

Dark skies for all

Mark E Bailey reports from the Sixth European Dark-Skies Symposium, held in Portsmouth on 15 and 16 September 2006.

The Sixth European Dark-Skies Symposium threw a spotlight on advances in a rapidly developing interdisciplinary field. The subject encompasses not just the physical and technical aspects of outdoor lighting, and its obvious impact on astronomy (e.g. Mizon 2001), but the social, environmental and ecological effects of the phenomenon as well. In England and Wales, light pollution has been recognized as a statutory nuisance.

The conference contained a fine array of scientific and technical presentations, all of which are now available on the internet (Mizon *et al.* 2006), and was noteworthy also for the hospitality and enthusiasm of the organizers. Evening visits to the South Downs Planetarium (Chichester) and the Hampshire Astronomy Group's suite of telescopes in Clanfield were greatly appreciated. And with opening and closing speeches by MPs Lembit Opik and Robert Key, it is evident that the subject has a growing political profile.

The tone was set with an excellent introductory overview by John Mason, highlighting points that were discussed later in more detail. Noting the advances since he first spoke on light pollution some 15 years ago, his main message was that the issue is now at a crossroads. Great strides have been made in the past 10 years, to the extent that the "battle" for people's hearts and minds is finely balanced. However, more needs to be done if we are to obtain dark skies for all and retain the benefits of a source of inspiration that has led people towards science and a scientific way of thinking for thousands of years. Whereas many people are able to recognize, at least when they are pointed out, the worst excesses of light pollution, we still have to overcome the "novelty factor" of being able to make night as bright as day.



1: An example of poor church lighting in Malvern, illustrating sky glow, glare and the effects of light waste shining uselessly into space. (C Baddiley, taken from CfDS Image Library)

ABSTRACT

More than 100 people including members of the British Astronomical Association Campaign for Dark Skies (CfDS), representatives from local and central government, lighting professionals, environmentalists, astronomers and journalists, met in Portsmouth for the Sixth European Dark-Skies Symposium, on 15 and 16 September 2006. The meeting covered the adverse impacts of light pollution on various fields, for example health, the environment and the economy, as well as astronomy. With support from the Campaign for the Protection of Rural England, the publication in 2003 of a comprehensive report by the House of Commons Science and Technology Committee, and the recent rise in energy costs, light pollution has become a subject of growing public concern. Professional astronomers have an important role to play in commending the argument for a return to darker skies.

Most people, for example, probably do not think about lighting at all, just installing random lights as they see fit; others install light-polluting external lights simply "because they look nice". Some, such as the architects who quite literally "flood" buildings (and their surroundings) with light, should know better. Their efforts with new lighting technology often swamp the very architectural features they seek to display.

By bringing light pollution into the public domain, the largely amateur astronomical community has performed a significant public service.

The CfDS website (<http://www.britastro.org/dark-skies/>) holds a wealth of detailed information and links to other material. Moreover, as the subject has matured, so the small minority prepared to "lobby for their hobby" has been joined by a growing number of other special-interest groups. These embrace subjects as diverse as the ecological effects of excessive lighting; the legal implications of light pollution as a statutory nuisance; and the social and environmental costs of the wasted energy.

Many people realize, for example, that when they illuminate their homes with up to 1 kW of so-called "security" lights, they are burning money. Perhaps they can afford to waste up to £500 per year? But how many understand that in the course of a year the additional CO₂ pollution emitted in producing the wasted electricity is equivalent to driving the family car halfway to Australia?

The problem

Light pollution is light in the wrong quantity, in the wrong place and at the wrong time. It is responsible for the sky glow around our towns and cities; the light nuisance or "trespass" in our gardens; the glare in our eyes; and light waste. In the words of Martin Rees, the Astronomer Royal: "You don't need to be an ornithologist to want to be able to see some birds in your garden, and you don't need to be an astronomer to want to be able to see the stars... The night sky is part of our environment – indeed the only part that has been experienced, equally, by all cultures at all times."

The overwhelming majority of people nowadays, perhaps even some astronomers, have never seen a really dark sky, nor a shooting star, nor even the Milky Way. This creeping *dispossession* of our night-sky experience has caught many unawares. But there is a rising tide of opposition.

John Mason captured the mood well: “Light pollution is all about quality lighting for everybody... it is very much an environmental issue.”

Health and environment

Some speakers highlighted the impact of light pollution on health. It can cause rifts between neighbours, and lack of sleep can bring increased stress and irritability. The suggestion that too much night lighting may cause cancer is more worrying. The CfDS website provides links to studies that suggest that exposure to light at night can disrupt the body’s production of melatonin and so increase an individual’s risk of developing oestrogen-related malignancies, such as breast cancer. This is another rapidly growing area of research, but the precautionary principle would suggest removing lights wherever possible.

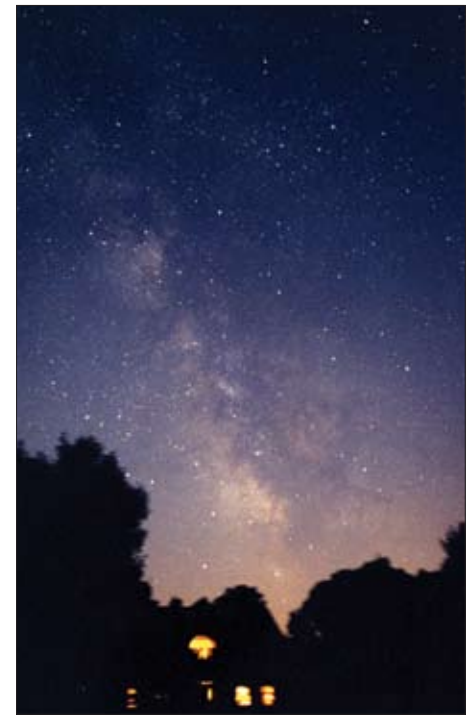
But bright lights can have a violent effect on health, as when the glare from an inappropriately directed “security” light dazzles a passing motorist. In at least one reported case (Dryden 2002), the resulting accident caused the death of a pedestrian, and in law the lighting engineer who installed the light could be liable in contract or tort for an unsuitable or dangerous design.

However, while lawyers and some academics may rejoice in the employment possibilities provided by this new field, light pollution remains a menace. It is responsible for the loss of the tranquility and visual amenity of the countryside, and to a blurring of the distinction between town and country. It seriously damages the rural idyll.

The environmental impact of light pollution on flora and fauna is well documented. Outen (2002), for example, noted how night lighting can critically affect the behaviour of birds, plants and mammals. The dawn chorus of thrushes is influenced by a critical light level; some plants, exposed to a brief flash of light during darkness, can cease to flower; and in mammals the changing length of the day, influenced by artificial lights, can affect the reproductive cycle and peak body weight during autumn fat deposition.

Similarly, Henshaw and Cliff (2006) have highlighted the increasingly severe effects of light pollution on the number and diversity of insects, and hence on birds and other creatures higher up the food chain. In the meeting, Alex Pollard (University of Cardiff) presented some fascinating results from her PhD thesis on the effects of artificial lights on the behaviour of robins. In Northern Ireland, the installation of a new lighting scheme on the seafront in Newcastle, Co. Down, was recently discovered to have had a disastrous effect on the migration of salmon and sea trout up the River Shimna. Fish don’t like bright lights! Here the law of unintended consequences damaged the very tourism “product” that the scheme was intended to promote.

These examples demonstrate the wider impact of light pollution. Although quantitative studies of the ecological effects of light pollution are in



2: Comparison between two views looking towards Toronto, Canada. The left image shows the usual view, dominated by sky glow; that on the right shows how many more stars are visible from the same location during a power cut. (T Carlson, taken from CfDS Image Library)

their infancy, the subject has already become a goldmine for environmental research (e.g. Rich and Longcore 2006).

Economy

Trying to make night as bright as day comes at a high price. Indeed, with sharply rising energy costs, everyone is aware of the problem. In a recent poll in Essex, 83% of respondents expressed support for the introduction of “curfew lighting”: that is, turning external lights off when they are not needed (e.g. from midnight to 5 a.m.). The annual savings to the ratepayer were around £1 million per year. In Northern Ireland, 23% of domestic electricity costs are attributable to lights. There are considerable potential savings if lights are used only when necessary.

What next?

Martin Morgan Taylor (de Montford University), stressed that the new Clean Neighbourhoods and Environment Act is a step in the right direction. But it must be strengthened if the continuing growth of light pollution is to be stopped. The present law is poorly drafted and has too many exclusions. The opening speaker, Lembit Opik MP, offered the scientific community a possible way forward. To help change the law, participants were urged to spend 10 minutes writing short letters to their MPs, arguing for additional statutory controls on light pollution. Robert Key MP made a similar request.

As the constituency of parties involved in light pollution has grown, so the subject has become a “calling card” for astronomers. It provides a vehicle for education and outreach, and a reason to contact decision-makers at all levels to con-

vey the importance of astronomy and related scientific issues.

Eighty years ago the French Nobel physicist Jean Perrin (1870–1942) wrote: “It is indeed a feeble light that reaches us from the starry sky. But what would human thought have achieved if we could not see the stars?” Similarly, Robert Key emphasized the unique cultural importance of access to dark skies, fully half of our nighttime field of view. It is the one part of our environment that we have shared with all cultures in all periods of human history, and is a key part of mankind’s cultural inheritance. Professional astronomers have an important responsibility to advance wider public understanding of science; the BAA Campaign for Dark Skies should be widely and strongly supported. ●

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