# Guide to Lighting

## Introduction

First of all, this is not supposed to be a comprehensive step by step guide to lighting a show, as this is very subjective area, and there is no right or wrong way to do the job. However, it should give you some idea of what is expected of the LD for a show, what is available to you to discharge your responsibilities, and should be a good introduction if you're never worked in a theatre before.

As lighting designer, it is your job to prepare, arrange and program the lights in the theatre so that the audience can see the show, and also to enhance the drama and visual impact of the show with artistic use of light. To achieve this, you will need to not only liaise with the design team, but also work with the Technical Director of the show to make sure that the show fits together not only artistically, but technically too. You might also need to approach the producer of the show if you need to spend any money on lighting.

## The Script and Evolution of the Design

Start by reading the script, then read it again and perhaps once more. If you're lighting a musical, get a copy of the soundtrack and get to know the songs. Time spent in preparation will be repaid handsomely later on, and there's no better preparation than knowing the script in depth. It is tempting with lighting design to leave it late to read the script and get started on the design in general, but the earlier you start the better the end result will be. Talk to the Director about the play and try to understand what they want to achieve with it. It is extremely important that the lighting design fits with the director's overall concept for the show. Light has the power to control the atmosphere of the entire show and therefore has to be controlled with great care. Talk to the Set and Costume Designers and find out their ideas. Together you form the design team, and in helping realise the director's concepts, it is important to have a completely cohesive design. It is worth remembering that in all these discussions, your opinion is valid too – don't feel afraid to suggest ideas to directors or designers if you can think of a particularly good use of light which will require a change to their plans. This is almost never a problem as long as it is done in advance! You should also keep in touch with the Technical Director who will probably be supervising construction of the set, and with whom you need to liaise to make sure that there will not be any problems when integrating the lighting with all the various other aspects of the show. All "authority" for what goes where on the stage, and the health and safety considerations, ultimately rest with the Technical Director so it is important that you have made sure everything is sorted out in advance.

The set determines what positions you can use for lanterns: side walls block out any sidelight for example; lots of flown set will restrict the bars you can use for lights on stage. Also the colour of the set and costumes will have a profound influence on your choice of gels (pieces of coloured plastic used to colour the light).

If you desperately want to use an angle that's blocked by the set then you may be able to negotiate a change in the set design. Similarly if you have a good idea about an LX practical (light fittings on a wall that light up, or a glowing fire-place) talk to the Set Designer and the Technical Director.

Aim to assemble a rough cue list, and have an idea of the colours, angles and intensities of light that you need to light the play a couple of weeks before the get-in. This gives you time to think carefully about the lighting plan before you draw it and to obtain any extra equipment or sundries (e.g. gel) you might need. If lighting a show at the ADC Theatre, the purchase of gel and gobos must be done through the Theatre Management - the Theatre will often pay for these items (if they are not too specialist), thus lowering your show expenditure.

Meet the Director again to finalise a cue list, and then see the Stage Manager so that he / she knows where the lighting cues are to run. Have them marked to the nearest word or appropriate place in the music so that they run in the same place every night. This is often done during a 'paper-tech' session.

# Venue

There are many venues in Cambridge (and obviously many, many more outside Cambridge, on tour, or at the Edinburgh Fringe etc) and each one presents unique challenges and opportunities. Venues can range from professional standard, such as the ADC Theatre and the Art's Theatre, (which is a fully professional venue) to more austere venues, such as the Corpus Christi College Playroom, the Octagon or any one of the many other college venues! Clearly the venue for the show will effect the scope and the challenges of the lighting design process, as in venues with lots of lanterns and lots of control channels the scope will be very large and the challenge will not only be artistic, but also logistical in terms of putting up a large complex rig in the time available. In smaller venues, the challenge is to make a little go a long way, and making the show look great even if you only have 12 lights to do it with! A lot of people feel that they really learn things by doing shows in smaller venues as it gives a chance to try new things out; after all, if you have experimented unsuccessfully and need to re-rig because the design didn't work, you've only got 12 lanterns to move and refocus... This would be nigh on impossible with a rig of 80 lanterns in the ADC Theatre.

Notwithstanding this, most of the practical information given in this guide relates venues such as the ADC Theatre, as most of the Club's shows are staged there, and it is the most complicated student venue in Cambridge. All the smaller venues are simpler than this, and therefore, this guide should contain most of the information needed for that as well.

# Equipment

Obviously to light a show, you need some kit. All lighting systems, no matter how simple or complex, are broken down into the following components: Power; Control; Distribution; Rigging; Lanterns.

## Power

Obviously every light you have in the rig uses power, and the brighter you turn each one on, the more power it uses and the more current it draws from the power supply. Each 500W lantern will use about 2.2A, each 1000W lantern will use about 4.4A, and as a rough rule of thumb, you can power 2500W (2.5kW) from a 10A dimmer supply.

Most dimmer outputs have a 10A output, although make sure you know what the capacity of your dimmer channels are BEFORE you turn the lights on, otherwise the fuses will blow, or worse! Some dimmers can handle more than this too – for example there are eight 5kW channels at the ADC Theatre for large lighting loads in addition to all the 2.5kW channels. Look here for more details about dimming arrangements at the ADC Theatre.

Each dimmer pack requires a power supply too. In many venues, the dimmers are hard wired into the mains with an adequate power supply to run all the dimmer channels, but if you have to connect the cables yourself, make sure that you are aware of how much power you can use from that socket. 32A will power about 6kW, and 63A will power about 12kW, so you need to be aware of this when designing your wiring and lighting plans.

Different sizes of power supply use different kinds of connectors.

# Control

You need to have a way to turn the lights on and off, and this comes under the heading of "control". There are two basic elements in the control system, the lighting desk and the dimmer packs. The lighting desk is used by the lighting designer or technician to set up the lighting states as appropriate, and it then signals electronically to the dimmer packs which turn the levels indicated on the desk into voltage levels to power the lights.

There are many different types of lighting desk, ranging from small, manually operated six channel affairs right up to all singing all dancing, fully electronic, computerised lighting desks which can control hundreds of dimmer channels, along with intelligent lighting and so on. The ADC Theatre has one of the latter types, in the shape of a Strand 520 console. But no matter how big or small the lighting desk, the function is still the same, to have the lighting state entered into it, and have it turn the dimmers to the desired levels.

There are also many types of dimmer units, which vary in number of channels and power. They all do the same job however, which is the take the signal from the lighting desk, and then turn it into a voltage which can power the stage lantern. Dimmers come in various portable and hard wired guises; on the portable front there are basically two common sizes, 3-channel units, which run off a 13A plug and can power 1000W per channel (13A = 3kW, approximately) and 6 channel units, which run either off 32A, in which case they can supply 6000W maximum at any time, or 63A in which case they can power 12kW. Hard wired dimmers come in all kinds of shapes and sizes, but as they are installed already, they are just used as they are. The ADC Theatre has around 130 dimmer channels in total (fixed and portable). Click here for more information. All of these are run from the 520 console.

To use a lighting desk to drive dimmers, obviously electronic signals need to pass from one to the other. There are many ways to do this.

The first and most intuitive of these is ANALOG, which means that the lighting desk outputs a voltage between two reference voltages, which is then "scaled up" by the dimmer packs. There are three or four different standards of analogue control, so make sure your desk and dimmers are compatible

There are several common electronic control formats, of which D54 and DMX are the two used at the ADC Theatre. D54 is an analogue, multiplexed format which is used in the ADC theatre for dimmer control, while DMX is a fully digital format, used for applications like intelligent lighting and strobe control. If you want to use portable dimmer packs in the ADC Theatre, controlled by the lighting desk, ask someone to show you how to connect into the D54 system.

# Distribution/Patching

Most venues have a patching system which allows you to route any dimmer output to pretty much anywhere in the lighting rig. This is achieved simply by having 15A sockets on the lighting bars, and then having these sockets connected to 15A plugs in the patch bay. The dimmer outputs are then terminated in 15A sockets in the patch bay too, and by plugging a 15A plug into the 15A socket, that dimmer output will be routed to that socket on the lighting bar.

In addition to using the patching system it is sometimes necessary to add extra channels onto bars, this can be done using extra pieces of cables known as "TRS" which stands for "Tough Rubber Sheathing", and this term is used to describe 15A extension leads. If you have lots of channels that need extending, individual pieces of TRS would not be economical, and multicores become attractive. The most common kind of multicore is Socapex, which carries 6 channels at once.

# Rigging

The lights are held up by the rigging (and the verb "to rig" describes putting them up) which can take many forms, ranging from a single light on the top of a single stand to a system such as the ADC Theatre's, which has Internally Wired lighting Bars (IWBs) which are supported on counterweight flying system (a system where you load the bar, and then fill a counterweight cradle with the same amount of weight so that they balance, and it is possible for a single person to lift very heavy weights of up to 250kg). It is important that the rigging you use is capable of carrying the physical weight of the lights being used – on lighting stands, there will usually be a rating for a certain load, and if using fixed or hung bars, these systems will have a Safe Working Load (SWL) to which they have been tested, and beyond which they must not be loaded. All equipment used to support either lights or scenery above a stage must be load rated.

Most lighting bars are 48mm scaffolding, made either from aluminium or steel, and lights are fixed to them using hook-clamps (if the bar is horizontal and the light is being hung underneath) or boom arms (if the bar is vertical and the light is being held out to one side) These can either be plain scaffolding bars to which you need to run the power using extension cables, or might have cabling run inside them, and sockets on the side so that the light can be plugged straight into the bar.

In the ADC, there are a number of fixed lighting bars and an electric winch bar front of house, and on-stage there are two permanently fixed lighting booms (lighting bars that run vertically and then need boom arms) and four IWBs which are supported on the counterweight system.

# Lanterns

The final part of our lighting system is the lanterns. There are lots of different types of lanterns, and even more models, so this section will just describe the major types.

## Fresnel Spots

These are quite simple lights, which give a very soft, easy to blend light. They can be recognised by their stepped lens (which is called the "Fresnel lens", hence giving the lamp its name). They come in a large range of sizes, and are often used for front-washes. They need to be used with care in front of the proscenium arch, as the soft nature of the beam makes it hard to eliminate spill. Fresnels have two means of beam control; making the spot tighter or wider, or using "barn doors" (four shutters mounted in front of the light) to block off parts of the beam.

## PC (Pebble Convex)

PC spots are quite similar to fresnels, but with a different lens design. The back of a PC lens has lots of smooth bumps on it, rather like pebbles! They are still easy to blend, rather like fresnels, but give better beam control, which makes it easier to eliminate excess spill.

## Profile Spots

Profile spots are quite different to fresnels and PCs – they can be focussed to a sharp edged beam, and the beam shape can be very tightly controlled using "shutters" (which are metal blades which you use to interrupt the light beam inside the lantern) Standard profile spots have just one lens, and a fixed angle (meaning the beam angle at which they form a sharp beam) unlike "zoom spots" – see next section. using "gobos" which are either metal discs with shapes cut out or glass discs with full colour images.

## Zoom Spots

Zoom Spots are just like profiles except they have TWO lenses, which when moved accordingly relative to each other can change the beam angle of the light, meaning that unlike profiles, they can have hard edges at a range of beam angles, making them much more versatile and useful for gobo projection, as you can change the beam size while still keeping the image sharp. Follow spots are usually derived from zoom spots, with various additions.

## ParCans

The optical system is crude, giving no beam control except rotation of the lamp in the body of the lantern, hence rotating the oval beam of light it produces. There are different lamps available which give different beam angles (basically wide, medium or narrow).

The most common light in theatrical use is the Par64 (64 stands for the number of eighths of an inch across the bulb, so this is 8 inches) which is a 1000W light source.

## Floodlights

Floodlights have perhaps the simplest optical system, comprising a lamp and a reflector. New floodlights tend to have linear lamps, whereas older lanterns sometimes have round lamps. They produce a lot of light, because the optical system is so simple, but it means that you have almost no control over where the light goes!

## Miscellaneous

There are two main types of stage luminaire not yet described, those being ultra-violet lanterns and strobe lights. Ultra-violet light makes fluorescent things glow brightly, and makes teeth look purple... It can be produced either by strip lights (rather like normal fluorescent tubes) or by UV "cannons" which are more like normal floodlights, except they have a UV lamp. These UV cannons take a few minutes to warm up, so that's always something to bear in mind when using them.

## Automated

It is probably worth mentioning that there are a huge number of different types and models of automated lights, which are lanterns which move, change colour, project things and so on. They break down into two basic types, however:

Scanners – these are lights where the chassis stay still, but they have a mirror which reflects the beam in different directions.

Moving head lanterns – on these, the whole lantern rotates to point in the direction desired.

Both kinds of lantern are now very sophisticated, able to change and rotate gobos, vary beam size, vary beam focus, change colour, do various pretty effects with prisms and so on. They are not often used in amateur theatre because of cost considerations, but there are occasions when they can add enormously to the look of a show. They can look awful though, as well as taking ages to set up, so even if you can afford them, consideration is needed before using them.

## Practicals

The final kind of light used on stage are those that look like props or bits of set – these are called "practicals". They will normally take the form of lights hanging on the wall, or standard lamps etc. Often you'll need to change connectors or use adapters to power practicals, as they very rarely come with 15A plugs!

# Plan

When you reach this stage, it's time to get hold of an up-to-date lantern list and a stage plan from the venue management. For shows at the ADC Theatre, you can use the drawing board and stencils in the ADC Theatre technical office. For most shows an A3 lighting plan should suffice - it is certainly easier to photocopy and distribute at the get-in; though for larger designs you may wish to use an A1 plan.

It is good practice, especially for larger rigs, to draw your lighting plan onto film (tracing paper). You lay it over the top of the stage plan, and then only draw the information which is important; so you draw the lighting bars which you are using, which counterweights they hang off, the proscenium

arch etc. so that all the key information is there without having the rest of the clutter which isn't important to the lighting design. The lanterns are then marked onto the plan (it is very important to use the right scale, as it will give you a good idea of how many lanterns you can actually fit onto a given bar!) When drawing the plan out, it is very important to make sure that you include the bar centre lines and metre marks, as well as a key of which symbol represents which light so that the lights actually end up exactly where you want them. The plan is the main source of information during the lighting get in, so make sure that it is well drawn and contains as much information as possible. The more information you can get onto your plan, the fewer questions you will be asked by those doing your rigging! Lanterns will be marked with their channel number, gobo number (if they have one) and gel number on the plan, and it is important to make sure that it is clear which means which. A common system is to mark the channel number BEHIND the lantern, the gobo number in an octagon and the gel number in a circle, both in front of the lantern, although there isn't a fixed convention in use at the ADC Theatre. Just make sure that you explain how it is notated in your key. If you haven't done this before, you might find it easier to get in touch with an experienced LD and ask for their advice. It is also common practice to mark any non-standard cabling onto your lighting plan so that all the information is in one place.

If you are sufficiently ahead of time, the plan should be drawn some ten days in advance of the get-in. If lighting a show at the ADC Theatre, you will need to tell the management as soon as possible which lanterns you expect to use so they don't accidentally hire them out - technically they need to know two weeks before the get-in.

It is the responsibility of you and your Production LX to ensure there are people to run the lighting board during performances, so if you would like some nights off, make sure you enlist people do it, either by putting a sign-up list in the Clubroom or by getting an e-mail sent out to the techies list.

# Paper Tech

Many shows have a meeting between the Director, Technical Director, Sound Designer, Lighting Designer and Stage Manager (sometimes more people, depending on who has to be there!) when the lighting cues, sound cues and set movements are entered into the Stage Managers "Book" (which is a copy of the script with all the information needed to run the show written in it) so that the SM will know when to call the cues during the performances. Paper techs are not compulsory, especially on smaller shows with only a few cues of any kind, but on bigger shows with many lighting cues and set movements it has proved very problematic to have missed out a papertech. Then, during the shows, the stage manager will cue everyone from the Book, so that different operators can be used if necessary who do not know the show.

# Some design tips

This guide isn't meant to tell you how to light a show, as the best way is to learn through experience, but there are a few tips which might be useful for the uninitiated.

## Washes

The word "wash" is used to describe a general lighting state across the whole stage (or divided into sections across the width of the stage). Generally there might be a couple of front washes in different colours, and then a back wash or two.

## Colour

The ability to choose and use colour is probably the most powerful tool for a lighting designer. It is impossible to give a guide to which colours to use when, as it depends on the set design, costumes, mood of the play and individual lighting designers. Try to see what colours other people use and develop on their ideas. Also, try colours out; either with a swatch book of gels and a mini-maglite, or with a proper stage lantern. The only way to learn is though practice – you'll probably make some colour choices you don't like, but at least then you will know better for next time.

## Followspots

Followspots are essentially large zoomspots on a stand designed for hand operation to be used to follow actors during the show. They vary in design, size and power, but all operate on the same principle. You can add gels to followspots to change the colour of the light to match the rest of the design or the costumes, and many people think that using a layer of "frost" (a slightly diffusive media) makes the light look better on stage.

## Light direction

Almost as important as colour is the direction from which the light is coming. Very long books have been written about lighting design, and this guide is not trying to emulate this, but you should be aware that the direction the light comes from has huge potential to change the look of a show – as a couple of examples, if you light someone from below, it looks very strange, and slightly eerie; if you light someone from directly in front, their face looks very flat and boring. Aside from experimentation, you can find more information in the books on lighting design in the ADC library.

## Gobos

Gobos potentially have a key role to play in your lighting design. Again, as with everything, working out the best way to use them is something that comes with experience, but they can add hugely to the atmosphere and feel of a show. For instance, light slanting through "bars" can give the idea of being caged or jailed, and using a soft break-up gobo across the whole stage can give the impression of walking though a leafy glade.

## Masking

Most stage designers, lighting designers, directors etc want the lights to be concealed, and this is what masking is for. This isn't always the case; sometimes a director wants to see everything on stage as it is, the back wall of the theatre, the lighting bars and so on, but this is rare. Masking usually takes the form of wide but not very high black cloths, which are hung to block the line of sight from the audience to the lanterns, but not to block the light from the lantern. You should get an elevation of the stage of your venue, draw your lighting positions onto it, and then see where you can hang the masking in order that the lanterns cannot be seen.

# Get in

Once the design is finished, it just remains to get the lights up, coloured, focussed and plotted. For most shows, especially at the ADC Theatre, you will have held a "gel call" before the get-in weekend, and then the work starts in earnest during and after the get-out of the previous weeks show.

The LD won't have time to do everything, so you should choose a Production Electrician to be your assistant during the get-in. The Production Electrician will lower the LD's work load, and act as an invaluable second pair of hands during the get in. If you're interested in getting involved in lighting, taking the role of Production LX is a great way to get to know the ropes, as you will work with, and learn from, experienced LDs.

## Gel Call – gel trolley, gel ordering, gel cutting

The LD and the Production LX should perform the Gel Call. This is where the gels and gobos needed for the lighting rig are gathered together. Pre-cut gels are stored in the "gel trolley" which lives in the Green Room, and usually you will find what you are looking for in the pre-cut stock. The ADC Theatre keeps stock of Lee 100 – 200 gels, plus various others. If you don't find what you want in the gel trolley in the Green Room, you can cut it from the gel store in the roof void (please ask someone how to get there if you're not sure).. Please ask the Theatre Management about how gel is labelled and filed, and ask to be shown how the gel guillotine is marked with the relevant sizes. If the colours that you want aren't in stock at the theatre then they can be ordered for you; if lighting a show at the ADC Theatre, the purchase of gel and gobos must be done through the Theatre

Management - the Theatre will often pay for these items (if they are not too specialist), thus lowering your show expenditure. If your show is elsewhere, all the gel you need can be hired from the ADC Theatre pre-cut stock. When gathering your gels together, it will help the later stages of your get-in of you sort the gels into those needed for each bar, and then put them in a folder, or wrap a piece of paper round them, so that when you come to gel a bar, you just need to pick up a set of gels specific to that bar.

# Overnight – grid shift and rigging

Most of the rigging of lanterns will be done overnight, some during the later stages of the previous week's show's get out, and then the rest during the first phase of your get in. Typically, the incoming show's LX team will take over the de-rigging (and re-rigging) of the lighting positions front of house while the TD of the outgoing show is organising the dismantling of set and de-rigging of the lights above the stage. Once the TD hands the stage over to the incoming team, the get-in starts in earnest. Normally the first thing that needs to be done is a grid shift, where the lighting bars, curtains, masking and so on are moved to the required places in the grid. This is something that you should never attempt to do unless you have been trained to do it – it has potential to be very dangerous. Normal shows will require six or seven people to do a grid shift easily; smaller teams (down to about four) are workable, but it takes much longer. For big grid shifts, a larger team might be needed. If you've not got enough people on your own overnight team to do this, the outgoing team will often stay for an hour or so to get the grid shift done.

After the grid shift, once all the lighting bars are in the right places in the grid, the rigging above stage starts. It is always much easier to do if you have a few photocopies of the lighting design (or parts of it) so that each person can have their own copy of the plan to work from. After the lights are hung in the right places they should be patched, where the lighting circuits from the lighting bars are plugged into the appropriate dimmer channels. By the end of the overnight rig, the bars should be in the right places, with the right lights on them, the lights should be gelled and patched into the appropriate dimmer channels

## Focus

After having gone home for at least eight hours, the LX crew comes back in to finish the patch, troubleshoot any problems not solved overnight (blown lamps, inexplicably non-functional lighting channels) and then start the focus - where you will go through every lantern in order to point, focus and shape the beam of it appropriately. For the focus you'll need the help of the Production LX and probably one other: someone up the tallescope with hands on the lantern (possibly you), someone to wheel the tallescope around the stage and another to operate the rigger to control the lanterns. You may need pieces of set to be moved to the correct positions so that you can focus lanterns accordingly and may also want someone available to walk the stage so that you can see how the light falls on them.

Don't be afraid to demand some quiet time on stage during the focus; you're entitled to be able to give instructions from the top of a ladder without having to shout over the noise of power tools on stage; it's dangerous if your crew can't hear you properly.

## Plot

After the focus, you'll need to plot the show into the lighting desk. It's generally best to let your Production LX run the lighting board for you while you sit in the auditorium with the director. For the plot you'll probably desire an empty auditorium (no noise!) and possibly a volunteer to walk around the stage so you can see how the light falls on people. It's hard to give guidance of how to plot: don't panic! The simplest way to start off is to build some groups on the lighting board, and then use them to construct basic states with which you're happy. Finally, plot the scenes in order, thinking carefully about how the changes between states will work. You can always tweak the states during the tech and dress rehearsals until they match your expectations, when you have the set, costumes and tableaux before you.

With the ever advancing pace of technology, it's now possible to do an off-line plot. You can

download the same software that runs on the lighting board (Genius Pro if it's the Strand 520 at the ADC) from the Internet and run it on your PC in college. This means that you can prepare some elements of your lighting plot in advance of the get-in, which can save valuable time. It's debatable how useful this is, given that you can't see the lighting states you're generating, but you can get a reasonable head start just by giving all your cues text labels and times and by plotting some groups.

## Technical Rehearsal

The technical rehearsal is the chance for the technicians to run through the whole show with the cast in place, making sure that the lighting cues are in the right place, making sure that the set movements will work in the time available and so on. The technical rehearsal will almost never run from start to finish in one go – each time something doesn't work as it was supposed to, the tech. will stop, and that cue or sequence of cues will be repeated until it goes right. The progress of the technical rehearsal is controlled entirely by the Stage Manager – if you are unhappy with how the lighting is going, you should ask the SM to stop the tech so that the cues can be altered in the SM's Book, and then try it again. A tech for a typical show might take up to twice as long as the show itself, with very complex shows sometimes taking longer still. During the technical rehearsal, the LD will normally sit with the director in the middle of the auditorium with the LX running the lighting board, so that as LD you are free to discuss the progress of the show with the director, and make notes about any re-plots you need to do.

## Dress Rehearsal

The dress rehearsal is the final run through of the show before the opening night, and the aim should be to run the whole show with no stops, exactly as will be the case on the opening night. The LD should be taking further notes about what might need changing before the first real performance, but unless something goes badly wrong, the show should go on. And changes to the SM's Book should be given as notes afterwards, and if you want to re-plot any states or change the fade times, this should be done afterwards.

# Performances

For the performances, running the lighting ought to be a simple matter, especially if the venue has a memory desk, and as such, the LD and LX can take it in turns to operate the lighting board, or even get others to do it. No knowledge of the show is strictly needed, as the cues will all be written in the SM's Book, and the SM will call all the cues as the show goes along. Even if neither the LD or the LX is actually operating the show, however, one should turn up in order to do a rig check (check that the lights are all still working, and all still focused) before each show.

# Get out

Normal procedure for the get-out is to strike the set and de-rig any unusual lighting positions, like any stage booms or ladders that you've put up. In the ADC Theatre, the on-stage bars and the standard front-of-house lanterns are left for the next week's show to deal with, except for de-gelling the on-stage lanterns. Once the stage, dressing-rooms, corridors and yard are all clean and tidy, it's time to go to the bar for a well-deserved drink!

# Conclusion

The process of lighting design is extremely complex and there is only so much that can be written about it in so few pages. This is only an introductory guide and your skills as a lighting designer will continually develop with experience and by seeing how others go about it. For further reading, look in the ADC's library where there are a number of interesting books.