Getting Night Lighting Right

Taking Account of Nocturnal Urban Uses for Better-Lit Cities

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Translated from the French by Oliver Waine

Innovation in contemporary urban lighting has increasingly been driven by issues of sustainability. While environmental concerns focus attention on energy savings and reducing light pollution, taking account of how people use public spaces is important too, as artificial light can then be adjusted to actual needs. Following the pioneering work of Roger Narboni and Luc Gwiazdzinski, Samuel Challéat and Dany Lapostolle make the case for dedicated nocturnal city planning.

While the contributions of artificial lighting to urban convenience, safety and aesthetics are widely accepted, its negative effects have also been highlighted since the 1970s: amateur astronomers, doctors (Stevens 2009) and ecologists (Hölker *et al.* 2010; Gaston *et al.* 2013), for example, all question the merits of urban lighting (Challéat 2010; Collectif Candela 2017). This controversy over artificial lighting, which opens it up to wider environmental and health issues, is supported, broadly speaking, by two currents. On the one hand, "environmentalists" defend a comprehensive and cross-cutting approach to the nighttime environment:[1] in their view, artificial light is a form of pollution that not only alters the natural "dark night" but also affects living species. On the other, "technicists," who support a sectoral approach, describe the problems raised by artificial light as "nuisances" (Challéat and Lapostolle 2014). In both cases, urban light is described in terms of nuisance, or even pollution, in the same way as air or water pollutants, whose harmfulness must be measured (Knop *et al.* 2017). This reflects the shift from a functionalist conception—i.e. the segmentation of space by urban-planning experts into zones dedicated to housing, employment, traffic, leisure, and consumption—towards a sociotechnical approach to urban lighting, which adapts lighting techniques to the multiplicity of uses in the city (Lapostolle *et al.* 2016; ACE 2017). This approach fits in perfectly with the logic of urban projects, the production of which is open to multiple actors in the city—urban planners, users and residents alike (Comelli 2015). We show here how taking account of the many different uses and appropriations of nocturnal space forms part of a new way of producing the city and designing urban lighting.

The limitations of lighting master plans

The field known in French as *urbanisme lumière* (literally "light-based urban planning," but perhaps better expressed in terms of its key tool, lighting master plans) emerged at the end of the 1980s as a movement critical of functionalist lighting in cities. This kind of planning seeks to

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[1] The notion of the nighttime environment emerged in the 1990s and comprises all objects, phenomena and systems (human or otherwise) associated with the night. Damage to the nighttime environment can take various forms: sociocultural (access to and enjoyment of dark skies, i.e. where stars and other celestial bodies are visible), environmental (systems affected by artificial light, biological rhythms, etc.) or health-related (disruption of circadian rhythms in humans, endocrine disruption, etc.), for example.

incorporate a qualitative dimension in order to show off architectural heritage to best advantage and create nocturnal atmospheres and nightscapes, while ensuring safe urban mobility. Several metropolitan areas and medium-sized cities (Île de la Cité and the Seine Rive Gauche[2] development in Paris; Nantes in western France; Amiens and Cambrai in northern France), which wished to enhance their buildings and urban nightscapes, have adopted a lighting master plan (in French: *schéma directeur d'aménagement lumière*, or *SDAL*). This nonbinding planning document serves to guide lighting policies in the medium term (15 to 20 years). It is a strategic diagnosis of existing diurnal and nocturnal developments, taking into account the historical, geographical, economic and social contexts of the city (Narboni 2009; Fiori *et al.* 2009). In the best cases, rates of use of different spaces by residents are analyzed on a district-by-district basis. While, in principle, lighting plans differ from urban planning and zoning plans, as they involve a greater diversity of actors, they are nevertheless the subject of recurrent criticisms: too inflexible; too costly; and they target areas rather than populations and the diverse uses these populations make of the areas in question.

In the early 2010s, local-authority budget cuts in France and pressure to meet energy-transition targets placed new constraints on urban lighting. As a result, an increasing number of cities have been reducing or switching off public lighting at certain times of day and/or certain times of year.[3] These quite radical decisions can hurt local populations; instead of illuminating less, we need to think about how to illuminate more effectively.

"Getting lighting right" using knowledge of cities' nocturnal characteristics

The noctural characteristics of a given area—in French, *territorialités nocturnes* (literally "nocturnal territorialities"), understood as the daily practices and uses *at* night and *of* the night (Raffestin 1988; Deleuil 2009; Mallet 2013; Collectif RENOIR 2015)—need to be known before thinking about lighting. The participation of residents—not statistically standardized "typical" residents, but actual residents—should be sought through field surveys, participant observation, questionnaires, and public meetings (of varying degrees of formality), so that they can describe their needs and uses in this regard. With this knowledge of the diversity of nighttime uses, lighting professionals can then use flexible technological solutions to provide lighting that meets users' needs as closely as possible—and, in the process, comply with new French regulatory measures to reduce public lighting (in particular, the environmental laws known as the *lois Grenelle*).

The example of Toulouse illustrates this point well. Like many other metropolitan areas, it has its own technical department dedicated to public lighting; unlike many other cities, however, Toulouse has decided to use lighting to enhance and embellish the urban environment. In March 2009, the city launched a dynamic lighting experiment in the central neighborhood of Saint-Étienne, close to the city's cathedral, which makes it possible to vary the brightness when a pedestrian walks past.[4] Other innovations in the field of urban automation, such as an energy-producing sidewalk connected to a streetlight,[5] are presented as showcase projects. These prototypes form part of a wider sociotechnical approach whereby lighting strategies take account of the practices of residents and users.

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[2]   In 1996, the Seine Rive Gauche development was officially renamed Paris Rive Gauche. This neighborhood is located on the banks of the Seine in the east of the 13th *arrondissement* of Paris and includes the Bibliothèque François-Mitterrand (the main site of France's national library). The Île de la Cité is the island in the very center of Paris that is home to Notre-Dame Cathedral, the Conciergerie and other major monuments and public buildings.

[3]   The online platform *NuitFrance* has identified 2,168 municipalities (out of about 35,000 in total in France) that turn off streetlights for at least part of the night and for at least part of the year: www.nuitfrance.fr/?page=extinctions&partie=liste-communes (in French).

[4]   See: www.cleantechrepublic.com/2010/09/16,/luci-villes-eclairage-public-durable (in French).

[5]   See (in French): http://ecologie.blog.lemonde.fr/2010/04/14/a-toulouse-un-trottoir-produit-de-lelectricite.

The city's technical departments organize night walks that complement the physical measurements of the lit areas (color temperature, luminance, street-lighting uniformity ratio, etc.[6]). These walks allow them to modulate and adapt lighting by noting participants' comments, reactions and impressions. Armed with these various datasets, the public-lighting department illuminates different areas of the city according to their levels of activity at different times of day and night, as illustrated by this excerpt from an interview with a public-lighting manager at the city of Toulouse:

> Good lighting is complex. Because we're dealing with human beings, and you have to understand how they think, human beings, you have to understand how they live. […] "Getting lighting right" means identifying real needs; it's the "who, when, where, how and why." Once you get real, honest answers to these questions, you can get lighting right. *Who* are we illuminating: tourists, vacationers? Old people? Small children? A school? A rear exit from a cinema or the cinema's front entrance? *What*: am I illuminating a function, a political function, an industrial function, a factory parking lot, the exit from a factory car park, or a public square? *Where*: on the banks of the River Garonne or a quiet corner at the other end of the city? […] Lastly, *when*: that's the most difficult question today. […] We know how to answer everything else, but when it comes to "when," we have a little more trouble. When do we light up the city? Well, when it's necessary! Today, we switch the lights on when it gets dark and switch them off when it gets light. And in the middle of the night, what do we do? This is something we're asking ourselves! Today, we're asking these questions; previously, we never used to—that's already an improvement![7]

A similar experiment was carried out in the Grenoble urban area, in consultation with the population of the suburban municipality of Crolles. Over a period of 10 months (February to November 2015), the town's residents were heard at public meetings, where they were able to express their fears and expectations regarding the switching-off of public lighting during certain hours (from 1 a.m. to 5 a.m.). Questionnaires on the experiment and night walks were conducted to determine the needs and habits of the population.[8] Behavioral changes relating to the safety of nighttime walking and cycling, as well as advice concerning domestic lighting, were also discussed at public meetings. This approach enabled residents to overcome certain anxieties linked to the darkness resulting from the switch-off (in particular the idea that the lack of public lighting would encourage crime), and was also an opportunity to disseminate scientific knowledge on health and the environment. Following this period of experimentation and consultation, changes were made to the hours during which streetlights would be turned off: they are now switched off from 12.30 a.m. to 4.30 a.m. on weekdays and from 2 a.m. to 6 a.m. on Saturday nights/Sunday mornings. Among other planned developments, sensor-controlled lighting is an option being considered in certain neighborhoods.

A paradigm shift in the production of urban lighting

The shift from planned lighting to an area-based approach is a low-key development that seems to signal the beginnings of a change in the way urban lighting is produced. In particular, taking into account an area's specific nocturnal characteristics means partially moving away from technocratic prescriptions of what spaces should be, by giving back a role to do-it-yourself approaches with a view to adding other knowledge and experiences—i.e. other than those of experts—into the mix. This is essentially a form of democratization of urban planning which, in addition to defining space

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[6]   For more information (in French) on these characteristics and measurements, see "Notions simplifiées d'éclairagisme": https://renoir.hypotheses.org/1364.

[7]   Interview with a public-lighting officer at Toulouse city council, conducted on February 26, 2014, by the authors as part of the CÉPYMAC (Ciel Étoilé des Pyrénées et du Massif Central – Dark Skies of the Pyrenees and Massif Central) program coordinated by the MSHS-T (Maison des Sciences de l'Homme et de la Société de Toulouse – Toulouse Center for Human and Societal Sciences).

[8]   See (in French): www.ville-crolles.fr/vues/pages/la-mairie/grands-projets-eclairage-public.php.

in terms of the production of figures and procedural standards, takes account of actual uses and experiences of the city—practices that are sometimes difficult to objectivize.

This change in approach, supported by a number of lighting designers and specialists,[9] will only be possible, however, if academics and professionals alike are willing to explore new *ad hoc* investigation methods in order to comprehend the different ways in which different people experience the city.

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9   For example, in 2016, ACE (Association des Concepteurs Lumière et Éclairagistes – Association of Lighting Designers and Specialists) published a manifesto titled *Manifeste des concepteurs lumière pour des projets d'éclairage raisonnés* (available, in French, at the following URL: www.ace-fr.org/wp-content/uploads/2016/05/MANIFESTE-numerique-francais.pdf). In particular, they defend the enjoyment of twilight and darkness, respect for geocultural markers, and placing users at the center of lighting projects.

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