
Light Pollution – a growing world-wide problem

Robbie Yates

Uncontrolled light intrusion into the atmosphere, homes and streets is becoming a world-wide problem. This effect, known by several different names – spill light, light trespass, light intrusion, light pollution – has become of such magnitude that two international organisations – the International Astronomical Union (IAU) and the International Commission on Illumination (CIE) – have appointed special committees to investigate the matter and to jointly submit recommendations for overcoming or, at least, reducing the problem. Both organisations have committees in South Africa and have recently held discussions with the objective of defining the problem locally and co-operating with the international bodies to assist them where possible.

Who are the major sufferers from this intrusion? Firstly, light trespass into the atmosphere is causing major problems for professional and amateur astronomers. Many of their finer instruments can no longer be used

as a result of the increased ‘skyglow’. This means that observatories and other organisations working on space investigations are having to move further and further from populated areas at enormous expense and inconvenience.

Secondly, light intrusion is affecting more and more people. It enters their homes at night, causes glare situations on roads with resultant accidents, destroys the night time vista of our cities, obliterates the natural appearance of our countryside and reduces the visibility of the stars in our night sky.

Where does this light pollution come from? There are six major sources of light spill:

- public street lighting
- lighting from vehicles, particularly cars
- floodlighting of buildings and advertising signs
- floodlighting of sports stadia
- security floodlighting
- lighting from building interiors

Research in San Carlos, California, has shown that although the majority of people assume that the problem originates from street lighting, this is not strictly true. A survey carried out in that area showed that the upward light component from the street lighting contributed 14 per cent to the sky glow, the contributions from the other outdoor lighting amounted to 86 per cent. In the same way, light intrusion into private property and the problem of glare to motorists in the streets was to an even greater extent due to outdoor lighting installations other than street lighting.

Many general proposals have been made to contain this problem. These include the screening of the sources and the use of monochromatic light sources, such as low pressure sodium lamps, which can be filtered out by special procedures in observatories. The latter recommendation does however create a major problem to our environment. The virtually pure yellow light from these lamps totally destroys the appearance of the environment and of people in the area. All colours of trees, shrubs and plants are obliterated and the appearance of people under these sources is anything but complimentary. The lamps are widely used, especially in Europe, because of their high efficiency – lamp lumens per watt – and are therefore cheaper to operate.

But is this the sole consideration? The majority of people want to live and move about in attractive and pleasant surroundings at night and therefore there is a need to preserve the environment and preserve or enhance the appearance of all objects around us. Low pressure sodium lamps can remain in areas such as motorways and for security lighting around buildings, where their efficacy is of high financial importance but their

use in other areas is highly debatable.

With street lighting the main problem is with fittings utilising deep refractor bowls with a comparatively high upward lighting component. The 'cut-off' types with flat glass covers direct a greater amount of light downward onto the road surface and far less into the sky or into adjacent properties.

What then can be done about the problem? To many people lighting an object or an area is merely a case of 'putting up a globe!'. This is very far from the truth. To light an area properly is a highly technical procedure and requires the expertise of properly qualified engineers. Far too frequently we see sports stadia where incorrect types of floodlights have been installed in the wrong positions and at incorrect mounting heights. The utilisation of the light from the lamps is therefore totally inefficient – often more than 50 per cent goes into the sky and into surrounding areas. Does the buyer realise that he is paying for this spill light by having to buy additional floodlights to achieve the light-levels he wants and that he is paying for the electricity consumed to create this unwanted light spill?

A lot of work to combat this problem is still needed, particularly from the lighting profession. The negative effects of light trespass can be reduced to a very large degree by proper lighting design but unfortunately at present there is insufficient awareness on the part of the purchaser/user of the importance of controlling light obtrusion. There is therefore an obvious need for further research by, and education of, the lighting professionals to apply improved design methods. Quoting from an article from Dr D A Schreuder, an international promoter of considerable esteem in the matter of light control, the following needs to be carefully con-

sidered by all people dealing with light:

‘Authorities who order lighting installations and have to pay for them, must be convinced of the need to spend some extra money by employing qualified designers in order to preserve nature and to free people from the nuisance of light trespass. The industry should be prepared to make greater effort in properly designing lighting equipment (both light sources and fittings including electrical gear and optical elements). Other specific interest groups must also be involved, particularly architects and urban designers, with consumer organisations and with environmental protection organisations’.

The North American Illuminating Engineering Society recently published a concise description of the task ahead for all involved in outdoor lighting. This was given as follows:

- continue to support research to develop a comprehensive system for predetermination of light requirements for the effective performance of visual tasks

- encourage the development of specifications for outdoor lighting that recognise the possible adverse effects of stray light on the environment and make provisions for control
- continue efforts to co-operate with the astronomical community in the development of lighting practices that protect observatory sites from light pollution.

To this can be added:

- seek means whereby light obstruction can be legally controlled by public authorities.

In South Africa, the Institute of Lighting Engineers and the South African National Committee on Illumination have already made contact with the Astronomical Society of Southern Africa and with overseas organisations and it is anticipated that with the help of the community at large, recommendations regarding light control can be locally researched and the results published. We owe this to our environment and to all the people who regard this environment as an important part of our lives.