

The Dark Art

During the last few years, there have been a number of independent voices within the lighting design profession who have encouraged the use of darkness as a positive facet of lighting design. These independent voices attempt to redefine our understanding of light and darkness, presenting new lighting design philosophies and innovative technical methods that are inclusive of light, darkness and shadow.



Chris Lowe



Philip Rafael

From this background, The Dark Art group has emerged as a movement which has provoked a growing on-line discussion where professionals from many different backgrounds gather to develop and exchange ideas. The group, which is headed by Philip Rafael and Chris Lowe, has grown significantly in the last two years and now numbers 400 members worldwide.

This year, in anticipation of creating a consensus concerning the positive aspects of darkness, The Dark Art will host an open discussion with a panel of invited guests at PLDC 2013 in Copenhagen. The PLDC committee has offered The Dark Art a double slot session within the conference programme on 2. November at 16.45 to be chaired by Philip Rafael and Chris Lowe.

Guests on the panel include Eduardo Gonçalves, Edward Bartholomew, Paulina Villalobos, Koert Vermeulen, and Christopher 'Kit' Cuttle. During the discussion, the panellists

will have an opportunity to communicate their respective opinions on darkness in the form of a concise opening statement. This will be followed by an open moderated discussion with the panel members and the audience, and concluded with an assimilation of concepts encapsulated in the form of a manifesto. The Dark Art also plans to provide a vision of the 'next-steps' to open the possibility of further development on various platforms and further meetings to wider audiences on this topic.

Philip Rafael is an active lighting designer and Associate Director for the Shanghai-based consultancy, Studio Illumine. He commits a significant amount of his spare time to developing the lighting design profession through article publications, lectures, teaching engagements and international seminars. Alongside The Dark Art activities, he was recently appointed Director for Sustainability of the PLDA, where his

primary objective is to move away from a sole focus on energy efficiency and to humanise sustainability through the concept of Sustainable Development.

Following an early interest in architecture, Chris Lowe was drawn to the lighting profession because of its refreshing balance of art and science. Since joining the multi-disciplinary design practice BDP, he has worked on a wide range of large-scale projects. Along with co-authoring articles for PLD magazine, Chris has presented at Euroluce, guest lectured at IED Madrid, and been involved in award-winning projects such as Guerrilla Lighting. Chris was recently appointed head of the BDP lighting team in the Manchester studio.

Together, Philip and Chris co-founded The Dark Art in 2011 and were shortlisted for the Professional Lighting Design Recognition Award as 'Best Newcomer' that same year.

Edward Bartholomew is recognised as an early thought leader within the international darkness movement. From his first publications in 2003 he has given voice to the utility and beauty of designed darkness in his writings and talks. Edward supports a holistic approach to design that is based on composed luminance including darkness.

Eduardo Gonçalves is currently finishing his PhD in "Adaptive Lighting as an Approach to Urban Lighting Design". Through his work, Eduardo attempts to understand the thresholds of lighting and darkness that allow users to maintain their sense of security, visual comfort and orientation in night-time urban spaces, by considering adaptive lighting.

Paulina Villalobos grew up in the Atacama Desert and therefore has a strong personal relationship with clear, dark and star-rich night skies. After gaining experience in Ger-

House of Stone by architect John Pawson in the "Think Tank" exhibition in Milan, 2010.



many, Japan and Sweden she returned to Chile to set up the design practice DIAV. Paulina is the founder of Noche Zero, a movement whose goal it is to create a broader awareness of light pollution and the importance of dark skies, and to enhance communication between the experts in the field.

Koert Vermeulen is a lighting designer working in stage, event and architectural lighting. He is the owner and director of the design practice ACT in Brussels, and he and his team work on projects in all parts of the world. In all his work he shows immense sensitivity towards the use of darkness for effect.

Christopher 'Kit' Cuttle has a vast experience in lighting research and consultancy and is currently a visiting lecturer at the Queensland University of Technology. Kit has made important contributions to the lighting community through his books and research papers. Kit's

most significant contribution is possibly his work on Perceived Adequacy of Illumination (PAI) where he proposes a radical change in indoor lighting standards where Mean Room Surface Exitance (MRSE) would be the specified lighting criteria.

On the following pages these panellists summarise their main ideas on the topic of darkness and its role and significance as a design tool.

Journey to Darkness

Text: Edward Bartholomew



The first time that I heard about darkness in lighting design was when I worked for a lighting designer who mentioned this concept to me during one of our project charrettes. The project was a residence with exposed beams and natural finishes throughout. Being a young designer steeped in both theatrical design and architectural design my instincts were to compensate for these dark finishes by adding more and more light. Soon I had reached the point of visual saturation, no longer knowing what I was lighting and why. When I showed Novella Smith, my mentor and employer at the time, she said that when she speaks with architects she often mentions the need for darkness in her designs.

I was familiar with the concept of darkness from reading Jun'ichirō Tanizaki's seminal book "In Praise of Shadow" in graduate school, but as a young designer I was unable to translate those ideas into my lighting designs. In 2003 I wrote a short article for the IES magazine Lighting Design & Application called "In Defense of Darkness". This article was a naive exploration of the importance of darkness from an experiential and artistic perspective that relied heavily on Eastern thought:

We put thirty spokes together and call it a wheel: But it is on the space where there is nothing that the utility of the wheel depends.

We turn clay to make a vessel: But it is on the space where there is nothing that the utility of the vessel depends.

We pierce doors and windows to make a house: And it is on these spaces where there is nothing that the utility of the house depends.

Therefore, just as we take advantage of what is, we should recognize the utility of what is not.

Lao Tse (604BC)

The utility of darkness or planned designed darkness was still an abstraction to me. But this idea continued to develop, even when I was employed at an academic lab that concentrated on daylighting. In this academic position I sought less poetic justifications for incorporating darkness in design.

As a Research Assistant Professor at the University of Washington I was able to fully develop the concept of designed darkness through research, interviews and documented case studies.

In 2007 I applied to give a talk on Designed Darkness at the 2008 LightFair. This talk was rejected. So I continued to research the many ideas around darkness which included rereading Tanizaki's book. Upon this reading I discovered aspects of Tanizaki's writing that were racist, especially toward African Americans.

"Thus it is that when one of us goes among a group of Westerners it is like a grimy stain on a sheet of white paper. The sight offends even our own eyes and leaves none too pleasant a feeling.

We can appreciate, then, the psychology that in the past caused the white races to reject the colored races. A sensitive white person could not but be upset by the shadow that even one or two colored persons cast over a social gathering."

Jun'ichirō Tanizaki:
In Praise of Shadows.

Here was a Japanese man writing before World War Two about the impact of western modernization on his country, and yet he felt it necessary to express these repulsive ideas. How could I embrace his influential concepts when they contained these poisons? And why didn't anyone else notice this? Perhaps,

due to the fact that I am an African American and a Lighting Designer, gave me the unique perspective and determination to grasp and articulate these concepts around darkness.

The next year I applied again to speak at the 2009 LightFair and was finally accepted. I now had a platform to speak about darkness, and had amassed a considerable amount of research from a wide range of sources. But I now had to structure it all into an hour and a half talk to an audience of skeptical design professionals. I was resolute to explore all aspects of darkness in design including evolutionary, cultural, psychophysical, philosophical, energy and case studies documenting measured darkness.

My darkness talk was called; "Exquisite Darkness: a designer's guide to a richer, more sustainable visual palette" and it was based on three questions: "If we could light every surface in a space with light with no penalty for energy, should we? Should visual tasks be the only determinant for how we light or don't light a space? Should we only add light so that we don't get sued for accidents that may or may not happen?" These questions were based on the concerns of designers that I spoke with about darkness as a design element, and they were the frame for this talk. But in order to explain darkness to my audience I had to first provide a context. I developed a model of lighting as a building system that measured lighting's visual criteria against its energy impact. This model provided a holistic context for light that transcended the divisions of daylighting and electric lighting. Within this context I was able to redefine darkness as an attribute of a balanced visual criterion. But what do we mean by darkness? I confronted the negative Western connotations surrounding

Thermal Bath in Vals, CH
Architect: Peter Zumthor
Photo: View, Fernando Guerra

the word "darkness" in order to objectively redefine darkness as:

- ⇒ A subjective term for a perceived reduction in lightness and brightness
- ⇒ Encompassing the concepts: shade and shadow
- ⇒ A unique perceptual dimension of space
- ⇒ A set of unique characteristics that distinguish the qualities and visual experience of darkness from brightness
- ⇒ A quality of vision.

Once this foundation for darkness was established, finding historical examples, artistic explorations and architectural theorists who confirmed the utility of darkness in the built environment fell into place. Steen Eiler Rasmussen's book "Experiencing Architecture" (Rasmussen, 1992) was one of the first to assert that architecture lies in the senses. In his book he concludes that even natural light can be artistically controlled.

This is possible due to the adaptability of the human eye, which makes variation in the quantity of light insignificant, but the quality of light of paramount importance.

"Light's value is diminished by uniform illumination, becoming shadowless and dead..." Architect and phenomenologist Juhani Pallasmaa has written extensively about how architecture is experienced and decries the "ocular-centric" nature of today's architecture. In his essay "Hapacity and Time" he writes: "... architecture has turned into an art form of instant visual image...Flatness of surfaces and materials, uniformity of illumination,...Our buildings have lost their opacity and depth, sensory invitation and discovery, mystery and shadow." (Pallasmaa, Hapticity and Time, 2008) My



research led me to understand the process of visual adaptation and how spaces could be designed as a sequence of adaptive progressions.

I also found a way to measure not only darkness but the luminance of a space using High Dynamic Range (HDR) photography. This allowed me to quantify the visual experience to learn what is required for a balanced visual experience. This was also a way to develop case studies that mapped the distribution of luminances, identifying the role of darkness in a space. These case studies helped designers better understand the function of darkness and encourage a holistic approach to visual problem solving, an approach that is not based solely on lighting, but on the totality of visual experience including darkness.

This talk was developed to give designers a better understanding of the utility of darkness, so that they could then create richer, more balanced visual experiences. Instead of adding more light to eliminate darkness, designers could allow natural variability, including darkness, to occur. Through the designed use of darkness in all of its forms, designers would be able to satisfy a wider range of human visual experience, including the yearning for depth, mystery and splendor. I

am now at a different phase of my lighting career; working for a leading utility, focusing on energy efficiency. Even though I do not primarily design lighting, my new role is to develop targeted financial incentives that enable energy effective lighting design. In this new position I educate energy professionals about the inherent value and efficiency of quality lighting design.

And I assist in the market transformation of lighting by encouraging architects and lighting designers to design holistically, becoming responsible for the entire visual experience through the planned use of light and dark.

"It is necessary to return to the point where the interplay of light and dark reveals forms, and in this way to bring richness back into architectural space. Today, when all is cast in homogeneous light, I am committed to pursuing the interrelationship of light and darkness. Light, whose beauty within darkness is as of jewels that one might cup in one's hands; light that, hollowing out darkness and piercing our bodies, blows life into 'place'."

Tadao Ando, Architect (Ando, 1993)

Edward Bartholomew, LC, LEED AP, IES Commercial Lighting Program Manager for National Grid Waltham, MA, USA, responsible for researching, promoting and incentivizing new energy efficient lighting technologies and strategies that ensure the best lighting practices and outcomes. I am currently developing incentives for smart LED lighting, advanced lighting controls, direct fees for lighting design and functional daylighting.

Designing a methodology for the use of adaptive lighting in urban spaces

Text: Eduardo Gonçalves



Psychological darkness

Darkness is a tricky subject to deal with in lighting, even if it is an integral part of light. Paradoxically, growing research into the circadian system (Burnett, 2011) shows the extreme importance of darkness in the management of our vital biorhythms and general well-being and yet clashes with our collective fear of the dark. Darkness is perceived as the psychological "evil twin" of light. Not surprising if you consider the long story of bad PR that darkness has had since the beginning of man. Although today we can see better "from the trees", let's not forget that for thousands of years man's only light source was the sun, a good night of full moon and, eventually, fire. Although darkness is a very important part of our undeniable relationship with earth's natural cycle (Ferreira, 2008), in a very fundamental way it is natural to be afraid of the dark, of the unknown and every creature (small or large) that lurks in the darkest shadows of the night, leaving this residual collective memory in our DNA. Point being: there are several other aspects – from psychological to economic – to our acceptance of darkness, beyond the simple need

to see an obstacle or perform a task. Examples of this can be found in the discrepancy between what was considered as "correct light level" by the illuminating engineers in the UK in 1911 and what is now quoted for the same task of reading standard print: 30 lux to 300 lux, respectively. As Christopher Cuttle describes, "it is nothing to do with the speed and accuracy with which people are able to detect the critical detail of a visual task. It is a matter of meeting people's expectations..." (Cuttle, 2011).

Light and shadow as space builders

Perceived light has been typically considered as the "brightest area" and it tends to be the "focal point" of our attention (Flynn & Subisak, 1978). Although true, it is not the only aspect of light. According to Merete Madsen's (2006) concept of light zones, it is more appropriate to refer to light as being all the different levels of shadow in between light and darkness since that represents, by far, the largest portion of the overall light in a space. In other words, perception of our surroundings is the contrast threshold between full brightness and darkness.

This not only makes conceptual and observational sense: this physiological aspect has been the subject of several studies, starting with Dr. Mark Rea's Relative Visual Performance (RVP) (1986), which was further tested and developed with Dr. Peter Boyce (1987). One important aspect of this model is gaining an understanding of the wide range of adaptability of the human visual system to various thresholds of contrasts. Following these arguments, it becomes evident that it is fundamental to our perception of space that we understand how to control contrast as a visual space

builder, rather than creating a perfectly uniformly illuminated surface (Bartholomew, 2011).

Research-through-design

As part of a larger conceptual approach (Gonçalves et al, 2012), we propose developing a user-oriented methodology that can be used as a tool to support the design process: the use of adaptive lighting solutions that address users' well-being (sense of security, visual comfort, spatial perception and aesthetic), optimize the user-space relationship as well as energy use in the night-time urban space.

Given the complexity of the human perception system there are no current instruments (digital or analogue) that can compete with the human evaluation of light. Following the logic of Cuttle's Perceived Adequacy of Illumination concept (2010), and using a subjective appreciation approach (Flynn et al, 1973), cross referenced with quantitative data collection and questionnaires with semantic differential scale (Flynn et al, 1979), we expect to achieve something closer to the "true" nature of users' preferences of lighting for a specific exterior space based on their well-being.

Concept

The supporting concept of Non-linear Uniformity (Gonçalves et al, 2012) has been devised. This encompasses the dynamic configuration of a group of light characteristics (light level, colour temperature and light distribution), proposes shifting from the current concept of space uniformity (as described in lighting standards such as CIE 115:2010 or EN 13201) to a local uniformity, having the user/observer position and field of view as the point of reference rather than the space as a whole. The underlying idea is to create the

illusion of lighting constancy. This means providing light only in the vicinity of the user (Haans, & de Kort, 2012) and adapting it in real time, ensuring the user feels safe and comfortable with a fraction of the light in a regular non-adaptive lighting scheme.

Three light distributions were determined to limit the lit area to a 15, 30 and 60 metre radius with the observer at the centre. These radii are based on the field of view (FoV) of the observer and the concept of Prospect-Refuge (Appleton, 1975) (Fisher & Nasar, 1992) that determine the average action radius for a person to react to an event and Zones of Proximity (Hall, 1966) that determine the minimum safe distance for identifying a human face given a certain amount of light.

The light level variations threshold for the fully lit and "non-lit" areas – 17 lux (100 per cent), ten lux (65 per cent) and five lux (30 per cent) – were determined by considering the ability of the human visual system to adapt to a wide range of visual sizes, luminance contrasts and illuminance levels (Boyce, 1987) (Gibson, 1986). Given that colour temperature also plays a role in the perception of the amount of light as well as of visual and emotional comfort, a three-scale variation was considered of 3600K, 4500K and 5400K (Gibbons, 2012). We hypothesize that this approach can help the design of more tailor-made and flexible lighting solutions for a specific location/user. We hope to be able to test this method in a northern European country for geographical comparison.

How

The hypothesis is being tested through two correlated multi-variable tests: exterior real-life

scale experiment (Lindh, 2011), (Haans & de Koert, 2012) (in a representative group of pedestrian streets and square in Arraiolos, Portugal) and its digital simulated version (Pont, 2011), (de Kort, 2003), (Bishop & Rohrmann, 2003). Both are similar in format and content. Equipment-wise, we installed 25 dynamic white luminaires, a DMX controller and a 3D simulation model of the test site and lighting conditions, displayed through video retro-projected

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(2 x 1.1 metre canvas) rendered scenes and animated walkthroughs (Patrick, et al,) (Inanici, 2001). The digital tests are carried out through a custom-made application that supports an interactive visualization.

Each participant is asked to perform two tasks for both test types: first, freely adjust the three light characteristics to the settings that he or she "considers to be the most adequate, taking into account one's well-being", followed by a

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questionnaire. Secondly, do a walkthrough of the chosen scenario, again followed by a questionnaire.

"Conclusions"

Currently, both exterior and digital tests are being applied. Although we still have not reached a level of statistical relevance, it is possible to see that the possibility of the user "tweaking" the lighting is giving rise to unexpected low level choices of light.

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Noche Zero

Our time to embrace the darkness

Text: Paulina Villalobos



When was the last time you were in a place where you were able to see how bright the moon shines? Or the Milky Way? 70 per cent of the population alive will die without having ever seen the Milky Way¹. One of the most beautiful natural sights on earth cannot be seen by 99 per cent of the populated territory in Europe². Why? Because the majority of cities are planned without a lighting master plan or illuminated according to the criteria, technology and regulations from 60 years ago. But this is not surprising, when you consider that most city authorities do not even know that lighting designers exist. Lighting designers would ensure that light pollution is reduced to a minimum, but unfortunately no one asks for them. Almost all the active regulations on Light Pollution were made without a lighting designer or any lighting pro-

fessional at all. The result: the light pollution emitted by a normal city at night extends 30 to 40 kilometres beyond the city limits. Consequently more than half the population of the planet lives in cities and that number is growing³, and there is no end to this problem in sight.

There are just five countries which have an active regulation on Light Pollution in place. This is in operation in specific areas of their territory to protect the "windows to the universe" for the purposes of astronomy. People in other regions or countries have to accept that their health is in serious danger, because sleeping or spending the night in over illuminated spaces interrupts the melatonin production. And apart from the well-being of human inhabitants, the existence of entire species is endangered: 30 per cent of mammals are nocturnal and 50 per

cent show signs of nocturnal behaviour, also insects, plants, etc., so they need natural darkness to survive.

Towns today support public lighting financially, and there are towns where half the public funding is spent on the energy required for the urban lighting. There are many issues, therefore, that point to the fact that light is not always good and over illuminating our nights can be irresponsible. We are facing a problem and at the same time an important opportunity to change the future of outdoor lighting.

The fragmented vision to build, plan, regulate and design light at night is the cause of many of the problems related to the consequences of light pollution. So creating the connection between those different visions could be the solution to protecting our nights and to embarking

on a new approach to outdoor lighting design.

So, as lighting designers, what we can do? And how can we start?

That's why Noche Zero was born – as an initiative to connect and share knowledge about the value of natural night darkness and to make the first steps towards protecting the value of natural darkness and incorporating lighting design as part of the solution.

We planned Noche Zero to be an inspirational event, an educational summit and a darkness experience, gathering Design, Science, Culture and Regulations experts for the first time to present and share their different perspectives about the night and darkness. The first event took place in the town of San Pedro in the Atacama Desert in October 2012. During the spring season this is the best place on earth to see the stars

and close to the world's major observatories.

The venue was part of the key to achieving our goal, because we believe that it is our right to see the stars. Right now it is the privilege of exotic and isolated places to have a clear sky at night, so the starry night was part of the experience to share and learn about the different perspectives of light and darkness. We target people working in and linked to urban lighting design, to examine how light pollution affects our health and our eco-systems, to debate the value of darkness, to discuss how to manage the balance of light and dark within future cities and to actually experience what urban populations have lost.

Noche Zero will link the aspirations of existing organisations dedicated to astronomy, curbing light pollution and overseeing planning

within cities to preserve the night sky to the global lighting design community by creating a platform for each stakeholder to speak. The movement will empower lighting designers to become ambassadors for darkness and the night sky by providing them with inspiration, information and resources.

The first Noche Zero concluded with a discussion to create the Atacama Manifesto. One of the main conclusions was that we need to connect between Design, Science, Art, Regulations, Education, Heritage, Technology, Culture and City Authorities. And Noche Zero can provide a platform to link those different approaches.

The Atacama Manifesto pledges to build a network for lighting designers and other interested parties to collaborate, to disseminate and to exchange information, to create an

online resource documenting case studies, research, successful innovations such as star count/light pollution measures/nights of darkness, local regulations in different countries, existing policy documents and conservation programs, to encourage lighting designers to adopt similar methodologies, promote responsible energy use and a 'dark approach to design', using appropriate equipment and control systems, to educate and inform lighting designers about the consequences of light pollution, the value of the clear night sky, and to gain support from practitioners. The movement also aims to educate and inform city administrations, urban planners, architects, landscape designers, electrical engineers and other associated disciplines about professional lighting design and the quality of urban lighting, to motivate

policy makers and to initiate new partnerships with different experts and promote a holistic approach for design. Finally, the Noche Zero platform is intended to enable people to celebrate and be inspired, to share art and culture, films and astrophotography about the night sky. It will support the effort to create micro-level solutions that can be achieved by individuals or small groups.

We want to change the world and we need a lot of help.

Noche Zero 2012 was organised by DIAV, Light Collective and UCN.

www.nochezero.org



¹ National Geographic Magazine. November 2008. The end of the night.

² 99 per cent of the population in Europe cannot see the stars in general due to Light pollution, 100 per cent of the population in Japan, 99 per cent of the population of USA and 62 per cent of the world population. Astronomical Light pollution Study by Astronomers P. Cinzano, F. Falchi (University of Padova)

³ In 2008, for the first time in history, the urban population was bigger than the rural population, and is expecting to grow 1.5 per cent per year, according to the Global Health Observatory. World Health Organisation from the UN.

Darkness is more important now than ever

Text: Koert Vermeulen



To quote the famous theatre designer Richard Pilbrow: "It's not where you put the light, but where you don't put the light".

As a designer who has worked in both theatre and architectural lighting, I know that darkness is as important as light. Like the actor who needs silence before the beginning of his play, lighting needs darkness before it can show its splendour. In the theatre we do not have to adhere to codes or obey rules about lux levels and uniformity, or stick to conventions about best practice. All we have to do is convey an atmosphere, something that helps the narrative of the story. We do not mind if the actor is blinded by spotlights, or if the audience is led to believe something that is not true, or if half the set is not visible in a particular scene, or what we spend on wattage per square metre. All we care about is the best way to go get the message across. Theatre lighting designers are in a privileged position, and are frequently envied by colleagues who design architectural

lighting and are compelled to adhere to strict regulations, sometimes impossible objectives, and contradictory rules. But the outcome is the same. No light without darkness, no intensity without shadow, no texture without surface.

Darkness is more important now than ever before. I believe it was the late Jonathan Speirs I first heard talk about a darkness masterplan rather than a lighting masterplan about four years ago. That struck me, and stayed with me. Contrast has sometimes bad connotations in architecture, but in the theatre it is the ultimate goal. Just as a designer needs a blank piece of paper to start to create a beautiful object, so a lighting designer needs darkness to create his vision.

Nothing is more beautiful than to start in complete darkness and then raise the fader from zero and see the soft glow of our beloved incandescent bulb come alive in its surroundings. That first five per cent is where the real magic occurs...

To apply this theory in practice, I would like to present two examples.

While programming and following the rehearsals for the Youth Olympic Games in Singapore, I got into a lengthy discussion with the stage director, Ivan Heng, on the right mood and atmosphere for the last run with the Olympic Flame towards the Cauldron. Ivan wanted to put a lot of people, and drummers and musicians along the path to mark a big celebration. I had the opposite thought: I felt the boy should run alone, almost in silence, through the

water towards the Cauldron. For me it fitted perfectly with the theme of our story, which was based on the lonely and often very hard road an Olympic athlete needs to endure before reaching his goal, which is participating in an Olympic tournament, and the battle he needs to fight against his own monsters to conquer all the obstacles on his way. I saw this boy, running alone, towards his goal, in almost total silence with only the splashing of his feet in the water and maybe two lights on him with the rest of the stage in total darkness. For me, that was the ultimate vision.

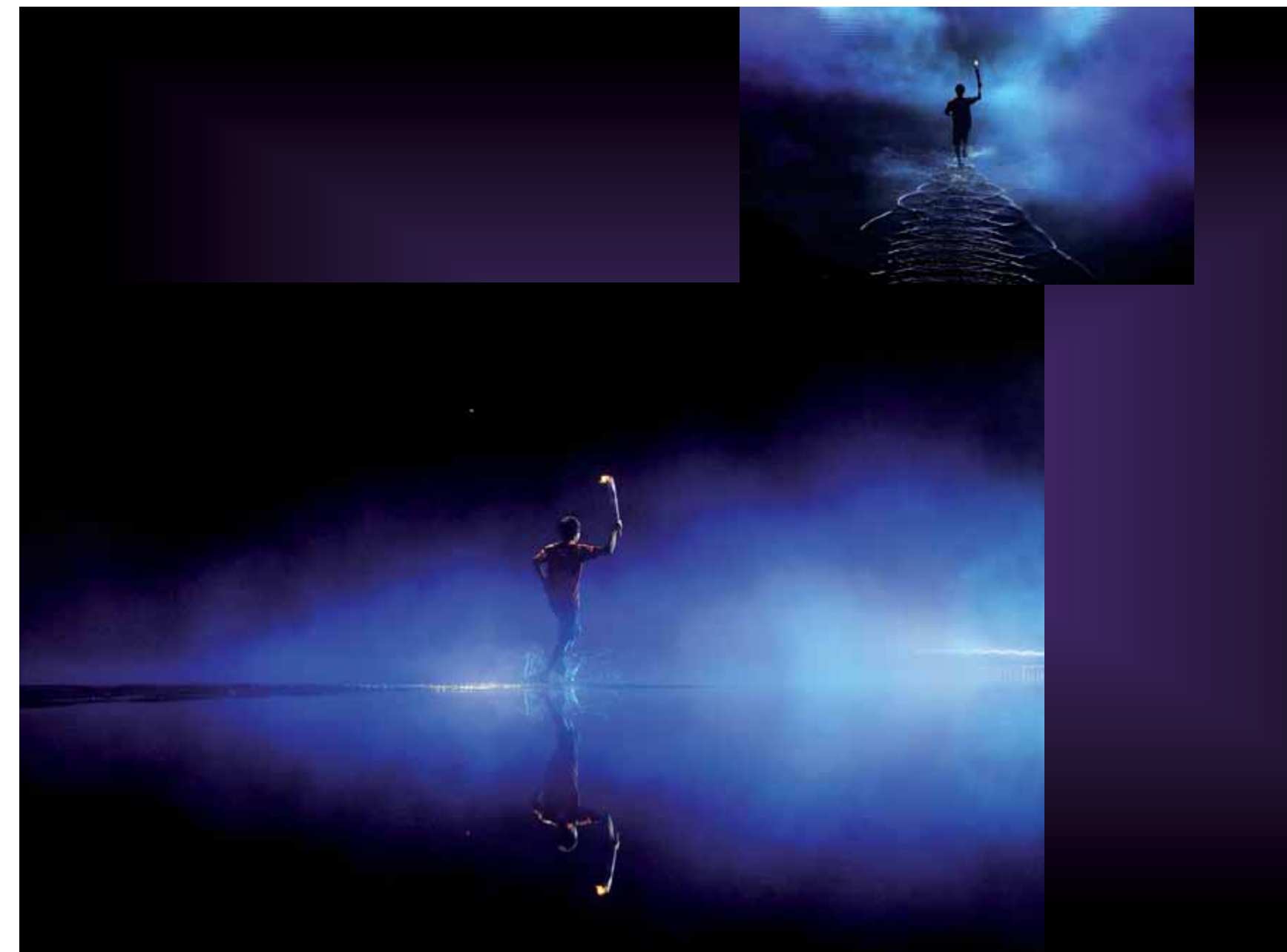
After mocking it up onstage and showing Ivan the end result on camera of this shot, he was convinced. He took all the musicians, drummers and cheering people away and the boy ran alone, with the stage in complete darkness, towards one bright light, which was my symbol for his victory.

A second example was during a show we just recently finished for Puy Du Fou Park near Nantes and Angers in South-East France. They have been producing a spectacle entitled CinéScénie for the last 35 years. It involves 1200 actors, 300 animals and 60 horses, a mediaeval castle, rural surroundings, a 300-metre wide and 100-metre long lake, and a front stage that measures 220 metres wide and 30 metres deep – a real Son & Lumière in the traditional French sense.

ACTLD was commissioned to re-light the whole show and we spent almost five weeks on site reprogramming this feast for the eyes.

The first thing that happens in the show is a short introduction and then a piece that is called the Interludium, where a man in plain clothes walks the whole length of the stage, the full 200 metres from right to left. I remember the first time I saw the show four years ago. This scene was so powerful: a single man crossing the stage, so intimate, so small a gesture in front of 14,000 people watching in anticipation for the show to start. And walking that distance takes about four minutes. Four minutes in which nothing happens, only this guy walking in slow but decisive steps, and the whole audience focussed on what is going to happen next.

So when it was my turn to adapt the lighting of this piece, I stripped it completely from all its embellishments, took away the follow-spot, took away some of the scenery lighting and just placed a single lantern in his hand with a small flickering light like a candle and then a small uplight to put some light on his body and face, which was hidden by a large hat. Taking away all the extra lighting around him and really letting him traverse the empty dark stage alone reinforced the effect of anticipation on the part of the audience. When he finally arrived at the spot where he addresses the audience for the first time, we already got a round of applause – the audience was glad after four long minutes of holding their breath, enrapt as they were by the powerful art of darkness..



Photos: International Olympic Committee.

Ridding ourselves of the barriers to darkness in lighting design

Text: Christopher Cuttle



The stated aim of The Dark Art movement is directed towards the use of darkness "to enhance the balance between creative freedom and rational standardization". My own interest in museum lighting attunes me to the notion of using darkness for creative freedom, as the conservation restrictions that often apply to the illumination levels permitted for display lighting can mean that reducing ambient illumination to the minimum needed for safe movement is the key to achieving effective display. However, this approach can lead to direct conflict with lighting standards, and that issue needs our

attention because far too often these standards are anything but rational.

Worse still, they are becoming all-pervasive. Nobody can argue against the concept of sustainability, but when the architect or building owner chooses to go for LEED, or BREEM, or any of the other environmental accolades, compliance with all relevant standards is required, and this brings designers face-to-face with not just irrationalities, but with outright absurdities.

Lighting standards devised for last-century workplaces, and specified in terms of minimum illuminance to be provided uniformly over a

notional horizontal working plane, become applied to all manner of indoor spaces.

It is not just that the specified illuminance levels are usually far in excess of what is needed for the safe use of the space, but that the illumination distribution is defined around a lighting concept that totally disregards the space, its contents, and its purpose. Its application is inevitably a barrier to achieving even basic lighting design objectives.

I have argued in several recent publications (see references below) that the prime criterion for indoor lighting standards should be perceived

adequacy of illumination (PAI), which would be specified in terms of mean room surface exitance (MRSE). Such an approach would enable distinction between spaces where the occupants are required to spend long working days, and spaces that the occupants have chosen to visit, perhaps for interest or entertainment. PAI criteria would relate to human requirements, which could range from ensuring long-term health and welfare to providing basic needs for safety. MRSE values would be used to specify the amount of light available for vision, where MRSE is the measure of diffusely



Ambient darkness as the setting for brilliant displays. Museum of Old and New Art (MONA), Hobart/AUS. Exhibition artist: Wim Delvoye; Lighting design: MEGS Lighting, Adam Merideth; Photo: Remi Chauvin, MONA.

reflected light from surrounding surfaces, excluding all direct light from luminaires or windows, in lux or lumens per square metre. Importantly, MRSE does not define the distribution of illumination.

A switch to lighting standards based on PAI criteria and specified in terms of MRSE would not necessarily cause significant change in general lighting practice. There will, of course, continue to be situations where illumination requirements are quite satisfactorily served by grid layouts of luminaires providing uniform illumination on the horizontal

working plane. The real difference would be that wherever designers see opportunity to apply lighting imaginatively, creatively, or just non-uniformly, standards would not get in the way. It would always be possible to satisfy a PAI criterion with illumination that concentrates light onto selected surfaces or objects – the only requirement is to provide sufficient reflected light within the space to satisfy relevant human requirements. Take the above image as an example: there is no shortage of light in this location. The illumination enables people to orientate themselves and to respond to the content of this

art gallery display, and this is despite the fact that parts of the space appear to disappear into almost total darkness. A sensibly chosen PAI criterion would recognize that the illumination of this space would be perceived to be entirely adequate for the human activity that it houses, and the specified MRSE values would ensure sufficient reflected light at the eye to achieve this. There is an overwhelming need for radical change in the metrics employed in lighting standards, but it will require concerted and prolonged effort to achieve such change.

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