusionism". In this production we also have an example of lighting operators, who are coached to achieve the desired effects. "In accordance with general guidelines established by the designers, the lighting operators had to respond improvisationally to the movement and values of each scene from day to day. Adaptation to this format was made possible by the use of hand-held five-hundred-watt sources. These highly mobile instruments provided the experimental basis for that part of the lighting plot that was concerned with facial and focal emphasis for the actors. The lighting operators were also provided with other raw materials in the form of prisms and pulsating and rotating mirrors. The main body of the three-hundred odd instruments of the Old Vic rig, however, remained unavailable throughout the rehearsal period, and effects to be achieved from it had to be plotted on paper in the usual manner, then set aside until the technical run-throughs." The need for an improvisation period and a period of experiment for all the scenographic elements was not only integral to the process of production but also to the method of performance; the lighting designer as a performer, in the same relation to the composer of a score that is later to be played. This choice of production aesthetic did not emanate from a lack of technology but it was prescribed by the production style, a similar experience could not have been created by automated systems.

Ultimately, for the Garcia project, this method of production provided an organic platform for performance allowing the actor's total freedom of movement, "without fear of not being lit. The movements of these instruments onstage toward center also tended to reduce the cavernous empty stage house to a space of more intimate dimensions." [Arnott:1973,p.75] Again, the lighting was used as part of the scenography of the production. The most interesting and perhaps innovative technology was the use of a Polychromatron which is a sound activated device. It can convert audio signal into a power surge within a lighting circuit, "Thus when the Emperor had cast off the parachute and switched to violently flailing the floor with a large piece of hide rolled like a wet towel, there was a pulsing burst of light in response to every smacking blow on the metallic stage." In addition Hersey used a light curtain and sodium, mercury and Compact Source Iodide specials. "At floor level from the open wings and proscenium door areas, large wattage ellipsoidals, fresnels, and sky pans on castered stands had taken the place of the smaller hand-held sources formerly used in rehearsal experiments." Along with these were numerous reflective surfaces, pulsating and rotating mirrors, the improvisation of rehearsals began to become controlled for the plotting period with, "the operators wearing transistorized earphones through which he directed all lighting sources that were not part of the console-controlled rig." [Arnott:1973,p.76]

During the last twenty years in the theatre, through the medium of light the lighting designer as part of the scenographic team has become a director of the action. This fluid and almost symbiotic relationship of roles between the scenographic team is most clearly realised in this production, although not realised by Arnott. It is the lighting designer who conjures for the audience and directs our sight to the moment of importance. It is the lighting designer who frames the moment in a similar way to the film and television editor, "the rolling follow-spots dollied in like TV cameras until they came to a stop only inches from each side of the actor's face." [Arnott:1973, p.78-79] Arnott speaks of graphic lighting effects by which I believe he means, those that are a literal translation of the actual event presented, "Another graphic lighting effect was achieved during the war scene. The stage went suddenly black while the sound effects speakers delivered a fully dimensional battle score with voice-over harangue. Augmenting the noise of the gunfire, the follow spot operators shot tracers of light obliquely through the house." [Arnott:1973, p.76]

We perhaps need to redefine the performance in terms of the lighting technology. In the last twenty years there has been a trend in theatre productions, other than those of the West End, towards low technology productions. Where designer and director have no desire to hide the illusion and lighting rigs have been totally open to the scrutiny of the spectator. This rather hackneyed but effective metaphor for the theatre originated as part of the aesthetic for studio spaces, where the mechanisms of performance are harder to hide. Gradually the acceptance of this aesthetic has become a part of many theatre environments. If a spectator sees the equipment in some theatres why not in all and when does the designing of the position of the lighting rig apparatus become a piece of environmental design which is more intrinsic to the

production than simply illuminating the stage? This 'environmental' use of lighting equipment was most effectively achieved by Jean Kalman for Richard II at the RNT. In this production Kalman placed rows of parcans either side of the stage, which formed the actual environment of the action. They metaphorically suggested battlements, searchlights and barbed wire by the use of the cabling etc. They were scenographic and functional and we saw both the poetic and metaphorical statement of the objects as well as their more functional use to light the show.

Similarly, Rick Fisher created a rig of 40 par 38 lamps some of which were also on pulleys for Shared Experience's production of The Bacchae, in 1989. The oppressive nature of the rig amplified the oppressive nature of the production. Single lamps were lowered onto Bacchantes, spotlighting and literally closing in on the performers. Both the movement of the light and its changing quality as it came nearer a performers face, or the floor, enhanced the atmosphere for the production and the whole rig was a substantial part of the setting. As such the lighting was used as a mystic force.

Lighting, when used as in these examples, extends the palette of what is possible through the use of traditional units in an innovative way. It also calls into question the 'innovations' which the manufactured goods can make and the possible dramatic affect they might have on the final product, the performance. As can be seen from these examples, these aesthetic changes are designed by the lighting designer and involve innovative use of units and apparatus rather than innovative specification by the manufacturer. The open stage settings and changes in production aesthetic, which rely on concept and metaphor, have enabled lighting to perform within the scenographic context of productions. Through the use of a different aesthetic in Assyria by Arrabal, in Richard II with traditional units as a visual image and in The Bacchae with non-theatre lights as part of the scenic and kinetic, lighting has not only been used as a source to illuminate but as a form and metaphor. In these examples the actual units of light have formed part of the scenographic aesthetic.

The most obvious use of light as a scenic contributor is through projection and this technology was used to produce naturalistic effects. The kinetic stage was first produced through projection in 1640 by Athenasius Kircher and the use of projection instead of scenery was used by Edward Fitzball at the Adelphi in 1827 to present a ship. This image was projected onto a surface called union, a glazed calico.[Fitzball:1859] Subsequently, complete sets of effects slides became available commercially and the beginnings of moving pictures at the end of the nineteenth century meant that moving slides and dissolves formed part of the optical host available for scenic design. "I do not want to depress our scenic artists...but it sometimes seems to me that as stage lighting develops more and more the scenic artists will become superfluous. I grow more and more convinced that lighting has hitherto been in its infancy and that it is rapidly taking its place as by far the most important of all the ancillary arts of the Theatre."

The importance of painted sets has subsequently diminished in the sense of naturalistic painted scenes. Whilst the kinetic use of light and projection are not new, the use of such effects for a non-naturalistic purpose is. Svoboda experimented with the use of kinetic forms on stage, " Svoboda has understood more than anyone else, how to employ projectors in order to create a kinetic stage in the rhythmic movement of drama."[Bergman:1977, p,365] Late twentieth century lighting has evolved beyond the presentation of moving 'filmic' scenes, to a nature of light which contains metaphoric meaning within the production, the nature of which the audience must interpret. The change in aesthetic has been due in part, to the popularity of open stage settings which have altered what can be achieved through lighting for a production. As a consequence lighting can be used as a more expressive contributor to the scenographic aesthetic. The style of modern theatre lighting has become sophisticated and often emblematic, it uses old and new technologies in a 'playful' and experimental way.

In the late twentieth century the importance of lighting has been contiguous with its use in both public and domestic life. In the home we fit dimmer switches in order to control the level of light in particular rooms, enabling us to change the mood of our environment. The revolution in the entertainment in clubs where lighting is one of the deciding factors for which club to go to as it generates a particular experience, suggests that an audience is aware of the evocative nature of lighting. Light shows have popularised lighting and in particular lighting technology. Consequently, the audience is more aware of these aspects of production, as the technologies have become more visible.

Whilst Appia and Craig theorised the importance of light within the theatre, the late twentieth century has provided the apparatus by which theories of lighting have been able to be applied. The technology that has been developed for lighting design has however, not necessarily been determined by theories of plasticity but has been more orientated to theories of the market place in particular, the use of other entertainment equipment for use in the theatre, rather than the development of specific theatre equipment. Theatre practice in the UK and the US reveal many similarities of theatre production and the kinds of developments which have changed the aesthetic of lighting. The following section discusses the market response to developments in equipment and working practice.

Lighting - control and personnel

UK practice and technology has been influenced by US practice, for example, in the use of computers and Computer Aided Design systems. The 1980s computer control had become a form of technology that all theatres either used or aspired to. As such Lighting Design is a very specific area of design which has been wholly influenced by a particular standard and type of operator control. There are few other areas of scenographic work which are as beholden to the influence of technology; materials may change and new weaves and plastics can be formed, chemical mixtures of paint and resin can be manufactured but the application of the work of a set designer is not directly influenced by where they sit, or who works with them. In the case of the lighting designer, the operation of lighting movements and effects are a major part of the lighting design's contribution to the theatre performance. Therefore, the development of modern lighting techniques has followed hand in hand with developments in the technology of lighting design. Whilst historical accounts clearly map the actual light source changing from candle to low voltage more integral is the apparatus which is used to control the lighting changes. It is in this role that the human contact of the operator with the act of performance, defines the use of light on stage and how it directly affects the nature of the production. The technology of control has not been defined as part of a theory behind a practice but is rather a part of an engineering evolutionary process, as such, the manufacturers have not taken into consideration the role of the operator of lighting control systems. Nor has the aesthetic changes brought about by the technology and practice in theatres been clearly documented.

The importance of lighting control is illustrated by the work of Mario Fortuny. In 1902, the first attempts at coloured sky effects were installed by Fortuny at La Scala Opera House, Milan. "It is not, however the precise electrical form of the dimmer that is important but the facilities for variable group control the panel or desk may provide."[O'Dea:1958,p.33] This suggests that from early experiments the use of new lighting units was thought to only be effective when the control mechanism was equally adventurous in its use of technology and expression of ideas. Lighting as an accompaniment or score, which has a similar place in the hierarchy of artistry to that of music, was first mooted by Adolphe Appia and realised in 1923, at La Scala, Milan for a production of Tristan und Isolde. He referred to the "living work of art", and in his 'Mise en scène Wagnerian' emphasised the importance of the "through-lit" or what might be termed, underscored production.[Volbach:1968, p.50]

The development of control technology influenced the nature and time scale of a performance. In lighting terms this is measured by the lighting operator as a series of static states, as this is how the images of light are plotted; not as a fluid movement of light throughout the piece but as something which is selectively pictorial. This is how modern control technology has interfaced with the act of performance. Solid state technology and later computer technology is able to memorise the individual states and this terminology is a part of lighting practice. However, as lighting has progressed the possibility of 200 cues in one hours worth of performance has become more likely, as the computer technology has enabled it as such, the lighting has been able to keep pace with the performance as a fluid feature of the scenographic. "Light , in fact, is no longer about unity but about transition. *How* we get from one place or moment to the next has become more important than what it looks like when we are there".[Aronson:1993,p.57]

The technology of lighting has gradually worked towards providing a system of control which allows instant access to all levels of operation. However, computer use in other areas of production has raised questions about a standardisation of product, which can operate on the lines of a p.c. terminal, rather than as a dedicated lighting computer. This was illustrated by the electrics team for Miss Saigon on

Broadway in 1991. The p.c. offers programmable memory but does not offer a performance level of operation.

The aesthetic of lighting for the theatre and the relationship between this technology and its operation must also consider the changes made to the visual environment of theatre production. Whilst the roles of the scenographers have become more specialist the method of control for lighting has become more standardised and less specialist in the qualities required for theatre performance. However, modern theatre lighting has been influenced by what manufacturers have produced at a reasonable price and this has often been hardware which contradicts both the flexible nature of the medium and the theatre practice of experimentation and improvisation so central to modern performance. This point is crucial both for technical training and more particularly for the role of the lighting operator.

Pilbrow suggests that the opportunity for mimicking nature is only the property of the twentieth century lighting designer. "For centuries men have written into their plays the light they have experienced in their lives; now this light can be 'manipulated' on the stage. Its visual and emotional effect can be used to accompany and influence the action: its dramatic potential, as new horizons of technique appear, is boundless".[Pilbrow:1992, p.10] The relationship of open staging to this is undoubted. The aesthetic of the scenographic metaphor has to a certain extent, obviated the need for closed scenic environments and lighting has been able to contribute a three-dimensional atmosphere of light around the actor, as illustrated by the examples of The Emperor of Assyria, The Bacchae, and Richard II. Appia realised light has the ability to communicate meanings and feelings directly to an audience like no other element of a production can. Lee Simonson comments on this phenomenon. "Appia's supreme intuition was his recognition that light can play as directly upon our emotions as music does. We are more immediately affected by our sensitiveness to variations of light in the theatre than we are by our sensations of color, shape, or sound. Our emotional reaction to light is more rapid than to any other theatrical means of expression, possibly because no other sensory stimulus moves with the speed of light, possibly because our earliest inherited fear being a fear of the dark, we inherit with it a primitive worship of the sun...."[Simonson:1964,p.365-366] The artistry of the gas man lay in the ability to set and reset the flames of gas to burn at the right colour to affect the scene. Similarly, the limelight man influenced the production, "we have to follow the story in a descriptive song introducing different shades to illustrate it. And the dramatic effect helps out the singer immensely."[Rees:1978, p.128] It is increasingly apparent from accounts such as this of the important role which lighting operators have always played in producing the appropriate effect for the atmosphere of a drama, and in the whole process of dramatisation. It is the action of 'play' which has always been of primary importance.

For rock and roll, lighting control boards are designed in order to offer unlimited access to all channels and units. Light is 'played' as an instrument and its beams keep time with the music of the band. Theatre lighting control on the other hand, has not been conceived as an instrument to be 'played' in this manner. It has the means provided by technological advances but the design of the control equipment does not easily allow it. The very fact that theatre lighting control has now moved away from this area of 'play' again highlights the strength of the p.c. compatible system in technological developments, rather than the nature of lighting for theatre. The technology has distanced the designer from the experimentation process and the palette by which she creates. There has been no realisation of the effect of this distancing of the operator from the production namely, the potential loss of that sense of 'play', which in other areas of theatre we value as a vital part of the process. The lighting designer is rarely afforded the opportunity for experimentation, improvisation or creative space, for which the design of control technology is partly to blame, as this technology has been created in order to repeat sequences of information again and again.

In the discursive comments received from designers about their production process the majority complained of a lack of collaboration with lighting designers, which was usually due to the production process and employment practice. Generally, lighting designers are employed after the design process has begun. The lighting designer's contribution is therefore, a response to the design, rather than a response to the literary text and concepts discussed by the scenographic team. This practice has begun to change but often only for the larger budget productions. The status and employment of set designers is often based on a previous relationship with the director. In their response to the questionnaire set designers

always hoped that the process would be a collaborative one where egos did not have to get in the way of the working relationship. However, some designers felt that certain directors believed that the employment of the set designer was all part of ordering the set. They were simply buying the set and the technical expertise of the set designer, rather than embarking on a partnership of artistic collaboration.

In some respects this feeling of 'buying up' expertise from various professionals is what actually happens to a lot of lighting designers. Some set designers mentioned their dismay at directors who worked in this way and the set designers expressed sympathy for the lighting designer in this situation. They also mentioned the way in which directors are obstructive to lighting designer's ideas and the availability of the lighting designer was commented upon by the set designer. They felt that often the pre-design meetings were too late for the lighting designers input to be taken on board by the set designer.

Lighting Control or 'Play'

The most useful adaptation of lighting boards in recent years has been the introduction of the designer's palette and/or the ability to move the board into the auditorium from the control room. Manufacturers seem to think the marketable parts of a board are the number of buttons on it, when an overwhelming response from lighting designers suggests that the ability to move the board or to plot from the auditorium is of most value. The more computer orientated boards have been able to achieve this most easily simply because their technology is more compact. However, with the potential changes in the nature of the plotting session they will soon be an unnecessary piece of hardware. This is the most controversial area of the discussion. Many lighting designers do not welcome the introduction or use of 'computer' speak, in lighting boards perhaps because of the influence in the UK of 'Strand logic'. Almost an equal number of replies to the questionnaire, either suggest that they are aware of the need to get rid of their prejudice towards QWERTY keyboards, or in fact that they are pleased to see the computer terminals in the control room. It would seem a logical process, however, and this was expressed by the results, that computer based control is where the future of control is headed.

Computers have little to do with theatre but as a tool represented in the right box they can add far more than simply illumination. The choice of an organ console as the appropriate layout of keys for such an instrument links the visual image more directly to music. The lighting console and Bentham's colour music sessions for Strand Lighting in the 1930s were originally intended to illustrate the flexibility of the lighting console and the many changes of image possible on this type of equipment. It was the equipment which was being sold not a new theory of lighting practice. These son et lumière sales room techniques used light and colour to move in relation to particular pieces of classical music. However, Bentham did not transfer this technique to more conventional theatre performances.

What has become more important to lighting and its use in a production has been the positioning of the control equipment. As soon as we place the lighting console behind glass and out of the way, we need another pair of eyes to see the effects and modify them within the actual theatre space. Sound engineers work from within the auditorium as we realise it is essential for the sound operator to be totally involved in the performance space, able to hear and see the same object of attention as the audience. The operator has become a 'player' in the same event and can modify levels and effects to suit the size of house and the performance given. They therefore can interpret the 'moment' and do not simply produce a fixed and predetermined text. Meanwhile, the lighting operator is divorced from the event often not interested in the piece nor aware of how s/he can alter the performance by her/his own mediation. The computer board remembers the interpretation and there is no need for human involvement. The 'mind' of the computer has been programmed to cope with all eventualities; either, the lighting has to compromise in order to cover a large area enabling the actors freedom, or the actors compromise to be within a tightly lit area, or be in darkness. The computer has the information but will not be altered to keep pace with the production dynamic. A great deal of the structure of lighting design in Britain is revealed by the way in which personnel from different areas refer to the problems and challenges of the job. Few lighting designers are concerned about the manufacturers dealings and future products. The lighting designers are more concerned with a new response or look which has to date, been created by specific design oriented products, such as gobos and projection equipment, rather than lantern units and control boards. It is the theatre technicians who have most complaints about this type of equipment as they are closest to it.

Lighting designers complain about lighting boards in terms of very specific functions as that is their most particular unit of operation but even as their modus operandi they are still very divorced from it. Even though designer's palettes have been in operation for many years now few shows are plotted on them by the lighting designer experimenting during a lighting session. Still rarer is the use of the palette as an instructional tool to the operator by which the lighting designer could show the kind of feel and mood to a cue as an expression of what the operator should try to achieve. This would be closest to the transposed idea of the operator as the instrument player, and the lighting designer as the composer.

The advent of computer control systems started a revolution in lighting design of far greater significance than that of the thyristor dimmer. Although the mechanics of theatre lighting, as in the specific method of dimming, did ultimately affect the technology of control, it is the structure and operation of access to particular lighting systems, which has the greatest impact on the final look of a piece of theatre, in that, the control equipment is responsible for the level of performance. It is not just the hardware of the control but the layout of the control board and the organisation of the lantern stock, which changes the nature of the lighting design, and the role of the lighting designer. Richard Pilbrow's belief in saturation rigs of a similar nature to those found in television studios meant that the lighting designer became a lighting engineer similar to television's opposite number.

Pilbrow instigated these ideas at the National Theatre in 1976, which had very particular requisites, one of which was to cut down on the use of labour. Scenic units were to be shifted with as little breakdown into components as possible and the main theory of the machinery was to facilitate the playing of productions in repertoire. The lighting control board was designed as a piece of technology for this venue which allowed the recording of information and its replay again and again, as precisely as it was played for the very first performance. This enabled quick and efficient turn rounds of shows in repertoire for little expense. The structure of lighting and the method of thinking about the process in this environment meant that the lighting designer had to become an executive. This ultimately meant that the trend of control board design was based on this practice and was market led in that it was a cost accounting method of advancing the technology and the implications of this process on the aesthetic were not considered. The National was to run on the basis of a saturation rig. This meant the bulk of the equipment was permanently focused with only a small amount refocused between shows.[Pilbrow:1992, p.130-131] Richard Pilbrow who was the consultant for The National felt that this was the beginning of a new era for stage lighting, "Unlike at any time in the past, light can be created at a distance from its actual source."[Pilbrow:1992,p.10] The technology was the hope for a future where continual rigging and re-rigging in respect of each show's requirements would be a thing of the past. This was especially important in venues such as the National Theatre where a repertoire system left little time for specific rigging.

The use of a computer system similar to that used for word processing was thought to be the answer to the continual changes required by a repertoire structure of performance, however, a p.c. would reduce the ability to run a multiplicity of activities from one system. The need for the operator to have a form of access through the technology which allows instantaneous changes and therefore a level of 'performance ability' in the equipment's design, depends very much on how we see his/her role. If they are to load a series of commands to later be executed with a single button push, when cued the use of the qwerty keyboard is quite adequate. If they are to be involved in the design on a performance basis then the equipment needs to have instant access to every level and not involve a series of coded commands but as on the rock and roll boards provide the operator with a keyboard to 'play'. This problem of 'play' in the production of theatre is exacerbated by new technologies such as moving lights. However, in order to program moving lights we also require more specific commands but with flexibility in order that the designers may have any configuration to design with rather than a series of choices. As soon as more effects are required other terminals or control boxes are needed. The argument that if control was from a standardized QWERTY keyboard any additions to the normal lighting rig could be added and commanded from one station would seem to be the way forward for the technology. John Letheridge, Chairman of Cerebrum Lighting Ltd, felt that the number of features on control desks is increasing and the demand for this is created by bigger touring rigs and installations. As prices of these systems drop, they become more available to various places of entertainment. The sophisticated functions of dipless fades and memory stores, external protocols and chases are not often used by operators of rock or club lighting as they usually play the board in terms of flash buttons. The arguments for bringing the boards down in size are

not really viable in the rock and roll market, where size really does matter, in order to be able to 'play' the board. The conflict of markets with studio, theatre and club spaces, where space is at a premium becomes obvious. Manufacturers have realised the difficulty of covering all markets with the same type of control and this has lead certain companies to be more popular depending on the entertainment field they specialise in. Control systems' communication between various pieces of equipment is where a conflict of protocol can cause problems. Integrated packages to control numerous devices from one operator is what prove most saleable, even if from the technological point of view the protocol chosen is not as reliable or effective. Once more this leads to the need for the universality of control in the form of QWERTY keyboards. Exactly how much designers concern themselves with protocol depends on the amount of staff and money available to them. If they have a large team and large budget the problems of protocol control will be solved by one or the other. In that it will become the chief electrician's headache and not the designers or the designer can buy a number of units to interface, control, and thereby solve the problem. Low budget and low staffing usually makes this kind of work prohibitive both in the time needed to plot the complex information and in the cost of linking up a number of FX and automated systems. This question of play or control has been influenced by the choice of control equipment. The advent of computer technology has reduced the skill of operation certainly in theatre performance but has enabled the electrician to be the lighting designer. Whilst this is an admirable democratisation of the role, the contradictions which the technology has created do not seem to have been challenged, and yet they are fundamental to the art of the theatre and its artifice.[Pilbrow:1992,p.144]

Would this condition be changed if the lighting designer were more like the composer? If we were to take the nature of lighting to its natural end and recognise it as a fluid form then this practice might be appropriate. The notes may be laid down the style of playing even the instruments used are very particularly chosen but the orchestra at any given concert hall can interpret. They can treat a note as a fortissimo or a diminuendo. The operator is responsive to the changing production dynamic. In this arrangement, the operator becomes a player, a performer in the whole piece of theatre that takes place and not simply a facilitator with certain technical expertise. Furthermore, as the pace of a performance changes in speed and dynamic, so the lighting can be altered to suit.

However such a vast change in the role of the operator would have to be facilitated by financial inducement as for the operator to want to play this part a degree of trust on the part of the lighting designer and time to train/coach the operator in the ideas of the design would be necessary. I have achieved this only once and the experiment was forced by the situation rather than through choice. However, as the lighting designer for Bed of Arrows by Nona Shepphard, a trilogy based on The Mahabharata, for the episode which played outside at Lincoln Castle, (1997) I was able to design and focus the rig, and then give instructions to the operator for the cueing and progression of the light for the production. As the production and performances progressed we discussed changes of dynamic as they were appropriate. In this instance such a working practice produced a strong aesthetic and an 'involved' operator.

The most influential hardware and software lighting developments are in the area of Computer Aided Design, which also suggests new methods of creating the theatre product and the possible manufacture of units very specific to a lighting designer's requirements. This implies that manufacturers have nowhere else to go unless they develop in the area of use, that is, *with* the lighting designers, rather than with the theatre technicians. CAD could revolutionise the design process not only of the individual lighting design but the manufacture of new lanterns to solve particular problems. CAD for theatre use offers the facilities to pre-program lighting and flying operations before going into the theatre. For example in the production process for Martin Guerre the Technical Manager and Deputy Stage Manager pre-plotted the scenic moves of the revolve before going into the theatre and due to this experiment specific software for theatre has begun to be developed. ShowCAD was launched in 1993. This software allows show data to be prepared in other PC programs and brought in to ShowCAD. It also allows a full computer operated lighting board for over one thousand circuits and can operate moving lights in addition to traditional lighting units. [Halliday:1993, p.36-37] Computer Aided Design systems with the computer terminals in the control room would allow designs to be created, altered and updated. Luminaires about to be added to the rig could be checked out in side elevation on screen, perhaps saving unnecessary rigging time. This has in part already begun with some of the big West End and Broadway shows. The process would involve the

lighting designer in drawing the design via CAD and then rendering the ideas for the work. The scenographic team could then meet to discuss the ideas around the work. If an angle did not produce the desired affect then the system could instantly change the positioning and give a view of the affect. This would also extend to the use of particular pieces of equipment. Having loaded a database of lantern specifications the correct tool for the job and its specific degree of focus could be noted. CAD rather than instrument design will be the greatest advance and change for the production process of lighting design. However, Jane Head of Production Arts New York believes this technology is more likely to be used by technicians rather than designers as designers are less likely to, "trust the data sheet". The production line philosophy is enhanced by the actual theatre practice which becomes necessary, in the US this involves the generation of masses of paperwork. The training of lighting designers in the US, involves the production of numerous plots and diagrams, focus plots and cue sheets before the work in the theatre. The practice in the UK is to produce the basic paper work and from the experimentation and work in the theatre itself, cue sheets and focus plots emerge as necessary. However, these differences are gradually becoming less as the praxis of production requires further information about the production's lighting, should it tour, be sold abroad, or be revived a year or years later. The marketing of the product of theatre has impacted on specific practice in lighting design for theatre and this practice is generally following the pattern of the more commercial US theatre. Production in the US is geared to cost cutting and profit making, which means that the time actually spent in the theatre in the production week is precious and requires planning. Consequently, the clear paperwork and the keeping of up to date records of changes in the plots as they occur becomes necessary. The lighting assistant may light the show again and again referring to the clearly set down perameters of the design.

Jane Head suggests that the use of the technology should not limit creativity. Again, she suggests the idea of 'play' has to be encouraged in the training as it is only through this and a free expression, that a sense of creativity exists. Automated lighting she felt at the moment, (1991) is still too noisy and has drawbacks in terms of the complexity of plotting the moves of the units, in moments when noise would not be perceived. In an article from L.A. Opera this problem is highlighted. At a rock concert or in Opera and Ballet the noise does not impinge due to a louder ambient performance level and this is where the majority of effects of automated lighting have been successful. Although in initial plotting the moves and technology is complex the need to repeat the show exactly is possible because of the precision of this technology. This means that the same presentation in lighting terms can be achieved again and again. In this respect the way in which moving lights are being used for theatre immediately contradicts the opportunity for 'play'.

Research and development by manufacturers has lead to specific types of product, which are cheaply made and therefore, attractive for theatres to purchase. Designers such as David Hersey and Andy Bridge import UK equipment into their US shows, and David Hersey popularised his own manufactured goods through his work on transfers such as Miss Saigon. For Aspects of Love, the Strand Lighting Power Assisted Lighting System(PALS) made popular automated lighting on Broadway. The computer logic of control which is different between US and UK computer boards was not an issue. Larry Kellerman an agent for Strand Lighting US explained, "you can run a show on practically anything, a matter of taste is all we're talking about". Kellerman felt that the engineering led companies hindered real progress the market was asking for a general progression of ideas, and the manufacturing industry was not pushing forward with the same enthusiasm. "Certainly, into the next century, each unit will have an in built dimmer and there will be cable-less control".[Kellerman:interview 1991] However, the manufacturers do not take leaps of imagination unless they can sell their products and the kinds of technological changes Kellerman discussed would not affect the designer, as they were advances which would change the working pattern of the technician. In contrast David Hersey Associates (DHA) directly influence the palette of the lighting designer. DHA produce equipment which enhances the aesthetic of lighting design and consequently, the scenography. This company researches and develops for a specific lighting designer, David Hersey. The company specifically relates technology to the artistry of lighting as most products from DHA feature projection patterns in the form of gobos or the transitional use of colour, therefore these developments of technology enable changes in the aesthetic possibilities of lighting.

It is generally noted that artistic expression in lighting design is most often conveyed through colour mediums and the original colour temperature of light sources, that is, the temperature at which the bulb

burns would be the most straightforward area to change. Moving light technology has produced a slightly different light quality especially relating to colour. The dichroic filter has enabled the source to change. In real terms there is more money in automated lighting, especially as film and t.v. companies can use its flexibility. The development of the dichroic filter in these units has meant that the interest has moved from light source to colour. The dichroic filter can mix quite startling colour densities and these units are using low voltage sources.

There is a definite market interest in the theatre industry for low voltage equipment and the development of such equipment would be backed by lighting designers if the equipment were flexible enough, that is, most importantly if it dimmed easily as if the lighting designers ask for the product the technicians will buy it. If Philips, one of the largest manufacturers of bulbs and lamps, were interested in manufacturing a low voltage bulb with finer elements this would facilitate the request for easy dimming for low voltage units. At present low voltage equipment does not dim easily and therefore, aesthetically it is limited. There is also a need for low voltage equipment to be flexible and to contain the basic tools of other lighting units for example having shutters, masks and barn doors.

In a survey which I conducted responses from 80% of lighting designers replied that they would like to be able to use more low voltage equipment. All the lighting designers from the questionnaire were referring to luminaires. The most popular unit is in fact a Birdie - basically an M16 bulb in a mini-parcan. The reason for its popularity with designers is its convenience, by which we mean it is lightweight and small and can be easily attached to the set or stage in often very tight corners. The reason for its unpopularity with chief electricians is the difficulty in being able to place the cumbersome transformers necessary for dimming close enough to the luminaires, so as to avoid voltage drop. However, of particular interest for lighting designers is the quality of light. As with all low voltage light it is much brighter and could be described as a ‘whiter light’. However, low voltage lanterns do not work well with dimmers and yet every theatre application requires this flexibility. If a designer were presented with lanterns that could not be dimmed much of the skill of design would be lost for it is the juxtaposition of light with darkness which enables the designer to highlight or effect subtle changes in scene, atmosphere and locale. So why is low voltage equipment, which is difficult to dim and impossible to 'snap out' effectively, so popular with designers, the people who require most flexibility? Could it be fashion? To some extent it is as with most innovations they inevitably become overused to begin with. However, the use of these units has stabilised and enabled lighting designers to place sources of light in very tight spaces. They have allowed therefore a discrete use of light but also a variety of angles which bear no relation to naturalistic presentation. In particular the use of M16 battens has allowed the designer to include banks of footlights which do not impede the vision of the audience and do not so severely separate the audience from the actor as has been the case in the batten lights from the 1960s. However the opportunity for the use of such units and the wish to use light in this angle to the actor has developed mainly from the interest in the light source and its effect. In this respect it is the fashionability of low voltage sources.

In recent years developments have been made in architectural and domestic lighting that have led to a more ‘hi-tech’ look. Homes are designed with dimmers for each room, modern offices have a variety of light sources in many styles and it is here that low voltage units have excelled. As with most developments that reach theatre, the technology has usually been developed to apply to another more lucrative area. The bulb manufacturers create a product for a known market which will pay for the development. Many lighting designers wished theatre equipment manufacturers would take hold of the low voltage technology and adapt it to theatre. Tim Burnham developed the T.B.A. Magic Lantern as a low voltage luminare. The name the Magic Lantern was no coincidence as in the sixteenth and seventeenth centuries it was a very popular form of projection. "In the eighteenth century it became more sophisticated in that it could be synchronised with other projectors cross-fading and over-lapping the images". [Walne:1995, p.9] It is this synchronisation which was similar to Tim Burnham’s Magic Lantern. Burnham's Magic Lantern was advertised either to be used without external dimmers but with dimmer per lamp flexibility, or to be used in an existing 240v rig but without heavy transformers. The electronics in the lantern converted the dimmers output to low voltage "even at barely perceptible levels". Tim Burnham Associates went bankrupt before his equipment could be proved in the market place. He had obviously felt that low voltage was the way to proceed and his market research into product popularity seems to have

been correct. However, no other manufacturer has taken up the challenge left behind by the collapse of his company.

The lighting designers' response to the questionnaire which I sent out in 1992, suggests that what is really being asked for is a new light source and manufacturers like Philips and Thorn must develop this technology. We now use sealed beam units in theatre lighting but these originally were designed as aircraft landing lights. Where are the next theatre bulbs going to come from? Unfortunately for the bulb manufacturers theatre practitioners are small purchasers and hence provide a low profit margin. The manufacturers need to have a profitable market for their products, hence the cross-over of products like the M16 bulb from domestic and architectural lighting, to theatre. However, lighting designers are searching for a new look and low voltage is popular as a different light source, which will partially dim and can be used in compact units, unlike Compact Source Iodide and Halogen Mercury Iodide. Ultimately, designers are itching for a different light source as revolutionary as electricity was in the 1880s and low voltage fills this gap. If it is the light source we as designers are interested in then it is the lamp manufacturers who have to be convinced of the market and need for the product. There is however, a comparison to be drawn between the introduction of gas and electricity with that of low voltage into the theatre. All these sources were first introduced to illuminate exteriors, public halls and foyers before they were allowed onto the stage or into the home. It was in fact the invention of the incandescent bulb which ensured that electricity would be adapted for theatrical purposes. This trend seems to suggest that given time and the development of the lamps low voltage could follow this pattern and find a home on stage in a flexible unit.

The impact of mass production has led to economic growth but has also led to a need for the new and different. The need to create moonlight, sunlight, lightning and rain has led manufacturers to design certain products geared to naturalism and the presentation of it onstage. As naturalism has declined in all the other arts of the theatre so lighting has sought other methods of expression. In this sense the new gadgets are superfluous as the means of communication through light is determined by an emotional kinetics which will not be created by the objects but the use of them. It is the light itself, the colour temperature, density and shape and not the instrument, which is important; the player and not the recording. The light produces an accent, in the way that music does, and as such it is part of the poetic of our time. The aspect of play in terms of the whole process of theatre must be re-invoked, play as performer and play as experimental. However, play and mass production of the theatre product have conflicting aims.

A demand for performance relativity in lighting control also begs the question of how much a production changes every night. On tour this is particularly pertinent but developing the kind of flexibility needed for one night stands also demands a universality in the equipment found in every theatre. Would the operator be briefed by the lighting designer on the concept and ideas behind the lighting, the basic necessities for the production? Or would they do the production in the same way an actor performs a piece, after being coached by the director - as I have suggested for Bed Of Arrows ? Is this in fact close to the practice at present at the National Theatre where each lighting designer has an assistant who understands the rig and can call up a relevant capacity lantern, at the kind of angle to the stage that the lighting designer has required, with a colour changer with the nearest colour to that requested? Is it not what most touring lighting technicians and stage managers do when confronted by a new space - they endeavour to re-create within a given environment ? It is less a case of the lighting designer designing for a specific show rather for the 'general purpose' rig being used for innumerable productions. The infinitely adaptable rig. Do we need to rig and re-rig for every show from the very beginning? The development of PALS and Vari*lites would seem to suggest not. However, the latter were developed for rock concerts and the former to allow an infinite number of permutations that one rig could achieve. These advances are exciting in their own right but where do they leave the studio space and multipurpose venue with little finance? These more complicated technologies also take more time to program, which leads us into the use of CAD for the process of production. Through CAD the set design can be loaded and the lighting designer can light the show on screen making it transferable to the theatre by disc and to the lighting control board.

The Art of the designer is confined by the technology available and the technology is produced for a specific technical function. Many members of the profession feel they are often presented with new technology and it is assumed that the technology leads the Art. However, no matter how exciting the technology it is not until the imaginative skill of the lighting designer has taken hold of it that its full potential, intentional or otherwise may be fully realised. At the point when the designed lights are rigged lighting designers require a high level of flexibility from luminaires, not to avoid making decisions on the drawing board but in order to avoid imposing limitations on the design at this relatively early stage in the production. This technology is not determined by the spectacularly gratuitous but needs to be viewed as an instrument of expression. Expression of the visual poetic interpreted from the literary text. The advances described above in terms of angles possible to the stage, the use of colour and projection mediums, comparisons of control equipment, the luminaires and sources, and the advent of computer aided design, have all radically changed the nature of lighting for theatre. They offer specific tools for the lighting designer to use and have both created and reacted to the fundamental differences in the theatre aesthetic which have occurred in British scenography, not least in terms of the role of the director and the nature of the Text.

Directors and Texts

The separation of the role of the actor from that of the director was not consistently practised in this country in the early twentieth century. Many directors still took part in the plays they directed. Edward Gordon Craig's The Art of the Theatre (1911), became a rallying point for British directors, as Craig debated the concept of the theatre as Art, as opposed to an entertainment. From this period the word 'Art' was increasingly used in connection with the stage and a division between commercial theatre and Art theatre became more apparent. Although it is debatable whether the Craig's idea if the director as mastermind of the work of Art called theatre and therefore the single view controlling a production has ever been totally realised, Craig's publications contributed to the downfall of the actor-manager. This division between commercial theatre and Art theatre again presupposes a distinction which is based on nothing other than the commodification of that art. It is a difficulty which has become insuperable in the late twentieth century due to the need for some patronage of the Arts in general and the dominance of a capitalist funding system based on market forces. These contradictions can be seen in the theory that the audience is a major creator of meaning as this suggests that any art of the stage does not exist without them. The sense of the audience as the major creator of the mise en scène is discussed by Appia, "Our eyes ...determine the staging and always create it anew...we ourselves are the mise en scène, without us the work remains a written piece".[Volbach:1968,p.103] This expression of the audience as creator of sense and therefore meaning voiced by Appia has become a central feature of recent theatre theory and practice. In practice it has enabled the scenographic team to provide suggestions, symbols and references. In theoretical terms it is crucial to an understanding of theatre theories in particular deconstructionist patterns such as semiotics. The ideas of Appia and Craig have reinforced both the nature of the visual and the importance of the audience as viewer, and therefore creator of meaning in the stage space. The influence of the visual has become paramount and as this realization has seeped into mainstream production, so scenography has been given a sense of place. "In philosophy, psychology, and the like, we give such phenomena technical terms. This does not alter the fact that all could be reduced to the term 'to imagine', for all of them imply an image before their realization. These facts are well known, yet we do not utilize them in those phases of our existence where imagination could be of great service. This indifference distorts and lowers our scale of values; for, in order to evaluate, the object of evaluation must be understood or invoked by imaginaton....One wonders whether it is not urgent to admit imagination as a specific branch of academic instruction or, at least, to encourage it by pointing it out and conferring upon it a very high value."[Appia:1922, p.364-5] Appia preempts interest in audience reception by suggesting that it is recognised as a necessary part of the theatre experience. In the late twentieth century this is exactly what a tertiary training in theatre and drama admits.

The involvement of the audience in the theatre experience has also come to affect the separate role of the director as the manipulator of the art. In the former hypothesis of the audience as creator of meaning, the audience should be admitted free, for without them what else exists? The latter belief of the director as the manipulator of the art suggests that they have come to view genius in the form of the director's vision. The problem in the late twentieth century has been to get the audience to go to the theatre at all

and this is where the use of technology has been successful in marketing the product whether it is one purporting a director's vision or not.

The dominance of the Oxbridge trained director in the UK, who is rooted in an academic tradition of the literary text and the subsequent diversification of the training for the actor, has provided a break from an actor's theatre. The director's theatre had reached its height during the late 1970s and actors have tried to reassert their power. Actors have begun to take directorial roles in an attempt to wrestle back some control from the authoritarian practice of some directors, for example Kenneth Branagh, Ian McKellern and Simon Callow, the latter writing particularly scathingly about the profession of director in the theatre.

The demise of actor-manager, director and actor as the author of theatre has only recently occurred partly as the complexity of theatre production vis à vis scenographic images has been realised. Directors are no longer required to interpret the literary text and reveal some great insight. They must now revise their role as being one which co-ordinates numerous messages to the audience beyond that which is laid down in any interpretation of the literary text. Directors may have independently learnt to lace their productions with concepts that show their skill and cleverness but this approach has been mediated *through* the director, with the lighting designer, set designer and others who form the scenographic team. As a consequence the meaning of a given performance has been played out in the rehearsal room rather than prescribed by the literary text. Latterly, directors have used rehearsals to explore rather than define a production. Director Sam Mendes revealed that: "Going to the RSC at that stage in my career completely changed my perception of what it is that you do in rehearsal. It became about the collective consciousness of a lot of very intelligent, sensitive people, and the imaginative exploration of an empty space."[Edwardes:1995,p.211] This change in understanding of the aesthetic has changed the practice and production of theatre. "In the eighties, directors were getting too big for their boots. But now there is a new generation of directors who have tried to hark back to the Peter Brook experimental era and away from the empire building of Peter Hall, Trevor Nunn and John Dexter. They want something that is more studio based and unconventional and that also takes on board a great understanding of the actor's desires and their needs as human beings rather than as pawns in a master plan."[Edwardes:1995,p.212] It was not just actors who felt they were simply a part of the director's grand plan. Designers from all fields felt that the ideology of the *director's vision* was outmoded and egotistical. In Alison Chitty's production of The Rose Tattoo which she designed and Peter Hall directed, her approach was to create "moment drawings to express the tension and relationships in the text....Peter Hall is a strong advocate for naturalism and if it says it in the text he has to have it." Hall wasn't keen therefore on the idea of transparent walls, so Chitty designed in a style which she described as, "a heightened realism, extracted out of naturalism."[interview with Author 1991] However, in this example we have an illustration of the designer setting the performance aesthetic rather than the production being the result of "the imaginative exploration of an empty space". Mendes's ideal is always at the mercy of economics and working practice and the question must be raised as to *who* is allowed to experiment? In the responses I have received from designers through the Society for West End Theatre, the lack of time for experimentation was continually highlighted. In large institutions it is no better, as the RNT and RSC have schedules tightly planned around the demanding repertoire system which defines when designs must be completed, irrespective of the process.

A further change in the directorial role is the signature which is used to identify a piece of theatre. In the 1960s and 1970s literary texts were known by their author, the playwright, and dramatic texts were described, either by the playwright, the producer, or the director. Generally the naming of the product depended on who was the most famous name to use in relation to the production. Although in the case of Peter Brook's A Midsummer Nights Dream one would expect Shakespeare to get top billing! In this case however it was the extraordinary nature of the production, most notably in terms of the scenography used. However, as Iain Mackintosh points out the creator of the striking scenographic image, Sally Crabb is rarely mentioned in relation to this production.[Mackintosh:1992] In the 1980s and 1990s there has been a more homogeneous tagging of the authors of the production irrespective of whether that production has been a success or a failure. The employment structures of the latter period have also altered this naming, as directors, designers, lighting designers, choreographers, composers etc. now work in teams to produce the work together and are recognised as teams in the market place. As such the individual's signature becomes less relevant to the means of production. Therefore, the scenographic

team has become the auteur because of changes in the means of production; the specialist departments in the theatre; the importance of image to convey meaning and the involvement of the audience as maker of meaning. These modes of production brought about by the changes in technology have facilitated a rise in the presence and significance of scenography as part of a new text which we could call the 'performance text or dramatic text'. The making of image on stage is recognised as highly significant and the theatre departments have focused on the detail of production, rather than a broad stroke and potentially 'poor' theatre look of previous generations. For if the audience is to make meanings of the experience called theatre then this form of presentation must naturally become more complex , layered and provocative. The sophistication of audience perception has in many ways provoked the complex signification. However, this can also be perverted in the market place to mean ostentation rather than image for the audience to engage with. An example of this in the early 1990s was the subcontracting of specific areas of design in the set of Sunset Boulevard at The Adelphi Theatre, London. The attention to detail here is hardly noticeable from the back of the stalls and the intricacies of the work can only be appreciated in photographs as seen in theatre design catalogues. In addition it was photographed and reproduced in the programme giving the audience a closer look at what their ticket price has been spent on. The detail on the part of, in this case scenic artists provides a job but not a role within the creation of the theatre production and its process. The set became merchandise for the audience to wonder at. This practice differs little from the nineteenth century as it encourages the applause of the scenography as object and not subject. In effect such precise detail becomes insignificant to the audiences' appreciation or response to the performance text. The scenic art is part of the commodity and little else. The directors and designers of the late twentieth century try to find an angle for modern drama and for classical pieces in particular, in order to make the performance relevant to our time but also, and perhaps more importantly, such practice reinforces the perception of the scenographic team as the interpretative artists and has done some damage in distancing the actors from the process of creating.

However, different stagings have also caused changes in the fashion of visual stimuli. As Louis Jouvet wrote in Mise en Scène des Fourbières de Scapin, "The art of the director is an art of adjusting to contingencies. It isn't a profession, it is a state. One is a director as one is a lover. The varieties are infinite."[Cole:1962,p.69] The importance of scenography as a text within the performance text has enabled scenographic teams to assimilate techniques from a variety of discrete sources, often combining techniques of presentation which at one time would have been restricted to a particular constituency. One of the most notable areas of this type of assimilation is the work of alternative theatre companies and in particular what has been termed physical theatre. By the end of the 1970s there were around 70 groups in opposition to mainstream theatre in the United Kingdom. Studio theatre companies influenced by innovations in film developed more complex scenarios and the new theorizing of theatre as a degree subject, "led to a virement of intellectual and performance ideas: post-modern, post-structuralist and complex mise en scènes - a mix of social and theatrical conventions".[Kershaw:1992, p.141] This 'alternative' theatre had a subculture which was often contradictory and so similar to other subcultures.[Hebdige:1991] The study of theatre theory suggested the replication of style could be achieved by following the tenets of any one theatre theory. It was this import of theory which many alternative theatre groups were experimenting with and many of these groups chose to meet the ideological challenges of production, "with performance projects designed to activate every dimension of the theatre transaction in the interests of efficacy", in conflict with the literary theatre. "This emphasized theatre as cultural production rather than as aesthetic event".[Kershaw:1992,p.148] In the 1970s the Arts Council realised that a younger audience were enjoying more multimedia work of a 'non-establishment' nature, and so the Arts Council of Great Britain in response to this demand, decided to fund more of this work, thereby encouraging it. In addition post-modern theories that, "performance as text in which all codes are of potentially equal value."[Kershaw:1992, p.103], led to a diminution of the literary texts value, or rather the raising of prominence of other theatre texts which join together to form the performance text. Consequently groups explored the development of texts through performance and improvisation rather than beginning with a literary text. Issues within any one group became a focus for performance texts and consequently particular constituencies of audience were formed. The 'unionisation' in the form of the Independant Theatre Council, Theatre Writer's Union, Association of Community Theatres, put pressure on funding bodies to increase subsidy. This increase in subsidy included theatre buildings whose administrators could then afford more sophisticated technology with which to mount productions. The influence of computers and multimedia components led building based companies to believe they needed new equipment such as computer lighting boards, and this led to the re-structuring of

the means of production through the personnel required to manage the new technologies. A national touring grid funded by the Arts Council provided companies with performance spaces which were equally well equipped. The consistent components which companies could rely on were then sound, lighting and projection facilities in these spaces. These were popular scenographic features not only because they adhered to European theoretical theatre practice but also because in terms of lighting and sound rigs, they were already provided and therefore cheap and easy for a touring company to use to transform the space. As a consequence the scenographic choices made by these companies based on what was expedient led to a new aesthetic for the performance text. "It is conceptual in framework and realistic of selected detail. It is a poetic approach." [Rees:1992, p.234] The gap between West End and Alternative Theatre was then both financial and aesthetic. The West End in the 1970s were still playing on box sets for drama, with the occasional exception such as Jesus Christ Superstar which used rock concert techniques in the form of lit up floors, podium levels, disco rig and the principal characters wandering around with microphones on leads. The re-staging of Jesus Christ Superstar in 1997 offered this view of the 1970s. The assimilation of these techniques can be seen in Les Miserables . It is the scenography combined with physical theatre techniques which has been developed. "Les Miserables successfully marries the two approaches: creating enough visual excitement to make it a West End sell-out, while sticking to the RSC's low hype, high-fidelity treatment of the text."[Haye:1986,p.33-4]

The theatre workers of touring theatre had provided a training for new talent for many of the Royal National Theatre and Royal Shakespeare Company's main house and expensively funded productions. The writers and directors from the small-scale have all come from a touring and fringe, or 'alternative' theatre background. This separation of style and to an extent economy has led to divergent scenographic presentations. The larger establishment companies and much of the mainstream thinking suggested a philosophy of theatre and of scenography, which established 'spectacle' as a means of getting the audience into the theatre, whereas the serious drama was still achieved on a shoestring and with limited use of 'spectacle' presentation. In the last ten to fifteen years this aesthetic has changed the nature of the theatre product, a spectacle, political and arts style of theatre has been combined to produce work such as, An Inspector Calls, Machinal, and Les Miserables. Whilst all of these originated as subsidized theatre product they all have transferred to the commercial sector or have been made with a view to commercial profit. They combine the scenic need of visual excitement, engaging the audience's imagination with high-fidelity to the literary text - the combination of separate ideologies and rationales. Consequently the scenography has presented an aesthetic which has begun to be rationalised by particular market values.

The success of these techniques has become reified and as these techniques use scenography as part of the dramatic text the engagement of the audience becomes ever more complex. Our idea of verisimilitude is adjusted and considered in the light of the audience's involvement in the process. The scenographers must consider the scenographic text as the audience might perceive it. The reality of the environment both in terms of its suitability to the literary text and to the performance text makes the initial interpretation by the scenographic team complex especially in terms of realism. The presentation of which must now be regarded as a travesty as the whole stage space is recognised as symbolic. However what is accurate or veritable to any given period of history will depend on an audience's attitude to the realism which in turn will be mediated by conceiving realism in terms of a particular artistic method and conceiving realism in terms of a particular attitude towards what is called 'reality'. One of the complexities of realism is that it transcends period and history, and can be used as a term of description at any time. Therefore cultural changes in production and changes in the scenographic aesthetic with features from alternative theatre forms have been assimilated and have become a part of the mainstream theatre aesthetic. "Theoretically, it relates to Gramsci's idea that folklore and the popular arts could form the basis of counter-hegemonic cultural activism." [Kershaw:1992,p.153] However, these ideas have become a form of self-conscious presentation for theatre companies especially as they have been used by mainstream companies. They have not represented an afront to mainstream activities or involved a political takeover from the grass roots to the élite theatre institutions. The ceilidh, where there is an informal social gathering with singing, dancing and storytelling which results in the empowerment of audiences through a new theatre aesthetic has been used by the national theatre companies. In the assimilation it has no political meaning it is a technique and performance choice. When this is absorbed as a method of production in mainstream theatre the political purpose is diluted. These changes in the aesthetic of production have been used as an advertisement for the production and a gimmick which is very often commented upon by theatre critics. It therefore generates publicity. Welfare State's theatrical

practice has often involved using predictable visual images and transforming them, for example, a black crow becomes a bomber, then a cross. This type of scenographic mutability has become a strong part of the mainstream theatre aesthetic. This technique has been used by a wide variety of companies such as Cheek by Jowl where the changing nature of a single object has been used both as an aesthetic feature of the work presented by the company and to facilitate an easily transportable production for touring. Whilst this technique is not owned by companies such as Welfare State in their hands it has a political motive rather than simply an aesthetic one. In mainstream work it is a clever contrivance. Welfare State's work has very overt politics where, "the 'artist' merely serves (not leads) the community in a functional capacity and that necessary images and archetypes naturally and inevitably reveal themselves. It is only because we allow so few people to Dream profoundly in our society that we set up the specialist ARTIST...."[Coult:1983,p.21] This assertion concurs with Appia's belief in the need to provoke the imagination and recognise the use of it as a skill. "The form of the communication becomes part of the problem. Didactic and literal illustration can be counter to a more poetic, intuitive and sensual approach. False polarisations can be induced by the method of simply demonstrating."[Coult:1983,p.22] This description of poetic is very helpful in relation to late twentieth century theatre and scenography which aims to provoke the audience to imagine. It also relates to Brechtian theory of theatre production in terms of the aesthetic presented although not to a theatre of politics. Welfare State list their aims as the, "Power of spectacle whilst not being an opium; working from a painterly perspective; openness of image and music to allow the audience in; ideas of magic and the associated energies of audience and performers - the use of a circle for a performance rather than a square;"[Coult:1983,p.25-28] These features have been previously lauded as part of the touring theatre's brief but travelling theatres no longer need consider the politics of their work now they must make a saleable product. As a consequence of the pressure to find and make a saleable product the type of aesthetic mentioned above has encouraged a wider use of these features of production and they have begun to dominate the market. This has inevitably caused problems for companies like Welfare State and touring theatre companies who originated from a decade of experiment and artistic endeavour into the market place of commercial theatre. In addition one of the major problems for touring companies is that modern theatre buildings are closed systems. Welfare State express some of the problems for their work within this system, "Our research is into nascent ritual (using theatre) as part of a way of living rather than a repeated dramatic production, where theatre is an end in itself....Really we don't make theatre, we use theatre to make magic." [Coult:1983,p.29-30] Welfare State's international intentions are, " To analyse the relationship between aesthetic input and its social context..." "To develop theatre of a poetical and mythical nature that is popular and relevant to communities today."[Coult:1983, p.219] The closed systems of theatre buildings do not provide companies with opportunity for poetry, the context for theatre production in the late twentieth century is the market for that product. The general audience and not the particular. The 'spectacle' theatre of the late twentieth century has aimed to create magic through technology and has diverted from the poetic aims which Welfare State suggest is the end result of spectacle. However, as Welfare State imply, the use of technology alone to achieve spectacle is a vacuous attempt ruled by finance and not an internal aesthetic, which enables the participation of the community and/or audience. The poetic features of scenography and physical theatre that engage the audience's imagination, when repeated in the commercial environment for reasons not relevant to the performance text move the aesthetic of the late twentieth century away from audience engagement and the ideals of Appia.

The frequently fraught relationship of actors and scenography should also be considered. Through the performance theories of the late 1980s, and in the early 1990s Physical Theatre was coined as a term, which could be seen as a backlash against large scale technologically created scenography. This form of performance used contemporary dance and mime to produce often non-verbal theatre which was scenographically simple. Whilst one can see the reasons why there should be a reclaiming of the stage from some of the worse cases of technological clutter, in general theatre technology should not be seen as a negative attribute simply because in some respects it has been used badly. The power of the machine when it is placed on stage to effect can be a powerful performer alongside the actor. The actor whilst able to respond and possibly ascertain a level of performance stability by the reaction and feedback of their audience, cannot estimate the effect of the environment on that audience and in turn the implication of those effects on the actor's performance. Therefore, the effect of the animating technologies with the actor must be explained and understood for its potency in order for it to be a useful device.

Ideas of progressive harmonies of the stage space in which the human spirit can be expressive may be defined as Feng Shui, ad quadratum, or Corbusier's modular system but the central discipline is that all shapes are modulated by the human body. The harmony and exchange of energy which occurs in these spaces can inform the experience and enable the performer. The exchange of energy can help the actor to respond to the audience, and empower the performer to use the captive energy of the audience for their performance. [Mackintosh:1993] Irrespective of whether this philosophy is noted in the theatre building's structure spaces can be changed to aid this kind of confluence through the use of scenography. A sense of the space may be defined by a mystic sense or common sense, depending on our point of view but it is always designed and the physical theatre of the 1990s has added a new dimension to ideas of verisimilitude in theatre performance. In this respect Physical Theatre may be more clearly defined as a theatre which endeavours to portray the inanimate. The heritage of this work comes from such productions as Nicholas Nickleby and An Arabian Night where the actors formed the stage coach from tables, chairs and wicker baskets and an Arabian souk, from material and baskets. This definition of physical theatre animating the inanimate more clearly juxtaposes it as a form with the technology of spectacle, which similarly animates the inanimate in our imaginations.

In The Lady Dragon's Lament by Nona Shepphard, the performer was in control of the scenography and of what was required for the performance in association with the designer, Marsha Roddy, who tailor-made everything to fit the performer. The design evolved over a rehearsal period of three weeks, and followed the actor's preparation and needs through to performance. Roddy and Shepphard who have worked together on many occasions, in a much more formal design process, had to arrest their desire to complete a design before the actor had found what was needed. The scenographic ideas ranged from a large set comprising of the costume of the Lady Dragon and therefore her body, which would have formed the set and the environment, to a much more organic and simple use of two stage boxes in which the whole play is stored, transported and performed from. These boxes gave the audience the change of perspective necessary for the huge dragon and her world. The rest of the set comprised a floor cloth and screen reminiscent of Japanese Noh theatre, which was not used to hide the actor but to present the actor in the space. This was a piece of physical theatre which required the performer to use body shapes and postures to convey activity, location and atmosphere, the literal reality of which was not present. In this form of theatrical performance the audience is engaged as in a poem. The imagination contributes far more to the dramatic text than in a more literal presentation, as a consequence theatre scenography has responded to this change in aesthetic. The similarities between the approaches of physical theatre and the scenography of the late twentieth century to their audience can be seen in the way both texts encourage the audience's imagination. The culture of physical theatre has been absorbed into mainstream presentations and in addition companies which were formed from that perspective like Théâtre de Complicité are noted for their use of this aesthetic. They can be contrasted with companies from the 1970s who came to prominence for their politics of performance. As the RNT and RSC the UK leading national theatre companies become more and more commercial they have two choices; to provide a heritage that is, do the classics, or to have innovative ideas which must attain high production values as the companies must warrant public funding and a commercial standard. Alternative theatre and its original intentions and features of production has itself become mainstream; and as a basic intention alternative theatre companies of the late twentieth century wish to achieve mainstream status. As alternative theatres present work in new ways the form changes but they do not challenge our established views of bourgeois theatre. The companies and performers invariably are looking for success in their personal meteoric rise to stardom and the trend towards minimalist design has come from poor touring theatres - poor, that is, in economic terms; groups and individuals, which once they develop and become part of the mainstream theatre and part of the establishment, take with them their visual ideas of what theatre should be and how it should be designed. Mainstream theatre is now reaping the benefit of workers who learnt their aesthetic in a plethora of young and vibrant companies. Nick Ormerod's 'poor' theatre aesthetic at Cheek by Jowl is the primary aesthetic in the presentation of Martin Guerre (1997) as it was in his design for Peer Gynt (1990) at the RNT. In many ways Martin Guerre is part of Cheek by Jowl's house style. The irony of this low tech scenography used in the West End is that it has in fact the most sophisticated operations system to manipulate the scenic elements to date. [Halliday:1996] In this sense the aesthetic has formed a continuum from alternative to mainstream and commercial theatre production and the techniques and apparatus of operation in this instance, perform, as part of the spectacle of presentation.

The assimilation of theatre practices has now combined to form a rich tapestry into which the audience is woven, as Appia suggested, in order to create the mise en scéne. This attitude to the audience involvement has now become significant as the literary text has taken a more abstract view of human nature. Scenography is often the crucible for performance but the deconstruction of the place of performance through modern theatre theory, has raised the value of the scenography. The importance of the scenography to the production has then emerged from the need for a language of significance particularly originating in the small performance spaces and the variety of touring venues used by the companies of the 1960s and 1970s. As such scenography is now seen as a necessary part of the production process. As Tanya McCallin, one of the designers who worked for Foco Novo suggested, "Design has changed from being the after-thought to being the essential element, beyond the text and sometimes beyond the performance....Design was grossly undervalued before. But now it has taken on such a sophisticated level that the reason for it is not 'felt'. Its there only for its own purpose."[Rees:1992, p.246] In my belief it is there to communicate meaning to the audience, however when it is used badly and without relevancy it can be a meaningless design used for the sale of the goods, usually advertising the production. The mainstream subsidized theatres used 'spectacle' to sell theatre during the 1980s and spectacle became synonymous with the large musicals and in particular high technology spectacular productions. The use of such technologies was enabled by the prosperous 1980s when theatres invested in hardware. It was also aided by directors like Trevor Nunn who moved into commercial theatre from the subsidized sector. This movement of publicly subsidised professional designers into the commercial sector such as, John Napier, Tim O'Brien and Ralph Koltai (all of whom had developed an aesthetic at the RSC) meant they were able to use their ideas on a larger scale. The late 1990s have left a vacuum for new ideas and methods of theatre production as techniques have been repeated resulting in poor 'spectacle', and the production of poor literary texts, which have been hung around technological features. The establishment companies chose to go for 'spectacle' presentation in order to provide them with much needed financ even though physical theatre had proved to be highly attractive as a saleable product with for example productions like Nicholas Nickleby which achieved a number of short runs in the West End all of which sold out.[Rubin:1981] This I believe was a turning point for British theatre which had thus far maintained a clear distinction between the commercial and subsidized 'styles' of theatre and therefore scenographic practice. It is the combination of physical theatre techniques and spectacle theatre in the late twentieth century, which has diminished the status of the literary text and replaced this with a scenographic text that combines to form the dramatic text, or performance text. There have been attempts to capture the dramatic text in literary form with the recent RNT publications of plays they have produced. Although it would be impossible to give a full account of the scenographic activity within the literary text the fact that the RNT have begun to express the text in this way suggests a recognition of the scenographic as part of the dramatic text. This change in the publication of theatre texts also signals a recognition of the democratisation of the process of production, which has gone on during the last twenty years.

In trying to evaluate the role of the performer in the relationship of the performance to the audience we must not deny the influence of designed images even when they seem insignificant. The process of performance is perhaps the area of most relevance rather than the final product. "The intellectual, by contrast, is interested in the road as an activity, but he cannot evaluate it because his imagination fails to show him the goal clearly; he has to wait for it. When the goal is reached, he evaluates the result but loses sight of the road that led to it."[Volbach:1989, p.365] The evaluation of the process and the product through new theories of theatre often imported from other art forms has a relevance to scenography and aspects of its production but not its poetic value within the context of a piece. The poetic of the audience's imagination and their engagement with the art in order to create the mise en scène.

Bibliography

Adolphe Appia, 1922, 'Mechanisation', Part 5, in W.R.Volbach, 1989.

Peter Ansorge, 1975, *Disrupting the Spectacle:Five Years of Experimental and Fringe Theatre in Britain*, Pitman.

Brian Arnott, 1973, 'A Scenography of Light, The Architect and the Emperor of Assyria', *The Drama Review*, Volume 17, no.2 T58, June.

Arnold Aronson, 1993, '100 Years of Stage Lighting: Why We Cannot Light Like Appia', (p46-58) OISTAT Nederland, Lectures held on the occasion of the symposium: *Aspects Of Theatre Lighting Since Adolphe Appia*, Amsterdam, November 27th. Published by Vereniging voor Podiumtechnologie, Opleiding Theatertechniek (OTT) Hogesschool voor de Kunsten, Amsterdam.

Edward Braun, 1969, *Meyerhold on Theatre*, Methuen.

Edward Braun, 1995, *Meyerhold: A Revolution in Theatre*, Methuen, London.

Toby Cole and Helen Krich Chinoy, *Directors on Directing: A Source Book of the Modern Theater*, Bobbs-Merrill, Indianapolis.

Tony Coult and Baz Kershaw,1983, *Engineers of the Imagination:The Welfare State Handbook*, Methuen.

Jane Edwardes, 1994, interview, in Shank, 1994.

Edward Fitzball, 1859, *35 years if a dramatic authors life*, London

Judith Greenwood, 1984, *Am I Lit Here? - An historical survey of the theory and practice of lighting the actor on stage, from the age of gas to the age of electricity*, M.A. thesis Leeds University.

Dick Hebdige, 1991, *Subculture:the meaning of style* , Routledge, London.

Robert Halliday, 1993, 'ShowCAD: The PC Takes Control', *Lighting and Sound Internationa*l, February 1993, p.36-37.

Rob Halliday, 1996, 'C'est la Guerre', *Lighting and Sound Internationa*l, August, p.33-40

Bethany Haye, 1986, 'Les Miserables', *Theatre Crafts*, Vol. 20 no.9.

Ian Herbert, 1995, 'Asleep in the Stalls', *Lighting and Sound International*, Richard Pilbrow

Baz Kershaw, 1992, *The Politics of Performance:Radical theatre as Cultural Intervention*, Routledge, London.

Iain Mackintosh, 1992, *Architecture Actor and Audience*, Routledge.

W.T.O'Dea, 1958, *A Short History of Lighting*, HMSO.

Richard Pilbrow, 1992, *Stage Lighting*, Nick Hern Books.

RNT, 1993, *Platform Papers: 4. Designers Bob Crowley, Jocelyn Herbert, John Napier*.

Roland Rees, 1992, *Fringe First:Pioneers of Fringe Theatre on Record*, Oberon Books, London.

Leon Rubin, 1981, *The Nicholas Nickleby Story: The making of the historic Royal Shakespeare Company Production*, London:Heinneman.

Rudlin, 1986, *Jacques Copeau*, Cambridge University Press

Theodore Shank, 1977, 'The Welfare State Theatre', *The Drama Review*, T73, p.3-16.

Theodore Shank,1994, *Contemporary British Theatre*, Macmillan London.

Lee Simonson *The Stage is Set*, Harcourt Brace Jovanivich, inc. Rev Ed. N. Y. Theatre Art Books 1964, p365-366. &92.92

William Toynbee,(ed.), 1912, *The Diaries of W.C. Macready*, Chapman and Hall, London.

Walther R Volbach, *Adolphe Appia, Prophet of the Modern Theatre : A Profile*, Wesleyan University Press, 1968, edited and translated by Richard C. Beacham.

W.R.Volbach, 1989, *Adolphe Appia, Essays, Scenarios, and Designs*, edited Richard C. Beacham, UMI Research Press.

Rudlin, 1986, *Jacques Copeau*, Cambridge University Press

Theodore Shank, 1977, 'The Welfare State Theatre', *The Drama Review*, T73, p.3-16.

Theodore Shank,1994, *Contemporary British Theatre*, Macmillan London.

Lee Simonson *The Stage is Set*, Harcourt Brace Jovanivich, inc. Rev Ed. N. Y. Theatre Art Books 1964, p365-366. &92.92

William Toynbee,(ed.), 1912, *The Diaries of W.C. Macready*, Chapman and Hall, London.

Walther R Volbach, *Adolphe Appia, Prophet of the Modern Theatre : A Profile*, Wesleyan University Press, 1968, edited and translated by Richard C. Beacham.

W.R.Volbach, 1989, *Adolphe Appia, Essays, Scenarios, and Designs*, edited Richard C. Beacham, UMI Research Press.

Notes

1. Alan parsons *Daily Mail*, 18th August 1931, antedated by J.B. Fagan in 1919, in a paper given to the I.E.S.

2. A memory controlled computer board was first used in Television at Central Rediffusions television studio. The first computer memory board installed in a theatre, was at the Palace Theatre in 1955. See Applebee, 1935 'A Cavalcade of Stage Lighting' - paper to the Illuminating Engineering Society

3. The linking up of units was illustrated to me for Miss Saigon on Broadway in 1991. In the control room a p.c. was used to linked the control for the Vari*lites using an Artisan control board with the Light Palette which was controling the traditional units.

4. Pilbrow talks of the German's finally catching up with the argument in favour of the specialist lighting designer, rather than simply having the director relay wishes to a chief electrician "and is striving to introduce the concept of lighting design".

5. interview with Jane Head, Production Arts, July 1991

Rudlin, 1986, *Jacques Copeau*, Cambridge University Press

Theodore Shank, 1977, 'The Welfare State Theatre', *The Drama Review*, T73, p.3-16.

Theodore Shank,1994, *Contemporary British Theatre*, Macmillan London.

Lee Simonson *The Stage is Set*, Harcourt Brace Jovanivich, inc. Rev Ed. N. Y. Theatre Art Books 1964, p365-366. &92.92

William Toynbee,(ed.), 1912, *The Diaries of W.C. Macready*, Chapman and Hall, London.

Walther R Volbach, *Adolphe Appia, Prophet of the Modern Theatre : A Profile*, Wesleyan University Press, 1968, edited and translated by Richard C. Beacham.

W.R.Volbach, 1989, *Adolphe Appia, Essays, Scenarios, and Designs*, edited Richard C. Beacham, UMI Research Press.