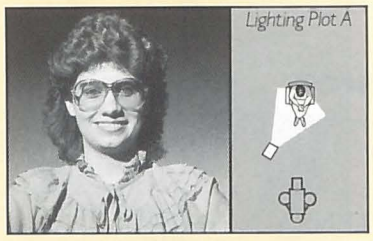
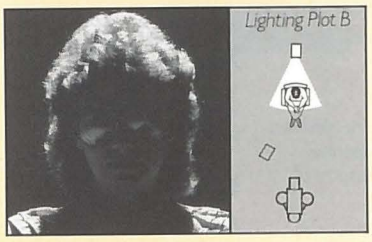
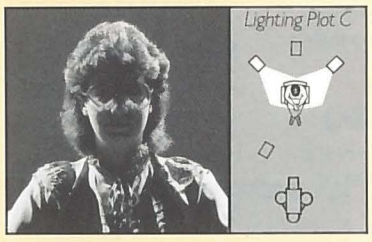
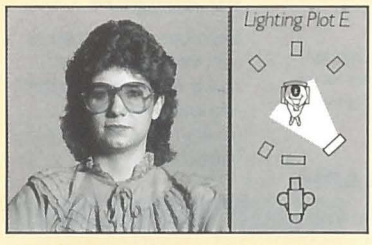
GENERAL LIGHTING

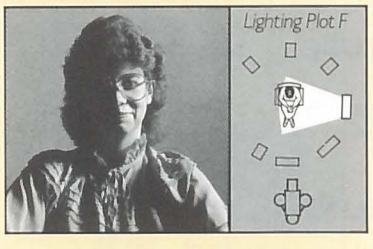

Lighting Plot A


Lighting Plot B


Lighting Plot C


Lighting Plot D


Lighting Plot E


Lighting Plot F


Lighting Plot G

THEORY

To help the reader it will be useful to examine some of the properties of light and how light behaves.
Lighting in its most basic form consists of sunlight and light from the sky. Most of our lives we see fairly well balanced lighting created by the sun and sky. An instance of unbalanced lighting are the pictures from the 'Apollo' moon shots where only the sun provides light and the pictures are of high contrast due to the absence of sky or 'fill' light.
Light always travels in straight lines, but it can be deviated by reflection, in mirrors, etc. and more importantly, it can be refracted when passing between air and glass. All lenses rely on refraction to focus rays of light, either in a camera or, more relevant to this booklet, in a luminaire.
Light is modified by reflection and, in general, the TV camera is responding to that reflected light. This modification by reflection is important because it gives the shape and texture as we view the scene. We are also very much concerned with the colour of the light sources. Sunlight and incandescent lamps behave in a similar way because they are black body radiators. What is a black body radiator? Imagine a piece of black metal being heated: first it glows deep red when it is radiating mainly in the red end of the spectrum, through white heat to an intense blue at the far end of the spectrum.
The balance of the colour temperature depends mainly on the relative amounts of red and blue, the colour temperature being expressed in Kelvin units, which are based on Celsius units, starting at Absolute Zero or −273 Celsius. Thus the medium red of an electric fire is around 2000K; in other words about 1737C.
Sunlight, which tends to red, is 4800K; a blue cloudless sky is about 10000K upwards. We normally use a mixture of both sun and sky; standard European daylight is around 5600K. The best way of understanding the range of light is to think of incandescent lights of 3200K as a pale pinkish white and daylight as a pale bluish white. We, of course, never see it that way because our brain takes care of the colour difference. The television camera can be lined up to accept incident light over a wide range, but if lined up for 3200K will reproduce daylight of 5600K as a slightly blue picture.
Some sources in use today, namely the discharge sources, such as fluorescent and mercury or sodium street lights, are not black body radiators and emit light in several narrow bands. Although strictly speaking these devices cannot have a colour temperature, they can have an equivalent which is called the correlated colour temperature. Much research has been done to improve the colour rendering properties of discharge sources and the HMI and CID lamps are good examples of modern lamp technology.
It is evident that we require light when working in the studio but on what parameters is the lighting based? There are several factors which dictate how lighting is applied.

i) There is a minimum quantity of light required that will enable the camera to work successfully. This is computed from the level of illumination required on the pick-up-tubes to give a good picture with allowances being made for the camera's optical system.
ii) The scene and action (day, night, sun, dull etc.)
iii) The angles and distances of the lights to the subject.

We must remember that the sun gives us almost constant illumination irrespective of where we are. Our distance to the sun (150,000,000km) is much greater than relative distances between objects or people. With our local light sources we have to take into account the inverse square law, which states that the light falls off at a rate determined by the reciprocal of the square of the distances, i.e., double the distance and we get one quarter of the light.
A picture can be obtained by illuminating all parts of the scene in a uniform manner, but the results are flat and uninteresting, e.g. a dull overcast day!
One reason for the disappointing result is that television is a two-dimensional system, unlike human vision which gives us three dimensional images. The human eye allows us to see shape, form and depth. For television, we have to create depth and this can only be achieved by lighting in conjunction with the subject matter. It is important to realise that it is not the light that creates the picture, but the shadows created by the light. An object uniformly lit would have no substance or shape. In the studio we can create the illusion of day or night, interior or exterior. One other aspect of lighting is to create atmosphere; having satisfied the technical requirement, we can use our lighting to stimulate emotion. Where a bright feeling is required, low contrast lighting together with fairly bright colours may sometimes be used. Where a sombre atmosphere is required high contrast lighting is employed, creating dark shadows and possibly only picking out the main points of interest. (Orson Welles' film – "Citizen Kane", is the supreme example of highly dramatic lighting).
From experience we can draw conclusions that the sun is a relatively small source (in area) of light and creates hard shadows; on the other hand the sky is a large area of illumination and creates very soft shadows, if any at all. Sunlight at dusk becomes diffused by dust in the atmosphere and this softens the effect a little. At dawn the atmosphere is free of dust and this results in hard light of high contrast. The mood created by light is affected by the colour of that light. Direct sunlight at mid-day is yellow and in the evening it becomes red (due to the scattering of blue light by dust in the air). The sky tends to let red light pass outwards and reflect blue light back to the earth. A subject lit by sunlight will appear warm, whereas if lit from the north sky, it will tend to take on a cold appearance.
As we will now find out in television our sun will be the spotlight and our sky will be a softlight.

PRACTICE

BASIC LIGHTING

The following descriptions apply to the lighting of people; however, it will be readily appreciated that all objects can be treated in a similar way and thus any picture is built up.

Illustrations and diagrams of Lighting Plots A,B,C,D,E,F, and G are on the left of this page.

The Key (A)

Why do we call it the 'key' light? Because it is the principal light and tends to be the key to the whole picture; it establishes the mood and character of the picture, and generally is capable of producing acceptable results when used on its own – it does not however contribute a great deal to the depth of the picture. The key tends to be used at a vertical angle of 30° but can be within the range of 20° to 45°. The range of horizontal incidence that gives satisfactory results is within 45° either side of normal. When the horizontal and vertical angles of incidence are both approximately 30° then usually good results are obtained. Typical light levels are 1000-2000 lux.

Backlight (B&C)

The backlight is used to enhance separation and depth; the angle of backlight to the subject should preferably not exceed 45° in the vertical plane and can be varied more than the key. It is more difficult to get a good backlight angle in the television studio due to the fact that the subjects have to be positioned quite a long way into the studio and this is generally impractical. The ratio of intensity of backlight to key light is generally 1:1 but strong backlight can sometimes be effective in creating mood and drama. Twin backlights are usually advantageous for subjects with long hair.

Fill light (D, E & F)

Fill light is often regarded as a base light upon which the modelling is built. Certainly the cameras have to have a definite level of light to work well, but it is found that modern cameras tolerate high contrast scenes extremely well, and base light does not have the importance that it did in the past. It is much better to light the scene and artists for effect as individual items built to a total, rather than flood the area with soft light and then add modelling keys.
Fill light also tends to be thought of as a soft source and, in general, is the most useful. This is not necessarily true for all situations. It is often found that a side hard light gives a very satisfactory result and spill light from keys is often carefully controlled to do just this.
A point to be borne in mind is that soft light is not shadowless light and the position of the soft light is most important. It is used generally to reduce the contrast created by the key light. The soft light has a level of approximately 500 lux.
A soft light used from the front can be used to control contrast but not often used in television. A soft light at 45° to the subject, would give a double key effect. A soft light from the side, used with our 30°/30° keylight gives the best result as you will see from our final illustration. When all the lights have been built up (Plot G) the final result can be very pleasing.