

04 | Vol 93 | 2023

In
Praise
of
Penumbra



Guest-edited by Agostino De Rosa,
Alessio Bortot and Francesco Bergamo





In
Praise
of
Penumbra

04 | Vol 93 | 2023

Guest-edited by
Agostino De Rosa,
Alessio Bortot and
Francesco Bergamo



**About the
Guest-Editors** 5

**Agostino De Rosa, Alessio Bortot
and Francesco Bergamo**

Introduction 6

A Eulogy to Penumbra

**Agostino De Rosa, Alessio Bortot
and Francesco Bergamo**

**At the Edges of
Transparent Language** 14

Akira Mizuta Lippit

Eden to Eden 22

At the Dawn of the Name

Renato Rizzi

**'In the Womb Yet
Out-of-Doors'** 30

**Penumbra and the
Spaces In-Between**

Stephen Kite

The Warmth of Death 38

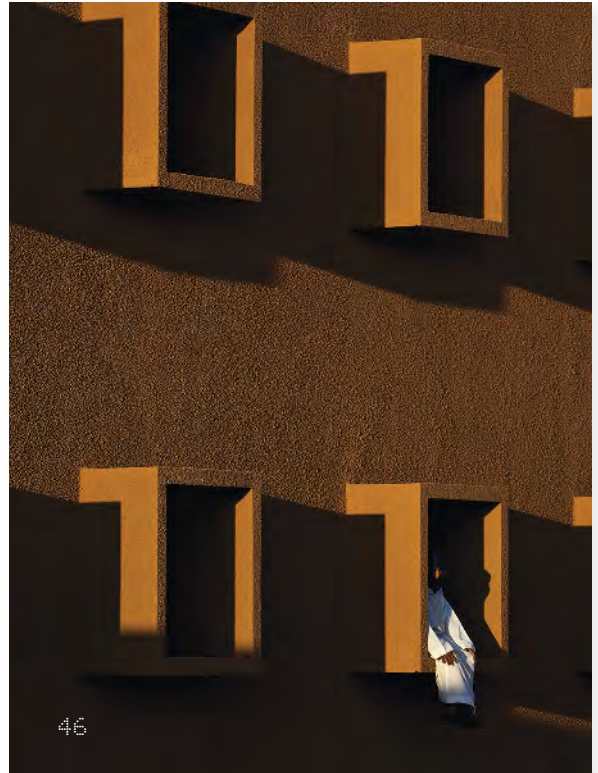
**Alexander Brodsky and
the Necropolis in the Womb
of the Metropolis**

Susanna Piscella

A Path to the Light 46

**Variations and Multiple
Dimensions**

Driss Kettani



Charged Space 54

**The Anatomy of the
In-between**

Silvia Benedito

Efficiency Versus Game 62

**Twilight Spaces for
*Homo Ludens***

Giancarlo Mazzanti



Seeking the Almost 70
Designing Shade
Filippo Bricolo

Rhythmic Alternation 78
Metaphors of Light,
Dark and Shadow
Javier Corvalán

The Intimacy of Neglect 86
Thresholds,
Interconnectedness and
Unexpected Glimpses
Lyndon Neri and Rossana Hu

As If Without Time 96
The Nuclear Twilight Zone
Matthias Bärmann

Things In Themselves 104
The X-Ray and Its Embodied
Space
Paul O Robinson

**Projecting the
Indeterminate
and Enigmatic** 112
The Painting of Marco Tirelli
Antonella Soldaini

Subliminal Blueprints 120
for Other Dimensions
The Time-warped Sanatorium
of the Quay Brothers
Edwin Carels

**‘The ambiguity of penumbra lies
in our difficulty in perceiving
it, in establishing exactly where
it begins and where it ends.’**

— **Agostino De Rosa, Alessio Bortot
and Francesco Bergamo**

From Another Perspective
The Shadowy World of 128
Domesticity
Neil Spiller

Contributors 134

Editorial Offices

John Wiley & Sons
9600 Garsington Road
Oxford
OX4 2DQ

T +44 (0)18 6577 6868

Editor

Neil Spiller

Managing Editor

Caroline Ellerby
Caroline Ellerby Publishing

Freelance Contributing Editor

Abigail Grater

Publisher

Todd Green

Art Direction + Design

Christian Küsters
Mihaela Minchea
CHK Design

Production Editor

Elizabeth Gongde

Prepress

Artmedia, London

Printed in the United Kingdom
by Hobbs the Printers Ltd

EDITORIAL BOARD

Denise Bratton
Paul Brislin
Mark Burry
Helen Castle
Nigel Coates
Peter Cook
Kate Goodwin
Edwin Heathcote
Brian McGrath
Jayne Merkel
Peter Murray
Mark Robbins
Deborah Saunt
Patrik Schumacher
Jill Stoner
Ken Yeang

Journal Customer Services

For ordering information, claims and any enquiry concerning your journal subscription please go to www.wileycustomerhelp.com/ask or contact your nearest office.

Americas

E: cs-journals@wiley.com
T: +1 877 762 2974

Europe, Middle East and Africa

E: cs-journals@wiley.com
T: +44 (0)1865 778 315

Asia Pacific

E: cs-journals@wiley.com
T: +65 6511 8000

Japan (for Japanese-speaking support)

E: cs-japan@wiley.com
T: +65 6511 8010

Visit our Online Customer Help available in 7 languages at www.wileycustomerhelp.com/ask

Print ISSN: 0003-8504

Online ISSN: 1554-2769

Prices are for six issues and include postage and handling charges. Individual-rate subscriptions must be paid by personal cheque or credit card. Individual-rate subscriptions may not be resold or used as library copies.

All prices are subject to change without notice.

Identification Statement

Periodicals Postage paid at Rahway, NJ 07065. Air freight and mailing in the USA by Mercury Media Processing, 1850 Elizabeth Avenue, Suite C, Rahway, NJ 07065, USA.

USA Postmaster

Please send address changes to *Architectural Design*, John Wiley & Sons Inc., c/o The Sheridan Press, PO Box 465, Hanover, PA 17331, USA


Rights and Permissions

Requests to the Publisher should be addressed to: Permissions Department John Wiley & Sons Ltd The Atrium Southern Gate Chichester West Sussex PO19 8SQ UK

F: +44 (0)1243 770 620
E: Permissions@wiley.com

All Rights Reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except under the terms of the Copyright, Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency Ltd, 5th Floor, Shackleton House, Battle Bridge Lane, London SE1 2HX, without the permission in writing of the Publisher.

Subscribe to

 is published bimonthly and is available to purchase on both a subscription basis and as individual volumes at the following prices.

Prices

Individual copies:
£29.99 / US\$45.00
Mailing fees for print may apply

Annual Subscription Rates

Student: £97 / US\$151 print only
Personal: £151 / US\$236 print only
Institutional: £357 / US\$666 online only
Institutional: £373 / US\$695 print only
Institutional: £401 / US\$748 print and online

Front cover


Marco Tirelli, *Untitled*, 2012.
Courtesy Archivio Marco Tirelli

Inside front cover

Bricolo Falsarella,
Lugana Winery,
Lugana, Italy, 2023.
© Filippo Bricolo

Page 1

Paul O Robinson,
Untitled Penumbrae, 2017.
© Paul O Robinson

	ARCHITECTURAL DESIGN	
July/August	Volume	Issue
2023	93	04

Disclaimer

The Publisher and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher and Editors, neither does the publication of advertisements constitute any endorsement by the Publisher and Editors of the products advertised.



ABOUT THE
GUEST-EDITORS

AGOSTINO DE ROSA
ALESSIO BORTOT
FRANCESCO BERGAMO



Agostino De Rosa is Professor at the Università Iuav di Venezia, Italy, where he teaches Theory and Methods of Architectural Representation and Architectural Drawing. Francesco Bergamo and Alessio Bortot both graduated in architecture with De Rosa as tutor, and are today, respectively, tenure track at the Department of Architecture and Arts at Iuav and associate professor at the Department of Engineering and Architecture at the Università degli Studi di Trieste. They have taken part in many of the research projects coordinated by De Rosa in which the projective nature and applications of light and shadow, and of the penumbra between them, play a major role. Among them are a long-term project on the *Roden Crater* artwork in the Painted Desert region of Northern Arizona by the American artist James Turrell, and a collaboration with the German director Werner Herzog on an animated sequence about the anamorphic corridor painted by Emmanuel Maignan in the Trinità dei Monti church in Rome, for the film *Salt and Fire* (2016). Their studies have also focused on the treatises by the Minim friar, painter and anamorphosis innovator Jean François Nicéron, who was the first to describe a general method for drawing geometrically correct sun shadows in perspective, and began investigating penumbral representation just before his premature death.

Agostino De Rosa coordinates the Surveying and Representing Architecture and the Environment PhD postgraduate programme at the Iuav, and also teaches at Venice International University. He has written several essays on representation, the history of images and land art. His many books include: *Geometrie dell'ombra. Storia e simbolismo della teoria delle ombre* [*Shadow Geometry: History and Symbolism of the Theory of Shadows*] (CittàStudi, 1996); *La vertigine dello sguardo. tre studi sulla rappresentazione anamorfica* [*The Vertigo of the Gaze: Three Studies on Anamorphic Representation*] (with Giuseppe D'Acunto, Cafoscarina, 2002); *James Turrell: Geometrie di luce* [*Geometry of Light*] – *Roden Crater Project* (Electa, 2007); *Jean François Nicéron. Prospettiva, catottrica e magia artificiale* [*Perspective, Catoptrics and Artificial Magic*] (Aracne, 2013); and *Cecità del vedere. Sull'origine delle immagini* [*The Blindness of Seeing: On the Origin of Images*] (Aracne, 2021). He has curated exhibitions for many institutions and he coordinates the Imago rerum research unit at Iuav, for which he has edited the proceedings of international seminars.

Francesco Bergamo has a PhD in the Sciences of Design and teaches Drawing for Product and Visual Design, Data Visualisation for Fashion Communication and New Media, and History and Theory of Representational Methods in Architecture. His research focuses on the genealogy and forms of contemporary representational artefacts for architecture, design, politics, art and sonic ecology, and on the mutual relationship between aural and visual cultures. His books include: *Stereotomia. Dalla pietra al digitale* [*Stereotomy: From Stone to Digital*] (with Gabriella Liva, Cafoscarina, 2010); *Architectural Perspective in the Venetian Villas Along the Riviera Del Brenta in the Province of Venice* (with Massimiliano Ciammaichella, Aracne, 2016); and *Il disegno del paesaggio sonoro* [*Soundscape Design*] (Mimesis, 2018). With Agostino De Rosa he published 'Geometries of Light and Shadows, from Piero della Francesca to James Turrell' (in *Handbook of the Mathematics of the Arts and Sciences*, 2020), and darkness and penumbra are also relevant in his article 'In Unknown Lands: Epistemology, Representation and Design in the Age of Intelligent Machines' (*Vesper*, 2020). He coordinates the SSH! (Sound Studies Hub) research group and the LaSD (Laboratorio Strumentale per la Didattica) at Iuav.

Alessio Bortot is Doctor Europaeus in Architecture, City and Design, with a specialisation in Representation. He has taught Descriptive Geometry, Advanced Technologies for Representation and Digital 3D Modelling at Iuav, at the Faculty of Engineering of the University of Padova, and at the École National Supérieure des Travaux Publics in Yaoundé (Cameroon). His research focuses on the history of representation and advanced technologies for architecture. He has lectured at international conferences and participated in national and international research projects. He is author of several publications, including: *Modelli digitali. Approcci multidisciplinari alla rappresentazione eidomatica* [*Digital Models: Multidisciplinary Approaches to Eidomatic Representation*] (with Mark Sonogo, Cafoscarina, 2010); *La Geomatica per la documentazione e la tutela dell'architettura e del paesaggio Veneto* [*Geomatics for the Documentation and Protection of Veneto Architecture and Landscape*] (Iuav, 2012); and *Emmanuel Maignan e Francesco Borromini. Il progetto di una villa scientifica nella Roma barocca* [*Project for a Scientific Villa in Baroque Rome*] (LetteraVentidue, 2020). His national and international awards include the Bruno Zevi Prize and the Unione Italiana Disegno (UID) Gaspare De Fiore award. ▯



A Eulogy to Penumbra

INTRODUCTION

AGOSTINO DE ROSA,
ALESSIO BORTOT AND
FRANCESCO BERGAMO

The unknown is an abstraction; the known, a desert; but what is half-known, half-seen, is the perfect breeding ground for desire and hallucination.

— Juan José Saer, *The Witness*, 1983¹

Penumbra – from the Latin *paene* (almost) and *umbra* (shadow) – can be defined as an intermediate zone of transition between light and shadow. Therefore, it indicates a liminal area, where many events can take place. Penumbra defines a space, both physical and imaginary, where everything is possible: it is the place of the uncanny, where presence and/or absence can produce wonder, or horror.

The contributors to this issue of Δ illustrate and discuss the archetype of penumbra in the world of contemporary architecture, arts and critical theory, investigating the ways it permeates different expressive forms and exploring how today's creativity is a reflection of the dramatic yet electrifying historical period we are living in, with no certainties.² Penumbra is not only a place of the unexpected: it can provide a preferential point of view.

The authors show and discuss how penumbra has shaped their creativity and modified their approach to their design process. Penumbra bears suprahistorical and global connotations; nonetheless, different cultures develop the symbolical phenomenon in different ways. It is part of the heritage of all humanity, yet it is employed through different aesthetic and designerly methods according to the cultural contexts within which it is situated, hovering between fullness and emptiness, presence and absence, past and future.

Geometric Origins

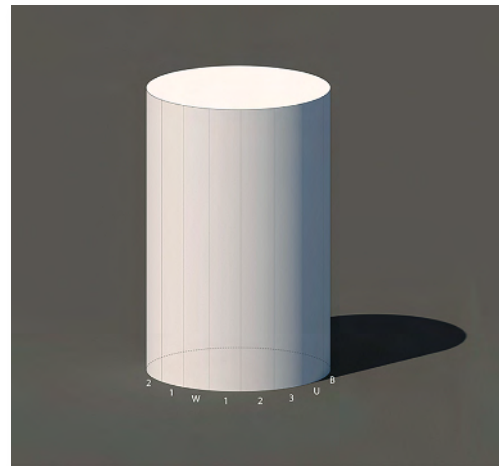
The first properly scientific references to the theme of penumbra can be found not in treatises about optics and shadows, as we might expect, but in those on astronomy. Such is the case of the Arab mathematician, astronomer and physicist Alhazen (Abū 'Alī al-Ḥasan ibn al-Haytham, 965–1039), author of the book *On the Nature of Shadows* (*Fī kayfiyyar al-aẓlāl*), where he defines shadows as the foundation of astronomy.³ It is a work of particular importance because, with theoretical clarity and practical demonstrations, it distinguishes 'shadow'⁴ from 'penumbra', for the first time raising the question of the indeterminacy of the outline of shadows projected by sunlight, and determining the features of various light sources.

Pino Musi,
Limes #5,
2008

Thanks to photographer and visual artist Musi's ability, the architectural frames, within the frame of the image, deny visible information outside (too much dark above, too much light below), while the inside is sculpted by half-lights, or half-shadows.

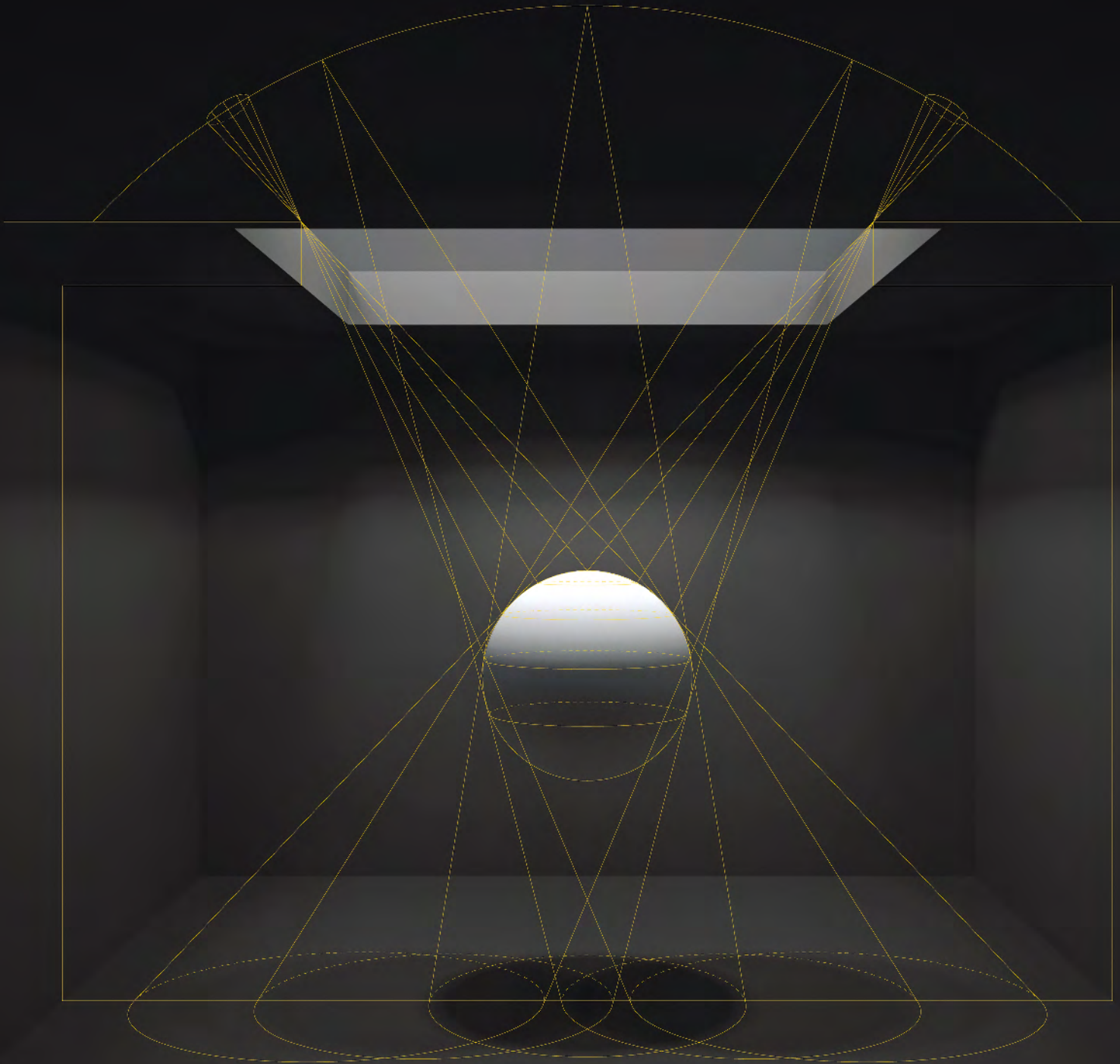
Another author who precisely described the physical phenomenon of penumbra and its artistic outcomes is the Italian painter Cennino Cennini. In his treatise *Il Libro dell'Arte* (written between 1390 and 1437) he introduces an interesting observation about the gradual tonal variation to which painted shadows must adapt.⁵ This can be interpreted as an anticipation of *sfumato* – the pictorial technique of the penumbra as 'half shadow' – and of the astronomical and geometric theory of isophotes, which are the lines of an illuminated surface whose points have a constant luminous intensity, as defined by Lambert's law: where the luminous intensity observed from a reflecting surface is directly proportional to the cosine of the angle between the direction of the incident light and the direction perpendicular to the surface.⁶

According to Leonardo da Vinci, the representation of shadows is subject to the same laws that determine foreshortening in perspective.⁷ In his work we find no hints of a method for drawing shadows and half-shadows. This absence may be due to the dilemma of the discrepancy between geometric experimental constructions where the contours of a shadow cast by an opaque body on a surface are represented as precise lines, and his refusal to show contours in his paintings. Indeed, we read in his *Manuscript G* (1510–16) that 'the boundaries of bodies are the least of all things [...]. Wherefore O painter! do not surround your bodies with lines, and above all when representing objects smaller than nature; for not only will their external outlines become indistinct, but their parts will be invisible from distance'.⁸



Alessio Bortot,
Digital reconstruction via light simulation of
the method used by Cennino Cennini to represent
shapes through light, shadows and penumbras,
2022

Cennini was a Tuscan painter influenced by Giotto. His masterpiece book *Il Libro dell'arte*, written between 1390 and 1437, explains how the painter should use different shades of colour to give roundness to shapes through the use of penumbra. 1, 2 and 3: mixtures of brighter and brighter colour; B: towards black; W: towards white; U: background.

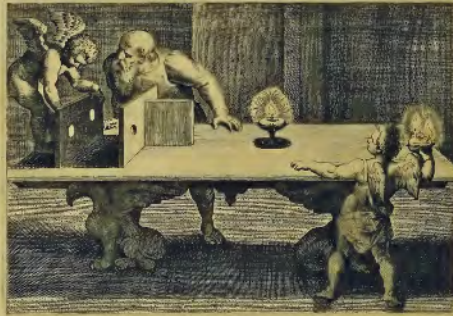


Alessio Bortot,
Digital reconstruction via light
simulation of a drawing from Leonardo da
Vinci's so-called *Manuscript A* (1490-92),
2022

In the original drawing Leonardo shows, in orthographic
projection, the behaviour of shades, shadows and penumbras
on a sphere illuminated by diffused light entering from a
window. Leonardo identified isophotes several centuries before
they were codified by Lambert's law, representing the correct
approximation of the various areas with equal light intensity.

**Penumbra forges a strong
dialectical relationship with the
darkest area close to it, and in
particular with those shadows
projected onto other surfaces**

FRANCISCI AGVILONII
E SOCIETATE IESV
OPTICORVM
LIBER QVINTVS
DE
LVMINOSO ET OPACO.



ARGVMENTVM.

LIBRO primo propositione 30. & sequentibus explicata est quaedam natura luminis, quoad scilicet ad obiectum rursus primo attinebat, cuiusque cognitio ad intelligentiam visibilium specierum conducibilis erat. Quo etiam loco de coloribus rursusque est actum, quatenus nimirum ab ipsis alij quidam tenuioris essentiae colores exsolui ac luminis ope ad aspectum delati, illos qui in rebus sunt, velut propriae imagines repraesentat. Nunc de luminis profusione ac propagatione, de luminis concursu & occurso, de luminis illapsu in varias corporum formas, de umbrarum productione, deq; varia figuracione luminis per foramen traiectionis non pauca proponenda occurrunt, quae

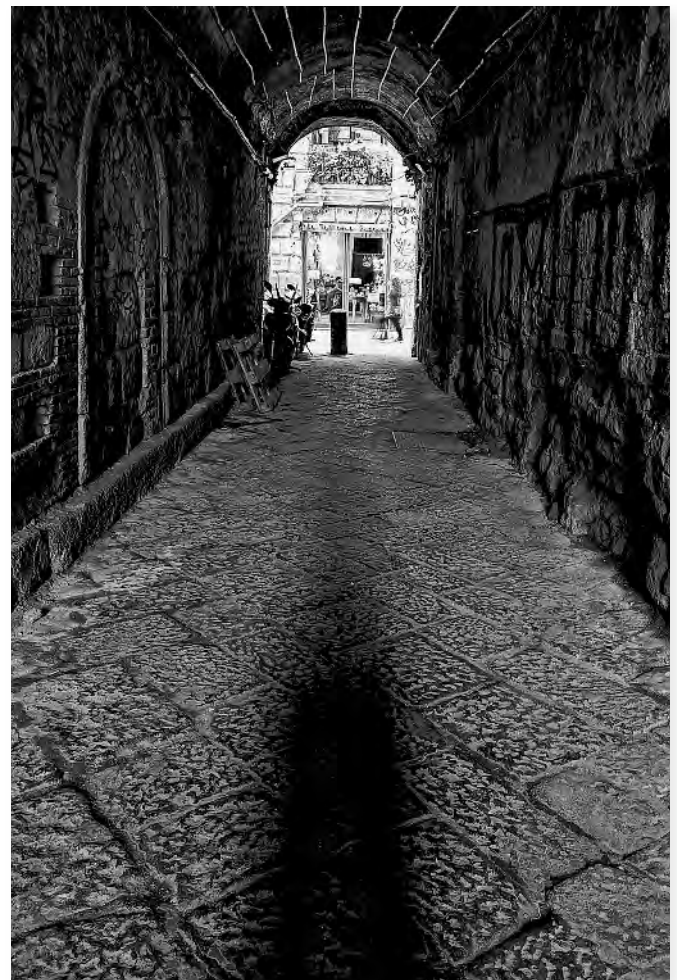
François d'Aguilon,
Frontispiece of the fifth book from
Opticorum Libri sex (*Six Books of Optics*),
1613

This engraving from the *Liber Quintus: De luminoso et opaco* (*Fifth Book: On Light and Darkness*), and the others introducing each of Aguilon's books, were based on Peter Paul Rubens's drawings. Aguilon was a Jesuit mathematician, physicist and architect whose illustrations testify to his bond with Rubens and Rubens's paintings, especially as regards the theory of colours, shadows and penumbra.

Giovanni Menna,
The Black Heart of the Old City, Naples,
Italy,
2021

Architectural historian Giovanni Menna frames a shadowy ectoplasm of a person standing in a tunnel in the historic centre of Naples, a city where penumbra reigns supreme. The area of uncertain definition surrounding the shadow cast on the cobblestones is the result of an extended light source, such as the sun.

This uncertainty was probably exacerbated after 1505, when Leonardo studied the effects of diffused light (*lume universale*): here the phenomenon of penumbra is sublimated and plays a major role in his *sfumato*, gently enveloping his pictorial images.⁹ The Jesuit architect François d'Aguilon, who was also a mathematician and physicist, in his *Opticorum libri sex: philosophis juxta ac mathematicis utiles* (*Six Books of Optics: Useful for Mathematicians and Philosophers Alike*; 1613) stigmatises an incompleteness in the geometric treatment of the problem of shadows in relation to the phenomenon of penumbra and focuses on the tonal gradualness of shadows, both self and cast.¹⁰ In the fifth book, *De luminoso et opaco* (*On Brightness and Opacity*), and especially in the section titled 'De umbris' ('On Shadows'), after having defined shadow as 'diminished light', Aguilon dwells on the perceptual aspect of cast shadows, distinguishing in them a uniformly dark nucleus (*umbra perfecta*) from the marginal areas that gradually become lighter (*umbra diminuita*, or *imperfecta*), which are penumbra. It is worth noting that this distinction had a powerful impact on the paintings of Aguilon's near contemporary Peter Paul Rubens. Here penumbra finally becomes a precise topic within the domains of geometry and pictorial representation.





Giovanni Menna,
Tra le ombre del Sé,
Sé Cathedral,
Porto, Portugal,
2020

The clear limits of the shade into this portico are the orthogonal projections of the contours of the shadow. In certain daylight conditions, the dialectic of the shadow is resolved only between these two projective elements, from which the penumbra is excluded.

Giovanni Menna,
Angevin hypostyle,
Monumental Complex of Donnaregina,
Naples, Italy,
2020

The pillars, supporting the Gothic vaults of the nuns' choir in the church of Santa Maria Donnaregina Vecchia, show their 'heart of darkness' through their cast shadows. In fact, they are surrounded by multiple shadows and half-light effects produced by the diffused light penetrating the building.



Ontology

Penumbra is generated on a surface in that area of gradual transition from clear light to shadow, when an opaque body is interposed between a light source and the surface-screen, producing an area of lower brightness than another contiguous one. In some of architectural historian Giovanni Menna's photographs this becomes evident, and temporal layers which light has stacked upon architectural and urban spaces over the centuries are evoked.

Penumbra forges a strong dialectical relationship with the darkest area close to it, and in particular with those shadows projected onto other surfaces: these are images by ontogenesis, faithful replicas and at the same time projective abstractions that clarify the nature of the light source that generates them and the formal complexity of the object of which they are projections. But they also conceal significant portions of its signifier and of its immediate and metaphorical signified.

Penumbra generates hazy areas around the darker zones which, as German art theorist and perceptual psychologist Rudolph Arnheim observes, can be considered simultaneously as integral and separate parts of the object of which they are projections.¹¹ The ambiguity of penumbra also lies in our difficulty in perceiving it, in establishing exactly where it begins and where it ends: while shadows are linked to the interdiction of light – that is, a condition of non-visibility – penumbras live a saprophytic life, in balance between light and shadow, and from that we can draw information.

As a liminal agent, penumbra can be compared to a common mediating element, not necessarily architectural: the frame. The term indicates the threshold and the border between different physical – or conceptual – dimensions, between landscape and architecture, between outside and inside, but also between reality and representation. In the visual arts it usually delimits a space, an area of significance, and triggers our curiosity to observe more carefully what it contains and delimits. On the one hand, it borders the space of representation (finite); on the other, it expands our perception (infinite). The frame thus becomes the threshold beyond which the gaze enters another world, that of imagination, exactly as happens in the figurative world that is delimited, evanescently, by penumbra.

Descriptive geometry senses the unfathomable nature of this 'heart of darkness' of opaque bodies. However, it is condemned not to be able to represent their weight, but to describe them only partially: therefore projective images remain incapable of explaining the phenomenal world in depth. The ghost of a deeper knowledge of reality, even if only longed for, hovers in those images – technical or artistic – where penumbra is perceived as an element of necessary realism, even if in a context dominated by alienness or a climate of deep emotional distance. A definitive condition that can be recognised in penumbra is that it has no shadow: it cannot be further projected separately from its own shadow, and therefore it does not possess a real external substance, but just an illusory appearance.



In Pino Musi's photographic series *Limes* (2008), 'architectures eliminate any layer of experience so as to create a link between elements on the margin, from the boundaries of which all things begin to "come into presence", and the beholder'.¹² It is a threshold between real and imaginary, between phenomenon and appearance, analogous to the one that this AD's contributors invite readers to cross, entering a space where everything is possible.

Dwellers on the Threshold

The issue begins with University of Southern California professor Akira Mizuta Lippit's exploration of the relation between transparency and opacity, towards the dream of a transparent language which unavoidably deals with the Tower of Babel. Language is crucial also in retired Luav University of Venice professor Renato Rizzi's considerations about the very essence of the term 'architecture'. The role and significance of penumbra in architecture are examined by Cardiff University Emeritus Professor Stephen Kite in works by John Soane, Louis Kahn, Frank Lloyd Wright and Aldo Rossi, and they seem to demand even more attention in today's wounded world – a quality to which researcher Susanna Piscicella's analysis of Alexander Brodsky's drawings, installations and architectural works relates.

It is also interesting to hear from architects from various parts of the world about their own relation with penumbra. In Moroccan architect Driss Kettani's buildings, penumbra is a path to the desired light, recalling the Arab-Muslim tradition. Silvia Benedito offers a precise application of the role of 'shadowing' in architecture, presenting in detail the 'Beastie' pavilion designed for New York's MoMA PS1 by OFICINAA, the practice she co-founded in Ingolstadt, Germany. For Colombian architect Giancarlo Mazzanti, the topic of this issue becomes relevant in architecture where play and entertainment dialogue with efficiency. Filippo Bricolo, based in Verona and a researcher at the Polytechnic University of Milan provides a detailed analysis of the way his work as an architect takes care of designing penumbra in interiors. From Paraguay, Javier Corvalán confronts the eastern, western and southern American worlds, his thought embodied by his Umbraculum-house. Lyndon Neri and Rossana Hu, of Shanghai practice Neri&Hu, start from the Chinese word *jian* (間), an ideogram composed of a sun between a pair of doors and related to notions of space and time, to explain the way liminality plays a major role in their work.

Pino Musi,
Limes #7,
2008

In this image, curved space is lit by a circular frame above, and reflected below. The surface appears raw, it is not meant to be inhabited, but its shades, shadows and reflections evoke a complex threshold, engaging the eye of the observer towards another dimension.

Four speculative texts then focus on three bodies of work where penumbra is crucial. Writer and curator Matthias Bärmann discusses the extreme, white, shadowless light of Ursula Schulz-Dornburg's photographs of the Kazakh steppe after nuclear tests, while artist, architect and professor at the University of Ljubljana Faculty of Architecture Paul O Robinson writes about his own use of 'forensic X-ray technology to induce correspondences between spaces, their constituent artefacts and their entwined narrative structures'. Curator Antonella Soldaini discusses Marco Tirelli's paintings – one of which has been chosen for the cover of this journal, a sort of first threshold – by considering their genealogies. And teacher, researcher and coordinator Edwin Carels's article is the perfect companion to recount the Quay Brothers' quintessential penumbra, happening inside and between vibrant lights and shadows.

Different scholars, architects and artists provide different observations, different shades of the notion of penumbra, each according to their own history and personal geography. Yet they all seem to praise penumbra, especially for the inexhaustible possibilities of the infinite shades between whitest light and blackest darkness. Penumbra makes it possible to inhabit our world and make sense of it, just as astronomers did centuries ago as they dwelled in penumbra to discover the universe. ▫

Notes

1. Juan José Saer, *The Witness* [1983], tr Margaret Jull Costa, Serpent's Tail (London), 1990, p 9.
2. See for example James Bridle, *New Dark Age: Technology and the End of the Future*, Verso (London), 2018.
3. Abū 'Alī al-Ḥasan ibn al-Haytham (Alhazen), *Opticæ thesaurus: Alhazeni Arabis libri septem, nunc primum editi – Eiusdem liber de crepusculis & Nubium ascensionibus – Item Vitellionis Thuringopoloni libri X* (Latin edition of *Kitab al-Manaziri*), ed Friedrich Risner, Eusebius Episcopus & haeredes Nicolai Episcopii (Basel), 1572.
4. On the topic of shadows in art and architecture, see for example: Thomas Da Costa Kaufmann, 'Perspective of Shadows: The History of the Theory of Shadow Projection', *Journal of the Warburg and Courtauld Institutes*, 38, 1975, pp 258–87; EH Gombrich, *Shadows: The Depiction of Cast Shadows in Western Art*, Yale University Press (New Haven and London), 1995; and Agostino De Rosa, *Geometrie dell'ombra. Storia e simbolismo della teoria delle ombre*, CittàStudi (Milan), 1997.
5. Published for the first time as *Il Libro dell'Arte*, 1st edition by Giuseppe Tambroni (Rome), 1821. Chapter 31 is the most relevant for this topic.
6. See for example: Wilhelm Fiedler, *Die darstellende Geometrie in organischer Verbindung mit der Geometrie der Lage*, Teubner (Leipzig), 1888; Gino Loria, *Complementi di geometria descrittiva*, Hoepli (Milan), 1924; Orseolo Fasolo and Riccardo Migliari, *Quaderni di applicazioni della geometria descrittiva 3, Kappa* (Rome), 1984.
7. Leonardo da Vinci, *Manuscript C* (1490–91), fol 5r, in *The Complete Notebooks of Leonardo Da Vinci*, tr Jean Paul Richter, Scribner & Welford (New York), 1888, vol 1, n 215.
8. Leonardo da Vinci, *Manuscript G* (1510–16), fol 37r, in *The Complete Notebooks of Leonardo Da Vinci*, op cit, vol 1, n 49.
9. See Moshe Barasch, *Light and Color in the Italian Renaissance Theory of Art*, New York University Press (New York), 1978, pp 62–6.
10. François d'Aguilon, *Opticorum libri sex: philosophis juxta ac mathematicis utiles*, Plantin (Antwerp), 1613, p 132.
11. Rudolf Arnheim, *Art and Visual Perception: A Psychology of the Creative Eye*, University of California Press (Berkeley, CA and London), expanded and revised edition, 1974, pp 315–19.
12. From Pino Musi's own notes on his *Limes* series: https://www.pinomusi.com/limes_2008-p11774.

Text © 2023 John Wiley & Sons Ltd. Images: pp 6, 12 © Pino Musi; pp 7–8 © Alessio Bortot; pp 9(br), 10–11 © Giovanni Menna

CONTRIBUTORS

Giancarlo Mazzanti graduated in architecture from the Javeriana University in Colombia, with postgraduate studies in Florence, Italy. He has academic experience as a visiting professor in Colombian universities, as well as in world-renowned universities such as Harvard, Columbia and Princeton. He is the first Colombian architect to have his work in the permanent collections of the Museum of Modern Art (MoMA) in New York and Centre Pompidou, Paris. His architecture seeks to realise projects that give value to social transformations and build communities, improving quality of life through the design of the environment and the idea of social equality.

Lyndon Neri co-founded Neri&Hu Design and Research Office with Rossana Hu in 2004. He received his Master of Architecture from Harvard University GSD and his Bachelor of Arts in Architecture from the University of California, Berkeley. Alongside his design practice, he is deeply committed to architectural education and has taught and lectured in numerous universities. He was appointed the Howard Friedman Visiting Professor of Practice at the University of California, Berkeley in 2023, the Design Critic in 2023 and the John Portman critic at Harvard GSD in 2019 and 2021, the Eero Saarinen Visiting Professor in 2022 and Norman R Foster Visiting Professor Chair in 2018 at the Yale School of Architecture.

Susanna Piscicella is an architect and researcher at the Università Iuav di Venezia, focusing on the cultural roots of architectural projects. She has worked for the University of Parma, HafenCity University Hamburg and Pontificia Universidad Católica in Santiago de Chile. Among her most recent monographic publications are *John Hejduk, Bronx: Manual in Verse* (with Renato Rizzi; Mimesis, 2020) and *Peter Eisenman: Gher-Ghar – House 11a* (Mimesis, 2018).

Renato Rizzi is an architect and Professor of Architectural Design at the Università Iuav di Venezia. In the 1980s he worked for a decade at Peter Eisenman's studio in New York. During the same period he developed a deep friendship with John Hejduk, then Dean of the Cooper Union, New York. He advances his cultural education by frequenting both sides of the Atlantic. Reduced to a Cartesian synthesis, the three fundamental axes are represented by as many pairs of names: John Hejduk-Carlo Enzo; Derek Walcott-Andrea Tagliapietra; Herman Melville-Emanuele Severino. His most recent book, with Susanna Piscicella, is *John Hejduk, BRONX, Manual in Verse* (Mimesis, 2020).

Paul O Robinson is a visual artist, architect, educator and Fulbright Fellow in art and architecture. His primary studio is located in Ljubljana, Slovenia, where he intertwines X-rays, paintings and castings to form narrative spatial correspondences. He continues to lecture and have solo exhibitions and installations in the US and Europe, and teaches design and theory in the Faculty of Architecture at the University of Ljubljana, where he is the editor of the journal *Architecture Research (AR)*.

Antonella Soldaini began her career as an associate curator at the Wexner Center for Visual Arts in Columbus, Ohio in 1988. She returned to Italy in 1991 where she became curator at the Pecci Museum in Prato, assistant to the Director at the XLVII Venice Biennale, and curator at the Prada Foundation in Milan. She has curated more than 50 exhibitions in Italy and abroad, and published books on artists such as Alighiero Boetti, Daniel Buren, Jan Fabre, Tadashi Kawamata, Alicja Kwade, Tobias Reheberger, Erwin Wurm, Marco Tirelli and David Tremlett. Together with Germano Celant, she co-curated a series of exhibitions dedicated to Arte Povera in 2012. Since 2020 she has been a curatorial consultant and head of research at Studio Celant in Milan.

Neil Spiller is Editor of *Δ*, and was previously Hawksmoor Chair of Architecture and Landscape and Deputy Pro Vice Chancellor at the University of Greenwich in London. Prior to this he was Vice Dean at the Bartlett School of Architecture, University College London (UCL). He has made an international reputation as an architect, designer, artist, teacher, writer and polemicist. He is the founding director of the Advanced Virtual and Technological Architecture Research (AVATAR) group, which continues to push the boundaries of architectural design and discourse in the face of the impact of 21st-century technologies. Its current preoccupations include augmented and mixed realities and other metamorphic technologies.

What is *Architectural Design*?

Founded in 1930, *Architectural Design* (Δ) is an influential and prestigious publication. It combines the currency and topicality of a newsstand journal with the rigour and production qualities of a book. With an almost unrivalled reputation worldwide, it is consistently at the forefront of cultural thought and design.

Issues of Δ are edited either by the journal Editor, Neil Spiller, or by an invited Guest-Editor. Renowned for being at the leading edge of design and new technologies, Δ also covers themes as diverse as architectural history, the environment, interior design, landscape architecture and urban design.

Provocative and pioneering, Δ inspires theoretical, creative and technological advances. It questions the outcome of technical innovations as well as the far-reaching social, cultural and environmental challenges that present themselves today.

For further information on Δ , subscriptions and purchasing single issues see:

<https://onlinelibrary.wiley.com/journal/15542769>



Volume 92 No 4
ISBN 978-1-119-78777-8



Volume 92 No 5
ISBN 978-1-119-83393-2



Volume 92 No 6
ISBN 978-1-119-83396-3



Volume 93 No 1
ISBN 978-1-119-83399-4



Volume 93 No 2
ISBN 978-1-119-83835-7



Volume 93 No 3
ISBN 978-1-119-83442-7

Individual backlist issues of Δ are available as books for purchase starting at £29.99 / US\$45.00

wiley.com

How to Subscribe

With 6 issues a year, you can subscribe to Δ either print or online.

<https://onlinelibrary.wiley.com/journal/15542769>

Institutional subscription

£357 / US\$666
online only

£373 / US\$695
print only

£401 / US\$748
print and online

Personal-rate subscription

£151 / US\$236
print only

Student-rate subscription

£97 / US\$151
print only

Individual issue:

£9.99 / US\$13.99

To subscribe to print or online

E: cs-journals@wiley.com

W: <https://onlinelibrary.wiley.com/journal/15542769>

Americas

E: cs-journals@wiley.com

T: +1 877 762 2974

Europe, Middle East and Africa

E: cs-journals@wiley.com

T: +44 (0)18 6577 8315

Asia Pacific

E: cs-journals@wiley.com

T: +65 6511 8000

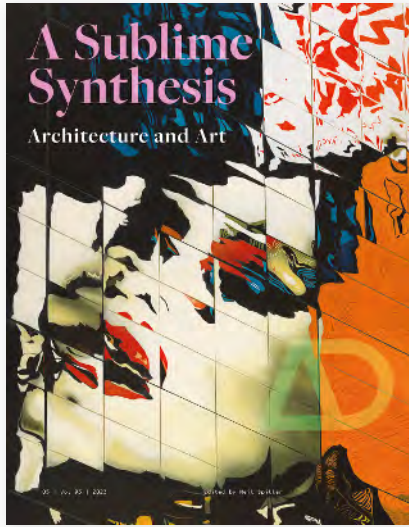
Japan (for Japanese-speaking support)

E: cs-japan@wiley.com

T: +65 6511 8010

Visit our Online Customer Help

available in 7 languages at www.wileycustomerhelp.com/ask



SEPTEMBER/OCTOBER 2023

Volume 93 ISBN
Number 5 978 1394 170791

A SUBLIME SYNTHESIS
Architecture and Art

Edited by Neil Spiller

The link between architecture and art and the sublimity it can create has a history that stretches back millennia. From cave paintings to the stained glass and saintly icons in churches and cathedrals, to the geometric and calligraphic treatments of mosques and contemporary artists channelling architecture and vice versa, and so much else. This AD is about the contemporary interactions between living artists and architects, and the artistic practices, such as poetry and abstractions, that architects adopt to develop ideas for their projects. The issue features artists, architects, curators, musicians, poets and designer craftspeople, illustrating the current rich mix of architectonic constructions, interventions and set pieces that range from musical performance to exhibition designs, glass works and digital 3D scanning. It lays out the wide spectrum and beauty of these sublime correspondences, with contributions from architects about their own artistic practices, and creative works viewed through the eyes of architectural commentators. An explosion of colour, form and creative tactics for making multifaceted work that above all is architectural, it offers a cornucopia of possibilities.

Contributors: Peter Baldwin, Kathy Battista, Nic Clear, Mathew Emmett, Paul Finch, Paul Greenhalgh, Hamed Khosravi, Eva Menuhin, Felix Robbins, and Simon Withers.

Featured architects and artists: a-project, Captivate, Brian Clarke, Andy Goldsworthy, Barbara Hepworth, Danny Lane, Ben Johnson, Brendan Neiland, Ian Ritchie, and Zoe Zenghelis.



NOVEMBER/DECEMBER 2023

Volume 93 ISBN
Number 6 978 1394 163540

MULTISPACE
Architecture at the Dawn
of the Metaverse

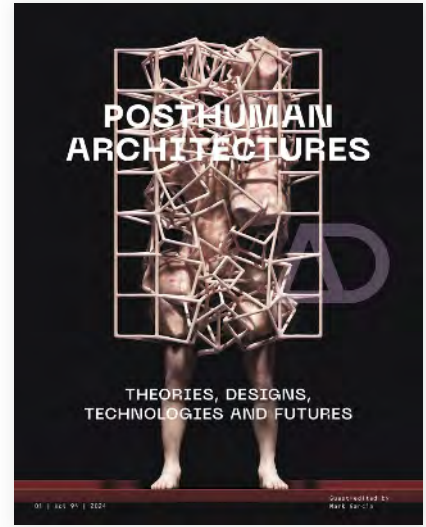
Guest-edited by Owen Hopkins

Multispace exists at the intersection of the physical and digital, and in the blurring of their previously clear dividing lines. Multispace is not a single space, but a hybrid space where, in effect, we occupy multiple spaces simultaneously. We enter it on a Zoom call, when we are in our office and in a meeting with 20 people; when we are cycling down a country lane whilst racing against thousands of others who also use the Strava app; when we are watching a TV show whilst live tweeting; or, perhaps most literally, when wandering around the local park looking for creatures that only appear on a smartphone screen.

A fundamental question of this AD is why the phenomena that multispace describes are of concern to architects. The answer is that multispace points to a situation that is at root an architectural one. Offering both a collective and highly personalised experience, static and dynamically customisable, and above all at the same time public and private, multispace lies at the centre of a set of tensions, concerns and preoccupations at the core of our conception of architecture as theory and practice. It is the messy space between, with rough and uneven edges that are constantly shifting.

Contributors: Aleksandra Belitskaja, Alice Bucknell, Jesse Damiani, Wendy Fok, Andrew Kovacs, Lara Lesmes and Fredrik Hellberg, Micaela Mantegna, Holly Nielsen, Giacomo Pala, Paula Strunden, Lucia Tahan, and Francesca Torello and Joshua Bard.

Featured architects and artists: iheartblob, Mamou-Mani, Space Popular, Liam Young.



JANUARY/FEBRUARY 2024

Volume 94 ISBN
Number 1 978 1394 170036

POSTHUMAN ARCHITECTURES
Theories, Designs, Technologies
and Futures

Guest-edited by Mark Garcia

The Posthuman is the new paradigm of architecture. Encompassing related topics such as the post-Anthropocene, more-than-human, non-human, trans-human, anti-human and meta-human, this AD presents a synthesis of the architectural Posthuman. Proliferating and diversifying, the Posthuman is now as planetary as it is everyday, and as disruptive, contested and contradictory as it is sublime. From the detail to the interplanetary, and from real and fictional designs and spaces to more proleptic universe-building futures, the issue describes and speculates on these spectacular and shocking new species. It envisions the Posthuman through the array of emerging technologies and features original contributions from academics, professionals, design studios and related disciplines and domains. These new spaces include the full electromagnetic spectrum and present new entanglements of Posthuman theories and technologies.

Contributors: Mario Carpo, Paul Dobraszczyk, Alberto Fernandez, Ariane Harrison, Steven Hutt, Barbara Imhof and Petra Gruber, Sylvia Lavin, Jacopo Leveratto, Tyson Hosmer and Roberto Bottazzi, Colbey Reed and Dennis Weiss, Andrew Witt, Brent Sherwood, Xavier DeKestelier and Levent Ozruh.

Featured designers and architects: Blue Origin, Christian Rex Van Minnen, Harrison Atelier, Hassell, Liqueur, Zaha Hadid Architects, and Blue Origin.

Guest-edited by
Agostino De Rosa,
Alessio Bortot and
Francesco Bergamo

CONTRIBUTORS

Matthias Bärmann
Silvia Benedito
Filippo Bricolo
Edwin Carels
Javier Corvalán
Driss Kettani
Stephen Kite
Giancarlo Mazzanti
Akira Mizuta Lippit
Susanna Piscicella
Renato Rizzi
Paul O Robinson
Antonella Soldaini

FEATURED ARCHITECTS AND ARTISTS

Alexander Savvich Brodsky
Neri&Hu studio
Quay Brothers
Ursula Schulz-Dornburg
Marco Tirelli

In Praise of Penumbra

Penumbra, from the Latin *paene* (almost) and *umbra* (shadow), can be defined as an intermediate zone of transition between light and shadow. Penumbra is therefore that space, both physical and imaginary, where everything is possible: it is the place of the uncanny, where presence and/or absence can produce wonder or horror.

This Δ positions this archetype in the contemporary world of architecture, investigating the ways it permeates different expressive forms – from critical theory to architectural drawing, from design and planning to photography. The contributors illustrate and discuss how penumbra has shaped their creativity and modified their approach to the design process. As a physical phenomenon, penumbra has supra-historical and global connotations; nonetheless, different cultures elaborate its symbolism in different ways. Its wide semantic spectrum powerfully inspires creative forms that hover between fullness and emptiness, presence and absence, past and future. The critical perspectives in this issue offer a wide analysis of penumbra's expressive potential and the key to an in-depth understanding of this elusive layer of reality.

Δ ARCHITECTURAL DESIGN

July/August 2023

WILEY.COM

WILEY

ISBN 978-1-119-98396-5



9 781119 983965

WILEY END USER LICENSE AGREEMENT

Go to www.wiley.com/go/eula to access Wiley's ebook EULA.