



GARDEN LIGHTING

Enlighten your knowledge

MARIO FRAU

Preface by Aldo Bigatti

A PRACTICAL GUIDE TO REINVENT YOUR GARDEN

MARIO FRAU

GARDEN LIGHTING. Enlighten Your Knowledge

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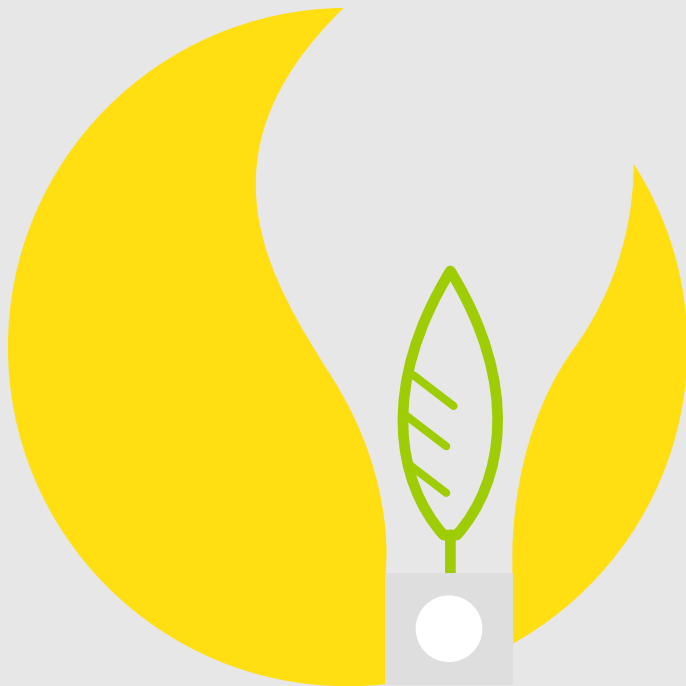
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THINK ABOUT THE FUTURE THAT AWAITS,
THINK ABOUT WHAT YOU COULD DO,
KEEP THE FLAME THAT IS INSIDE YOU ALIVE AND
DO NOT FEAR ANYTHING!

Rita Levi Montalcini
(Nobel Prize in Medicine 1986)

INTRODUCTION

This book was born as a collection of my experiences on the topic of the culture of light, applied to my gardening project as well as my working experience as a university professor at the Polytechnic University of Milan.

I wanted to approach the theme of artificial illumination in gardens in an original way, going off the beaten track with the intention of putting forward some ideas and stimulating the creativity inside us, in a simple manner, trying to convey *“how to illuminate a garden”*.

Experimentation and creativity are left to the readers who, once acquainted with the different techniques described, will be able to either realise personally or via the initial project and subsequent execution of their illuminating engineer, innovative scenarios for their garden.

I always tell my clients: *“think of your garden at night and*



let your imagination run wild because moulding light is like adding a touch of poetry and magic”.

I'd like this book to be a concrete experience for you on a sensitive and contemporary topic, like the one concerning light.

When you finish this read, you will be enriched of its meaning, and you will be able to extract from its essence. Enthusiastically, you will be willing to propose new ways—even provocative at times—to look at illuminating effects.

I may be tempted to say that, with a lot of love and a little whimsy and imagination, you will be able to make up another garden, one that is entirely different from what you see under the sun!

Enjoy!!

Dedicated to:
my father,

my family: Anna, Artemisia, Leonardo, Pina, Fabio, Liliana and Pietro,

and my friends:

Aldo, Gigi, Dante, Katia, Desirè, Francesca, Claudia, Abdullah E. Danish, Yaxi Yan, Ghina, Ivano, Michele and Sonia, Alberto, Mauro, Nicola, Simone, Rita, Benny, Riccardo, Mattia, Daniela, Alessandro, Paolo, Mario, Deborah, Luca, Ettore, Romano, Matteo, Tiziana, Accursio and Mariolina, Marco and Carmen, Valerio and Valeria, Loris and Stefania, Nicoletta, Uday and Triya, Labdhi, Igor and Marina, Nunzio and Laura, Danilo and Cinzia, Ethel, Carmela, Emanuele, Luisa, Andrea, Roberto, Luigia, Riccardo and Olga, Mariano, Silvia, Antonio, Elisa, Massimo, Lucio, Francesco, Mirko and Cristina, Tullio, Massimo, Roberta, Simonetta, Anna and Fabio, Angelo and Marisa, Donatella, Rosy, Anna, Luigi, Giovanni, Miriam, Alexandro Talamo, Eoin Finnegan, Shaz Alex and Sydney Morgan.

*Thanks to all of you for your confidence in my qualities and what I do;
I will confine myself to always be myself...*

Mario Frau



Foreword by Aldo Bigatti

It is with great pleasure that I decided to accept the kind proposal to write a foreword to the new book written by an old friend of mine, Mario Frau, a well-renowned lighting designer, who has always been interested in garden illumination and who has designed and realised many remarkable installations.

Owning a house with a personal garden, or a shared condo yard, is indeed desired by many, that is why we observe how attention to lighting is spreading in green areas all over our cities, even in non-residential neighbourhoods.

We also can't forget the importance of illumination as a tool to prevent criminal acts.

Garden illumination requires not only in-depth knowledge of the technology and of illumination engineering, but also an artistic eye and a botanical background. Plants, bushes, shrubs and flowers are living beings that never cease to grow.



Many change aspect completely depending on the season, and night-time illumination can have a great impact on their development and harmonic growth.

The technologic revolution of LED lights certainly offers new opportunities to illuminate green areas, plants, pools, relaxation areas and walkways in an appropriate, theatrical and even dynamic fashion, creating areas where you can enjoy your garden by night during the hot season, while camouflaging the lighting installations during the day and ensuring the comfort of the users at night by avoiding the blinding effect - and all that with the lowest energy consumption.

However, one needs to know this technology very well, make the right choices among a vast range, both in terms of all the different types of LED available - various optical characteristics, colour rendering, and temperature - and of the quality of the employed devices.

Illuminating a garden properly often requires little light, but the skilfulness lies precisely in utilising it with accuracy, projecting both the lights and the shadows to ensure a vision of the intended effect from all points of view, knowing how to emphasize the context and to evoke positive emotions.

This guide is very useful in disclosing all of these aspects since it educates whoever is looking to illuminate their garden by covering the topic in an easy and yet comprehensive way and by informing the reader about what to expect from certain choices and what elements need to materialise to achieve the intended result.

Aldo Bigatti

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Former Vice President of Bu Lamps Europe – Philips Lighting



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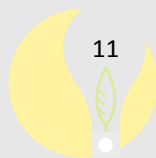
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PREMISE



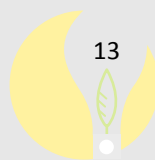
What does “*illuminating a garden*” mean?

Everyone can have a nice garden, but at night when natural lighting disappears, so does the garden.

The secret to giving life back to the garden after the sunset is to select a few natural elements (trees or plants), or artificial ones (pathways, gazebos...) and add a couple of intriguing lighting accents to them.

illuminating a garden is essential not only to see what you are doing but to look at the garden. The latter is part of the house; it represents an extension even beyond its mere physicality. For this reason, lighting takes on an important role from a functional, aesthetic and decorative point of view.

That’s why a contemporary landscaper or a DIY user cannot disregard the use of artificial lighting as a designing tool for green areas.



This guide will show you the different ways to use lighting in green areas to open up a new aesthetic perspective on your garden and continue to make use of it at night-time.

It is important to mention, however, that it cannot replace a lighting designer but rather remind you that light engineering projects can offer real solutions to overcome external illumination problems correctly. As an architect and a lighting designer myself, I can tell you that thanks to the progress made on a theoretic, technologic and production level, this branch of knowledge can deal both with enhancing the environmental and scenographic aspects of a space, and with functionality, durability and user security of the chosen installation; that is with the electrical plant design and with the illuminating devices.

So, we will take a look at the state of the art, that is to say, the trends in the field of designing, of new techniques, of plant design execution, of the characteristics of the most modern lighting equipment for gardens. All this will be contextualised in green area projects, between décor furniture and free time structures, with a particular outlook on how to light up entry pathways, other paths, entry doors, terraces and their jardinière's and trees, while providing the best tips on how to highlight the finest features of the house or the sculptures of a courtyard.

All this will be described without forgetting the focus on light, a fundamental factor at night-time, especially thanks to its ability to convey the perception of security in a mansion or other residences, and the psychological effect that makes its inhabitants feel protected because it enables them to see what happens around the home at any point, particularly when it comes to isolated homes located far from urban centres, in suburbs or in small villages.

We can affirm then that light at night gives us visual dominance over the environment.

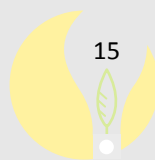
What is meant by “garden”?

Designing a garden requires theoretic awareness and technical knowledge.

In order to achieve a garden project, one needs both to ask himself questions about the relationship between man and nature -a theme so universal that it is present in all forms of scientific, philosophic, economic and artistic thought- and to understand gardening (but also architecture, engineering, hydraulics, agronomy, geology, botany, meteorology and sociology).

I have described in a previous book, the theme illustrating “*how to design a garden*”; in this one, I will only provide a definition of what a garden is with the intention of differentiating it from a park.

A “*Kepos*” or a protected enclosure, is the most accurate and exhaustive term used by the Greeks to conceptualise a garden: “*in it we look for paradise, not a lost paradise but a paradise that*



can be materialised, modelled after the garden of the gods which is a symbol of life”.

The Romans had other terms to define a garden which depended on its function: a “*Viridarium*” was the nursery where new plants were grown and taken care of; a “*Pomarium*” was an orchard; a “*Nemus o Locus*” was a forest where sacred rites were celebrated during the pre-Christian era. However, the word to describe a garden in the current sense was “*Hortus*”, used to define a delimited, closed-off space.

Today, Wikipedia defines: “*A garden is a planned space, usually outdoors, set aside for the display, cultivation, and enjoyment of plants and other forms of nature*”.

I will add to this definition that a garden is presented as a fenced-off space, either in a physical or in a formal sense; an outdoor space in which domesticated nature contrasts wild nature.

This is to say that the garden functions as a transitional element between architecture and nature, between the “*constructed*” and the “*natural*”. Rarely we encounter an isolated garden that is detached from a temple, the house of God, or from a home, the residence of men.

It is with the development of the urban phenomenon that we see a jump to the next level in terms of garden design; the transition from “*individual practice*” to “*collective practice*”, from a merely utilitarian phenomenon to a mainly aesthetic custom, which happened based on the evolution of urban culture.

This is how we get to the Art of Gardens and, at night-time, to the expert use of artificial illumination being used to show or hide features, put them in the foreground or leave them in the shadows, highlight their colours or remove their nuances to create scenarios through stunning chromatic and dynamic effects.

Here we focus on garden illumination, a space and a place where nature, mankind, and architecture are the main actors; this

shall not be mistaken with the definition of Parks.

In a Park, we can recognize the same fundamental characteristics of the garden -a fenced-in space, a transitional space, an expression of agricultural science where one can find flowering shrubs and fruit plants- but there is a sensitive dimensional difference that entails two consequences:

1. Walking in a park creates the impression of moving in a curated space that does not have limits or boundaries;
2. The protagonist of a park is not architecture but *“nature”*.

I think that the best expression to represent what we just said can be found in the works of the French architect André Le Notre, who lived in Paris (1613-1700) and created the *“French Gardens”*, as well as the drawings, which could be called masterpieces, of the great royal and aristocratic parks that were built in France in the mid-17th century.

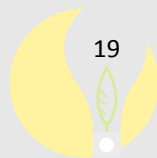
His parks were characterized by the search for broad perspectives, obtained via a severe arrangement of symmetric elements, like placing flowerbeds next to buildings or groups of trees only at a distance, separating them with vast avenues. Among the best examples, we can take the park of Versailles or the Avenue des Champs-Élysées.

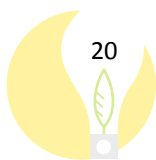
Parks are not simply a tool to embellish buildings, but rather a celebration of nature pure and simple, beautiful, and wild.

Testimony to that are landscape parks that have their own autonomy experienced as a protagonist by those who visit them.



ILLUMINATION AS PROJECT MATERIAL



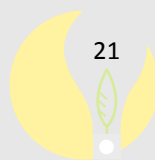


The goals of a Lighting Designer

In order to achieve a state-of-the-art garden, the first step is planning an impeccable design project.

This is true both for gardens in small spaces within a residential area -where there will very likely be problems related to shadow areas, which limit the options to plants that survive or even thrive when sun light is scarce- and for sunny gardens in full sunshine facing south or south-west, where the intensity of light is very elevated. If this is your case, you should bear in mind some expedients, such as installing automatic irrigation or using plants that are suitable for growing in full sunshine like petunias, fuchsias, geraniums, vervains, etc...

I wrote all about these tips in a different book: *“Designing a Garden. Let’s talk about it”*.



Whether your garden is almost entirely in the shadows, either because it faces north or because it is overlooked by tall plants or buildings -thereby receiving light only for a few hours or not at all, or whether it is in full sunlight, your garden will need to be supported by artificial lighting.

For example, even when it is not night-time but winter afternoons and evenings, you will need artificial light to avoid your garden transforming into an anonymous, if not threatening, obscure strip surrounding your home!

In this case, the best tip is to insert artificial lighting by introducing an illumination installation; in my experience, it is most common to do so when all the construction and botanic works are finished, and the garden is already done. However, this is how you obtain the most deceiving results!

Only afterwards one realizes that it is necessary to design illumination installations together with the construction works and the green areas to make sure that they will be incorporated seamlessly in the architectural and environmental context and thereby become a service element, useful and easy to maintain efficiently.

It is necessary to create an illumination project for the simple reason that the green area surrounding the house is, collectively, a multifunctioning space, an aesthetic frame for the architecture, and a protective casing for the inhabitants of the home itself.

Here are the three primary goals that a lighting designer or the person who engineers the lighting installation should set for himself:

1. Making the green area completely accessible at nightfall in all its functions foreseen in normal and occasional conditions;
2. Visually highlighting all relevant aesthetic elements;
3. Contribute to the security and the protection of the residence.

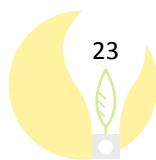
Finally, remembering that a light engineering project does not mean simply “*choosing a lamp*” from a catalogue, nor calculating “*how much light is needed*”.

When the illumination project is planned and integrated with the design of the construction work and the green areas, the lighting designer cooperates with all the players involved in the architectural, landscaping and artistic project, creating a single project which concerns both the architecture and its extension, the garden, in order to guarantee a successful outcome of their work. This means that all players should prepare the documents together, presenting the solutions to be proposed to the client.

Get ready to understand solutions and examples about various different aspects of light and, most of all, to appreciate the benefits of involving a lighting designer in the planning of your house or of your garden, because he will be the one responsible for your mental well-being thanks to his ability to “masterfully shape light” to improve the natural or artificial environment you will be living in.

As I was saying, in this book I will explain some solutions that had a meaningful impact on most of my clients’ projects, while paying attention to respect budgets and environmental sustainability.

This is precisely why a professional is necessary: to bridge the gap between the technical aspects of light and the aesthetic ones, to create an illumination solution that can be seamlessly integrated into your architecture while respecting the space, nature and all the needs of the people who will use the area.



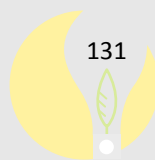
Artwork

The statues, sculptures, objects d'art that both embellish the garden are covered, read and interpreted before thinking about their lighting.

With the light, in fact, we do nothing but offer some images (among the infinite possible) as a function of the chosen observation points. It is not permissible to distort the overall message that the artist wanted to express in his work with a technical operation.

Sometimes it is sufficient to have a small light to create a suggestive image, other times it occurs in two or more different power sources which, with the different directions of incidence of the rays, allows you to create the playful illuminated backgrounds and shadows that return the volumes of the moulded plastic.

The devices will be projectors of different amplitude beams.



To highlight the grain or texture of the surfaces using oblique light, with appliances installed near the work.

You should always make sure that the shadows cast do not hide important details of the work.

The use of at least two light sources for works of medium size (approximately 1.5 meters wide to a depth of 1 and 2 meters high) allows you to avoid the phenomenon of shadows showing because the light beams are crossed.

I recommend to position and aim the apparatus in such a way that their axis forms, with the horizontal plane, vertical angles, or zenith, of the order of 20° - 25° , and with the perpendicular to the ground plane, which includes the direction prevailing observation, horizontal angles, or azimuth, of the order of 30° - 50° .

Good results are obtained with the negative lighting silhouette, and with the backlight.

Finally, to bring out details, using special equipment called "*shapers*" which have the prerogative to project halos from the edges cut into wire net, particularly suited to play with contrasts.

It may be a good idea to buy equipment predisposed for the assembly of coloured filters, in order to redefine the scene, on some occasions, even with the use of colour.

LIGHTING OF A STATUE

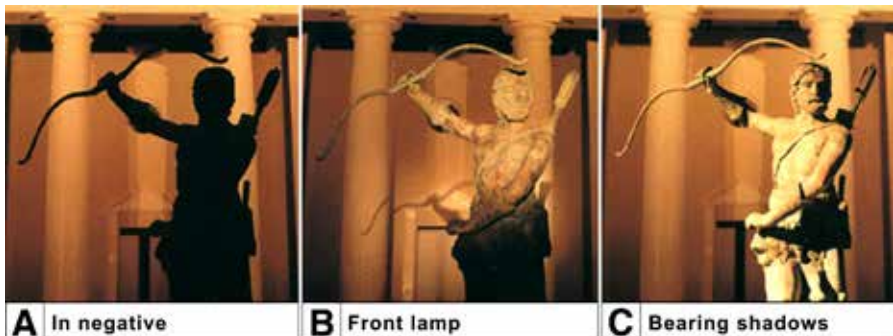
For illuminating sculptures you require illuminance that will give value to the three-dimensionality, favouring the alternation of light and dark areas and thus ensuring a plastic effect.

Here are three different scenarios to illuminate the statue itself:

A – Negative accent silhouette lighting

B – Front lamp

C – Bearing shadows



- Courtesy of PHILIPS OLAC (Outdoor Lighting Application Center) in Lyon (FR)

A – Accent lighting in a negative silhouette

It is a technique to emphasize the object of interest intensely and uniformly illuminating a flat element which acts as a background or backdrop (in the building wall, hedges, etc...) so that there is focus on the dark silhouette of the object (statue, tree, etc...).



- Courtesy of PHILIPS OLAC (Outdoor Lighting Application Center) in Lyon (FR)

This arrangement of lights makes sure it is defined, and that is perceived as the silhouette of the statue which remains in the shade.



- Courtesy of PHILIPS OLAC (Outdoor Lighting Application Center) in Lyon (FR)



water surface is not good if it is invaded—what is beneath the surface of the water—absorbs and does not reflect the light.

The ideal is to have a drop and very dark walls, which usually occurs in natural basins such as lakes and ponds.

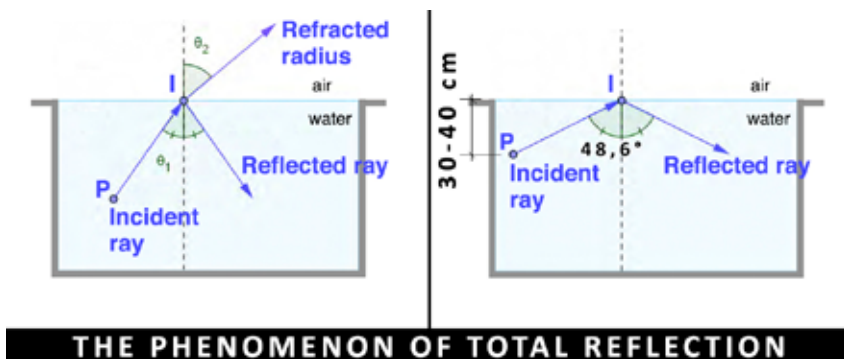
By contrast, drops are needed and very clear walls if you opt for the light from the inside of the tank. Speaking of the apparatus, it is necessary to use underwater lights or resort to optical ducts (bundles of optical fibres made of glass or plastic material carrying the light).

In all cases, it uses the optical phenomenon of “*total internal reflection*” governed by the physical law of reflection.

In practice, if we insert a lighting fixture within the water, when the light beam strikes the separation of water/air plane, or the surface of the material separation, part of the beam continues its path (refraction) diverting it to beyond the surface, while in part back in the direction from which it came (reflection).

In the case of total reflection, if the light beam, during the transition from a denser medium to a less dense, depending on the direction, forms with the axis perpendicular to an angle equal to or less than about 49° , is not transmitted towards the outside but rather reflected toward the water itself.

The phenomenon is reproduced with all the rays emitted by the light.

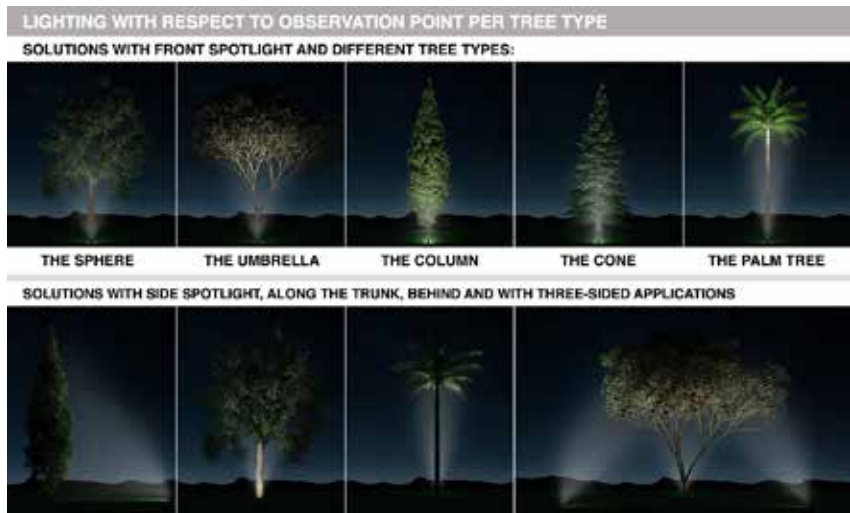


Looking from the window down can have the effect of glare when the devices are close to the front of the house, although it is easy to get a good attenuation of the luminance of the lighted tree foliage.

At the same time, we can achieve unusual effects because we are not used to seeing objects illuminated from below, and shadows face up!

Similar results are obtained with tall trees by placing the equipment along the trunk, a rather challenging solution under the profile plant mainly because it's not always possible to conceal or disguise the devices. In the case of compact foliage from trees may be more suitable for the front lighting apparatus by positioning the projectors on poles or on the walls of the house.

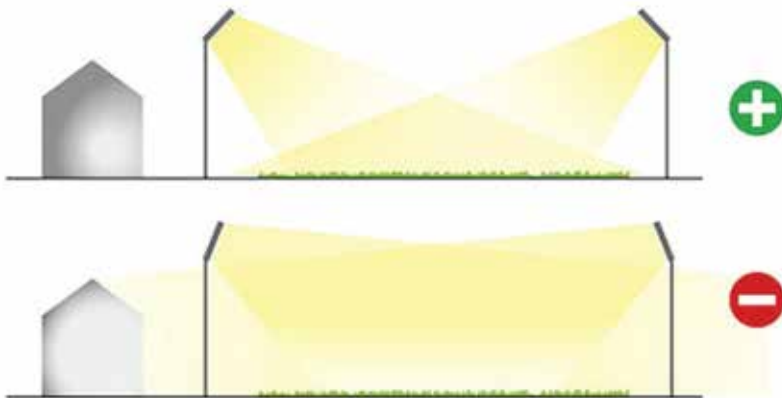
By doing so we eliminate the difficulty of camouflage and will light directly also tresses with little light on a cool shade for a lunar effect (diffuse illumination from above by more points), or with inclined and crossed beams to give plasticity to the mass of the foliage (by lighting directed by top projectors equipment from one or more points).



- Direct foliage lighting from below

Remember, too, that the oscillation of the illuminance values in various points of the field must not exceed 50% compared to the average value.

For the methods of verification of the minimum illumination values to be observed in the various outdoor sports facilities, even if amateur, reference must be made to UNI EN 12193.



- Illumination of a Sportsman system



- Tivoli - Villa d'Este – Avenue of the hundred Fountains



- Tivoli - Villa d'Este – Avenue of the hundred Fountains at night



- Tivoli - Villa d'Este

AUTHOR



MARIO FRAU

Architect, Landscape and Lighting designer, he was a lecturer at the Faculty of Architecture and Design at the Politecnico of Milan and the Brera Academy.

It deals with objects and light installations design, systems, appliances and lighting systems for indoor and outdoor environments.

He has written many articles on aspects and issues of illumination and on gardens.



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