Manazir
مناظر
Journal

Journal of the Swiss Platform for the Study of Visual Arts,
Architecture and Heritage in the MENA Region

Issue 3
2021

Geometry and Color. Decoding the Arts of Islam in the West from the Mid-19th to the Early 20th Century

edited by Sandra Gianfreda, Francine Giese, Axel Langer and Ariane Varela Braga

Impressum

Manazir Journal is a peer-reviewed academic Platinum Open Access journal dedicated to visual arts, architecture and cultural heritage in the Middle East and North Africa (MENA). Created in 2019, the journal is linked to *Manazir – Swiss Platform for the Study of Visual Arts, Architecture and Heritage in the MENA Region*, a platform of exchange that aims to connect researchers interested in these themes. The term "Manazir" refers to landscapes, perspectives and points of view in Arabic, Ottoman Turkish and Persian. Thus, *Manazir Journal* is oriented towards a diversity of transcultural and transdisciplinary "landscapes" and "points of views" and open to a multiplicity of themes, epochs and geographical areas.

BOP - Bern Open Publishing
ISSN: 2673-4354
DOI: https://doi.org/10.36950/manazir.2021.3.6

Manazir
مناظر
Swiss Platform for the Study of Visual Arts, Architecture and Heritage in the MENA Region

UNIVERSITÄT BERN
Philosophisch-historische Fakultät
Institut für Kunstgeschichte
Center for Global Studies

UNIVERSITÉ DE GENÈVE
FACULTÉ DES LETTRES
Unité d'arabe

Production, design & layout: Joan Grandjean
Copy editing: Hannah Jung
Cover image: "Moresque Ornament from the Alhambra" in: Owen Jones, *The Grammar of Ornament*, London 1856, pl. XLIII (detail).

This issue was made possible with the support of the Rietberg-Gesellschaft.

Ariane Varela Braga[1]

Through the Looking Glass of the Orient

Color, Geometry and the Kaleidoscope

Abstract

Traditionally related to concepts of luxury, fancy, and uncontrolled sensuality, color has in Western culture long been considered an unsteady component. On the contrary, and as often noted by travelers, Eastern cultures frequently demonstrate a particular talent for the harmony of color and ornament. In the nineteenth century, a number of architects and artists tried to rationalize the properties and use of color, ornament, and the Islamic arts in various ways, relating them to contemporary experiments in optics. This article examines the relationship between color theory, Islamic arts, and architecture, taking as a starting point the invention of the kaleidoscope by David Brewster and its relationship to Nasrid ornament. It then considers how Islamic arts and color theory dialogued in the work of British architect and decorator Owen Jones and Tuscan amateur architect Ferdinando Panciatichi Ximenes d'Aragona.

Keywords: color; kaleidoscope; ornament; architecture; Alhambra

Both material and optical, the result of cultural constructions, color has long been considered as an unstable element. Since Antiquity, color, ornament and the East have all been related to the idea of luxury, decadence and unrestrained imagination. In the nineteenth century, various attempts were made to rationalize color, ornament and Islamic arts. In search for an aesthetic renewal, several Western artists, architects and designers looked back to the East for guidance, following the *topos* that 'Orientals' possessed a special 'instinct' for color harmony (Ball; Gage, *Color in Art*; Gage, *Color and Culture*). While architects like Pascal Coste, Owen Jones or Jules Bourgoin highlighted the geometrical and mathematical principles of Islamic architecture and ornamentation, scientists such as Michel Eugène Chevreul, James Clerk Maxwell or Hermann von Helmholtz investigated the scientific properties and general laws of color harmony. In this article, I propose to follow the thread uniting the Alhambra and neo-Moorish ornament to nineteenth-century color theory and architecture, taking as a guide the kaleidoscope. I will examine two different ways in which the Alhambra and contemporary color theory intersected by considering the work of two men who shared a common fascination for Nasrid ornament, color theory and optics. I will consider firstly the case of the British architect and designer reformer Owen 'Alhambra' Jones, and secondly that of the marquis Ferdinando Panciatichi Ximenes d'Aragona, an amateur architect fascinated with the Orient and active in Italy.

[1] **Ariane Varela Braga**, Visiting Professor, University of Milan.
Email: ariane.varelabraga@khist.uzh.ch

The kaleidoscope and the Alhambra

From the Greek *kalos* (beauty), *eidos* (form) and *scope* (to see), the kaleidoscope was (re)discovered around 1815 by Scottish writer and scientist David Brewster, who was then investigating color theory and the polarization of light by crystals. Patented in 1817, Brewster's kaleidoscope became immediately extremely popular, provoking an authentic "kaleidoscomania" around Europe and even beyond, as recalled by media archeologist Erkki Huhtamo ("All the World" 142). Through the lenses of this optical instrument, the observer was provided with a new and stimulating visual experience (fig.1). Thus, for the poet Charles Baudelaire, it demonstrated a new kind of perception, epitomizing modernity itself. As Jonathan Crary has argued, the kaleidoscope materialized and echoed the perception of frenetic life in modern cities, characterized by constant movement and urban renewal (113-114).

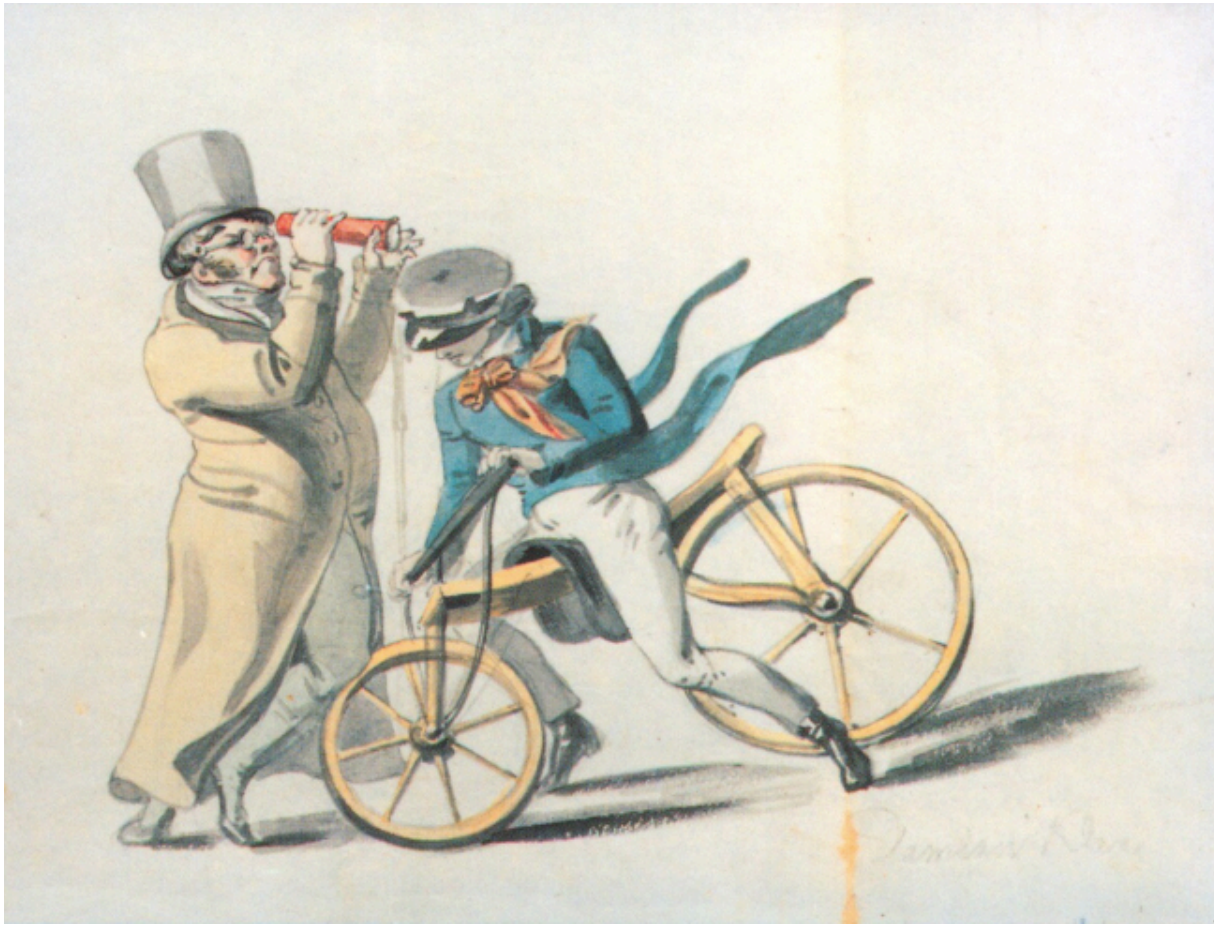
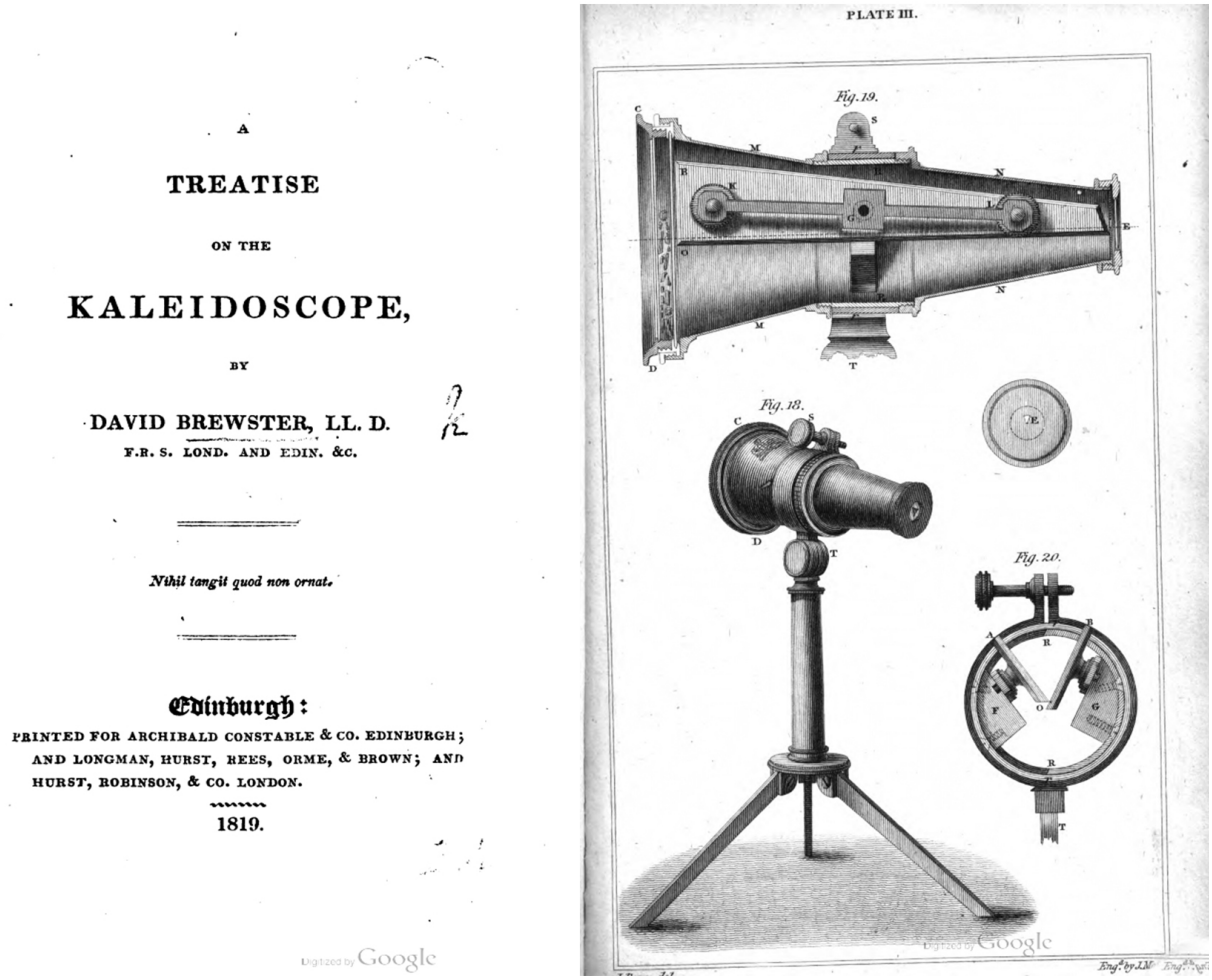


Figure 1 : Leopold Kupelwieser. *Schubertiade* (detail). 1818. Image courtesy of Wikimedia Commons.

Consisting of a tube that holds mirrors or other reflecting surfaces placed at a certain angle, the kaleidoscope can contain pieces of colored glass or other elements, which, by rotating the tube, create a multitude of symmetrical patterns, in constant evolution (fig. 2). As Brewster explained in his 1819 *Treatise on the Kaleidoscope,* the decorative effects produced by this optical instrument offer evident practical applications, especially for architectural and painted ornament, as well as for carpet design. This utilitarian role was further emphasized in the second edition of his book, published in 1858 and purposely entitled: *The Kaleidoscope, its History, Theory, and Construction, with its Application to the Fine and Useful Arts.* Brewster remarked:

> When we consider the immense variety of professions connected both with the fine and useful arts, … [t]he Kaleidoscope will assume the character of the highest class of machinery … [i]t will create, in a single hour, what a thousand artists could not invent in the course of a year; and while it works with such unexampled rapidity, it works also with a corresponding beauty and precision (136).



A

TREATISE

ON THE

KALEIDOSCOPE,

BY

DAVID BREWSTER, LL. D.

F.R. S. LOND. AND EDIN. &c.

Nihil tangit quod non ornat.

Edinburgh:

PRINTED FOR ARCHIBALD CONSTABLE & CO. EDINBURGH; AND LONGMAN, HURST, REES, ORME, & BROWN; AND HURST, ROBINSON, & CO. LONDON.

1819.

PLATE III.

Fig. 19.

Fig. 18.

Fig. 20.

Figure 2 : David Brewster. *Treatise on the Kaleidoscope.* 1819. Title page and pl. III. Image courtesy of Google Books.

Producing symmetrical effects of contrasts through the combinations and variations of a few simple elements, the kaleidoscope performs the basic principles of abstract ornamentation that would become the object of so much attention in the many grammars of ornament that appeared in the second half of the nineteenth century, a parallel that has well been noted by Arnaud Maillet. As the historian of ornament Ralph Nicholson Wornum explained in his *Analysis of Ornament* (1856):

> The whole grammar of ornament consists in contrast, repetition, and series. …Perhaps the best illustration of the value of series is the kaleidoscope. All the beautiful figures represented by that instrument are repetitions in circular series; and often the rudest materials will generate extremely beautiful effects (24).

Brewster's invention certainly attracted the attention of designers as well. In Paris in 1841, a certain M. Rouget de Lisle adapted the kaleidoscope for the design of tapestries (Calla 371). A few years later, Scottish decorator and color theorist David R. Hay referred to Brewster's invention in his book of 1844, *Original Geometrical Diaper Designs* (fig. 3).

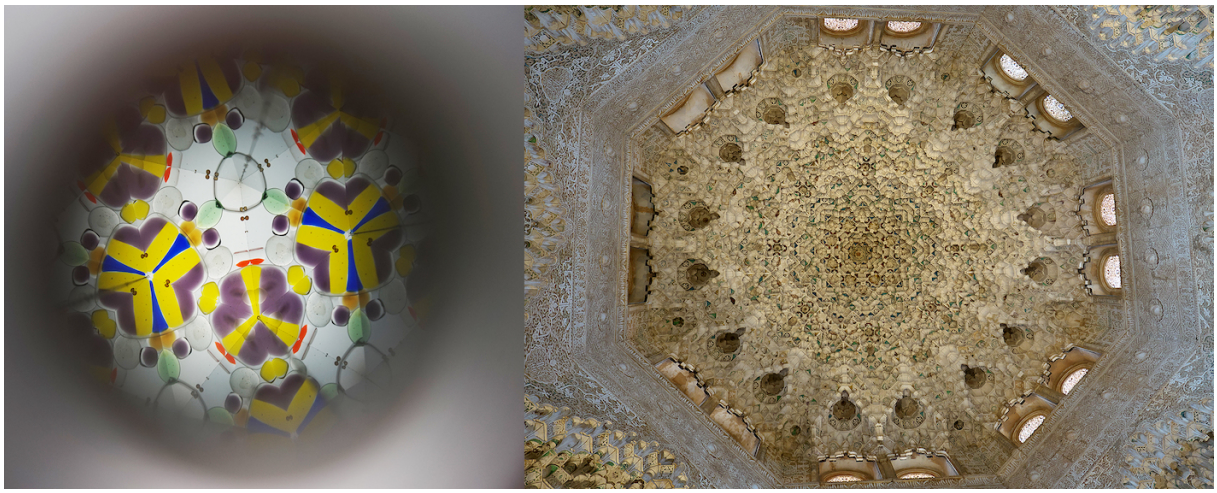


Figure 3 : A view inside the kaleidoscope (on the left) and detail of the ceiling of the Hall of the Two Sisters (on the right). Image courtesy of Wikipedia Commons, photographed by Tiia Monto (left) and Jebulon (right).

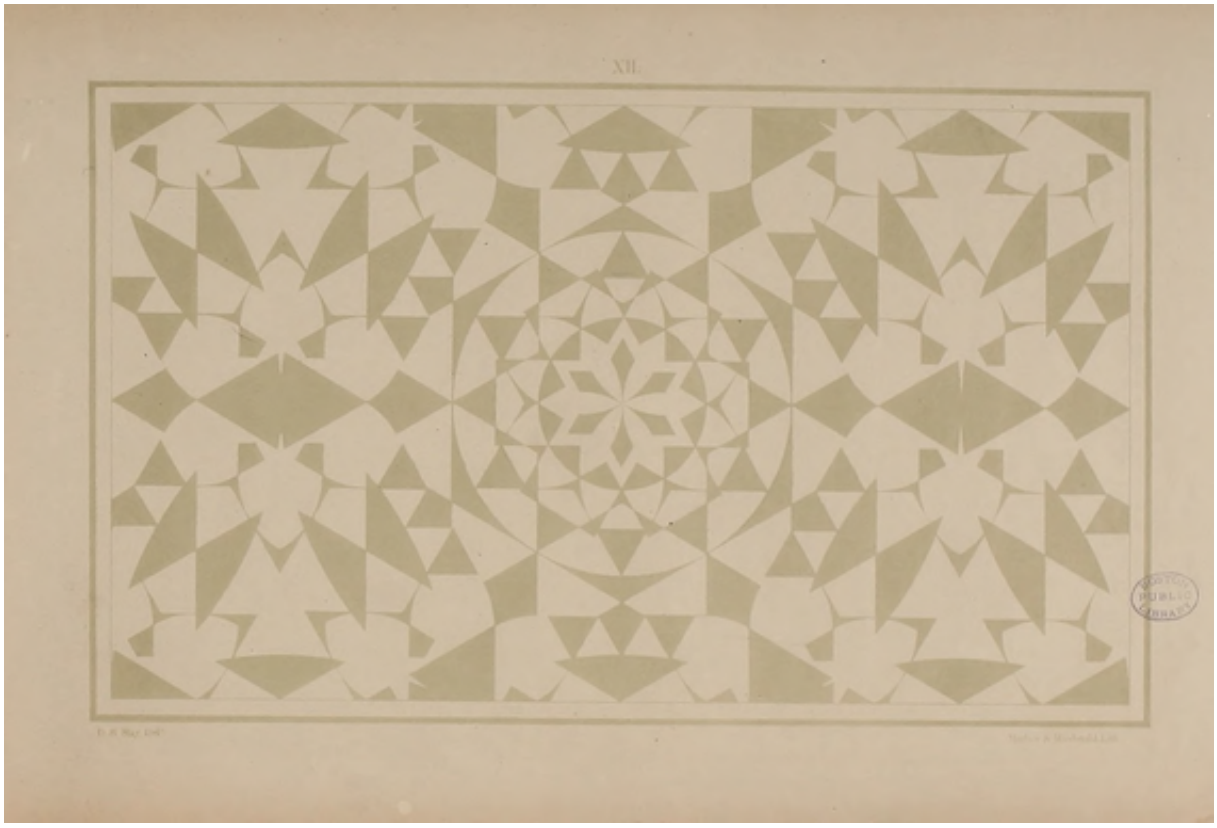


Figure 4: David R. Hay. *Geometric ornament*. 1844. Taken from Hay pl. 12. Image courtesy of Boston Public Library and www.archive.org.

In the volume's introductory "Essay on Ornamental Design", he argued for the need to renew the ornament of the Alhambra, which according to him had been "used, in various manufactures, for so long a period, that [it is] now exhausted … [and that] something new in this style of ornament is, therefore, required" (1). His comment coincided with the height of the fashion for the so-called neo-Moorish style that had become widespread in the 1830s and 1840s, following the Romantics' interest in Spain and the publications of Joseph-Philibert Girault de Prangey and Owen Jones. Comparing the ornament of the Alhambra to the patterns produced by the kaleidoscope was not infrequent, as already pointed out by Maillet (fig. 4). The multiplicity of Moorish ornament, its symmetrical variations and the pleasure deriving from its contemplation could recall "les grains de verre d'un kaléidoscope" (*Monuments* 21) or the Alhambra itself could be described as a "kaleidoscope of delight" (Thornbury 226). On the other hand, for John Ruskin, who considered "detestable [the] ornamentation of the Alhambra" (Ruskin 1851-53, 1: 429), and who despised the notion of formal symmetry for the decorative arts, the mechanical device of the kaleidoscope was only a brainless way to produce ornaments (Ruskin, *The Stones of Venice*; Ruskin, "Lecture III" 92) and the instrument was indeed sometimes criticized for the "stiffness of the designs" it produced ("Exposition" 98). Ruskin had, however, never seen the actual Alhambra. His knowledge of the monument was mediated by Owen Jones' and Jules Goury's plates in their seminal publication on the Nasrid citadel, *Plans, Elevations, Sections, and Details of the Alhambra*, a work in which the Alhambra's geometrical ornamentation had been translated into brightly colored, flattened patterns thanks to the recent technique of chromolithography, the development of which Jones contributed to (Ferry, "Printing the Alhambra").

Owen Jones, the "Paxtonian Kaleidoscope" and the science of color

Although there is no evidence of Jones's use of the kaleidoscope, Brewster's invention certainly coincided with a period of growing interest on the part of architects and designers for geometrical patterns, the study of Islamic ornamentation, and the popularity of the neo-Moorish style. In 1815, James Canavah Murphy's *Arabian Antiquities of Spain* appeared, with several decorative patterns from the Alhambra, soon to be followed by the publications of Girault de Prangey, and Jules Goury and Owen Jones in the mid-1830s. At that time, Jones was mainly known for his work as a color printer and designer of mosaics. Collaborating with ceramics producer John Blashfield, he published in 1842, *Designs for Mosaic and Tessellated Pavements* and several of his drawings produced in the 1830s recall the crystalline compositions produced by the kaleidoscope (fig. 5).

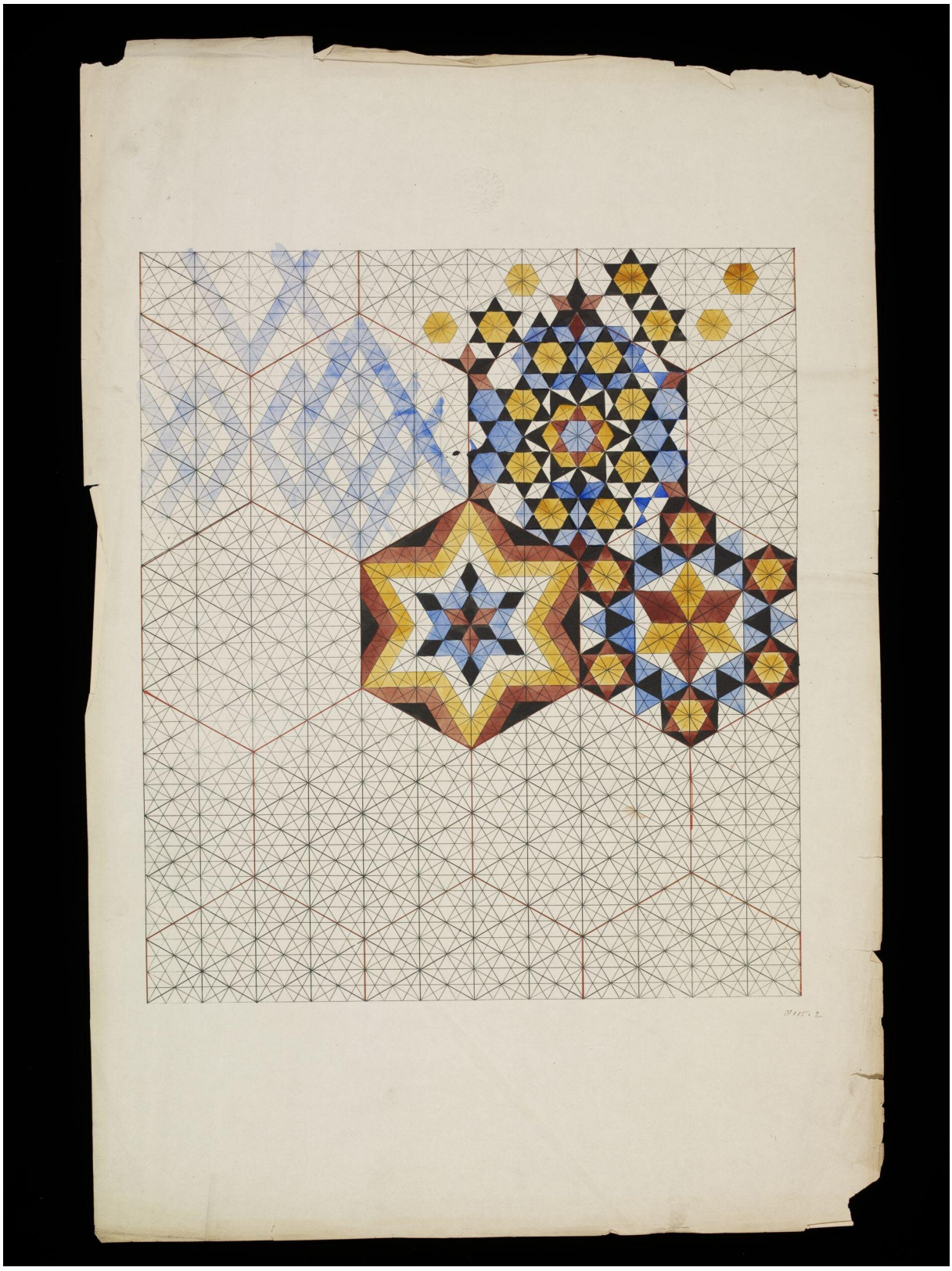


Figure 5 : Owen Jones. *Design for a tiled pavement in Islamic style*. Ca. 1840-1850. Pencil and watercolour. 54.7 cm x 39 cm. Victoria and Albert Museum, Prints, Drawings & Paintings Collection, 8115:12 © Victoria and Albert Museum, London.

Jones certainly shared Brewster's interest in the reconciliation of art and science and he would combine his knowledge of the Alhambra with contemporary color theories to promote the revival of polychromy. While studying the decorative system of the Alhambra, Jones had found confirmation of the importance of the use of the three primaries—red, yellow and blue—which, according to him, characterized the "early periods of art" (Goury and Jones, vol. 1: 1842, plate 28). He would later diffuse his ideas in the fine arts courts of the second Crystal Palace, rebuilt between 1852-1854 at Sydenham, which constituted a *manifesto* for the importance of polychromy throughout history (Moser 121-139; Varela Braga, *Une théorie universelle* 33-55). This culminated in the Alhambra Court and its accompanying guidebooks, in which Jones detailed his theories on color and ornament (Ferry, "Owen Jones; Varela Braga, "How to Visit"). Seen by millions of visitors, this reinvented and condensed version of the Alhambra not only contributed to the popular knowledge of the monument but more importantly transformed the actual perception of the original Alhambra as a highly colored architecture, saturated with blue, red, and gold.

As could be expected, the Court's colored ornamentation attracted comparison with the kaleidoscope. A visitor to the Hall of the Tribunal in the court commented on the "the diapered patterns in lines and curves running into and crossing each other, so as to form an endless variety of floral and geometrical shapes, like those of the kaleidoscope" (Adams 306), whereas the French writer Alphonse Esquiros admired the patterns on the ceiling and the multiplicity of colors that recalled "*toutes les teintes du kaléidoscope*" (658). The kaleidoscopic effect of the court was further enhanced in the section inspired by the Hall of the Abencerages, where Jones had used colored glasses to decorate a *muqarnas* dome, probably inspired, as noted by Sarah Keller, by the stained glasses of the Mirador del Lindajara (317).

However, "Alhambra Jones" was no revivalist. On the contrary, he advocated for the creation of a totally new architectural and ornamental language, that would be the expression of his age, and in which color would play a central role, as demonstrated in his color scheme for the Crystal Palace at the London Great Exhibition in 1851 (Darby 262-290; Van Zanten 235-241; Flores 79-88; Moser 44-58). In the well-known decoration of the "Paxtonian kaleidoscope", as the Crystal Palace was also referred to ("Introductory Address" 169), Jones combined his ideas about the polychromy of the Alhambra with contemporary theories of color and optics. The interior of the iron structure was painted with the three primaries red, yellow, and blue, scientifically applied in accordance with the proportions and notions developed by two contemporary chemists and color specialists (fig. 6).

The first was George Field, a British producer of pigments, who counted Turner and the Pre-Raphaelites among his clients and was the author of several treatises on color harmony (Gage, *George Field*). The second was Michel Eugène Chevreul, director of the Manufactures des Gobelins, who had established in 1828 his *Laws of Simultaneous Contrasts*, proving that colors were perceived differently when seen isolated or juxtaposed (Roque). The primaries were therefore applied in narrow stripes, separated by white, so that they did not blend, following Chevreul's theory, and in the ratio of three parts yellow to five parts red to eight parts blue, according to Field's experiment with the light spectrum. With this system, Jones believed the three primaries would be blended in the eye of the viewer, thus producing what he called a "neutralised bloom" and an artificial atmospheric perspective that provoked the admiration of viewers (Merrifield ii). However, contrary to Chevreul, Jones was not aiming at the harmony of complementary colors. Instead, he turned to an ideal and symbolical unification of the three primaries into light, which owed much to Field's analogical system of musical harmony, as Michael Darby and David Van Zanten have shown.

At this point it might be useful to consider briefly the question of primary or primitive colors. When Isaac Newton had realized his experiment with the prism, he had stated that the primitive colors were seven, in analogy with the musical notes. This, however, appeared to be in contradiction with

Figure 6 : William Simpson. *Interior of the Crystal Palace decorated by Owen Jones*. Ca. 1851. Watercolour on paper. 71 cm x 99 cm. Victoria and Albert Museum, Prints, Drawings & Paintings Collection, 546-1897 © Victoria and Albert Museum, London.

the practical experience of artists who believed the primitive colors to be three, a fact that was established in the early seventeenth century by engraver Jakob Christoph Le Blon and his trichromic color engraving process. Consequently, several theorists would later try to reconcile Newton's theories with the idea of the three primaries. One of them would be David Brewster, who developed the theory of the three spectral primaries: using light filters, he argued that the light was made up of a mixture of red, yellow, and blue. David Ramsay Hay or George Field also shared his view. Field even elaborated an apparatus called the "Metrochrome", to prove that light was composed of three parts of yellow, five parts of red, eight parts of blue, an idea that would later prove to be totally arbitrary but which illustrated the efforts to unite art and science.

Jones' color system was further exposed in his 1856 *Grammar of Ornament* and put into practice in his other ferro-vitreous decorations, like the 1858 shopping hall of the Crystal Palace Bazaar (fig. 7) and the show room for glass producers Follet & Osler in Oxford Street (fig. 8). For the first, Jones created a polychrome ceiling composed of transparent glass panels framed by a band of yellow, red, and blue glass, whereas for the second, he not only decorated the ceiling with colored glasses in the three primaries, but also took advantage of the optical effects of mirrors placed along the walls to produce, as in a gigantic kaleidoscope, a specular effect of depth. Combining his knowledge of the Alhambra and contemporary color theory and applying them to modern building techniques, Jones demonstrated how art and science could renew contemporary architecture.

Figure 7: Owen Jones. *Osler's Gallery, Oxford Street, London.* Ca.1858-1860. Pen, ink and watercolour. 147.3 cm x 102 cm. Victoria and Albert Museum, Prints, Drawings & Paintings Collection, P.29-1976 © Victoria and Albert Museum, London.

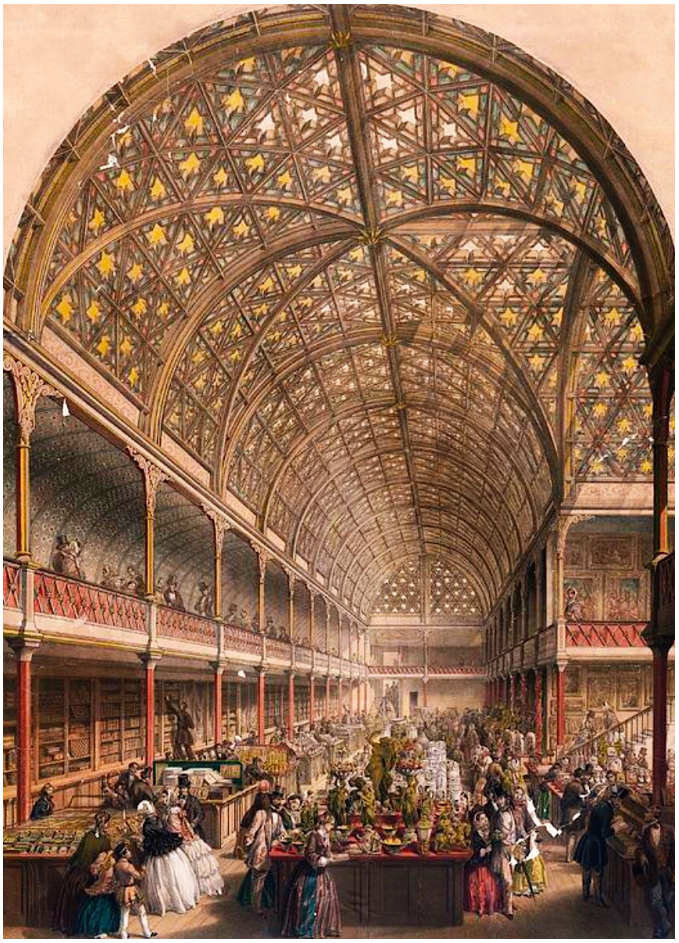


Figure 8: Owen Jones. *Interior of the London Crystal Palace Bazaar*. Ca. 1858. Lithography, hand-colored. Image courtesy of Library of Congress, Washington D. C.

A Tuscan kaleidoscope: The villa of Sammezzano

Goury and Jones' volume became one of the main visual sources for documenting the architecture and ornamentation of the Alhambra, thus contributing greatly to the international diffusion of the neo-Moorish taste. The interest for Islamic ornament that developed in several parts of Europe found in Tuscany a fertile ground too, as the spectacular orientalizing interiors in the Villa of Sammezzano in Regello demonstrate. Realized between the early 1840s and the late 1880s, Sammezzano was a product of the Marquis Ferdinando Panciatichi Ximenes d'Aragona's imagination, who acted both as patron and amateur architect. The result was a blend of western and eastern styles that owed much to the gothico-Moorish romantic spirit, and a *horror vacui* decoration that is yet another example of the fertile interaction between orientalizing decoration, optics, and color theory in the nineteenth century.

Panciatichi never visited Spain nor traveled outside Europe. His knowledge of Islamic architecture stemmed from contemporary architectural publications and was mediated through Paris and London. Two men were particularly relevant for his ideas about ornament. One was the French painter and ceramist Jules Ziegler, known in the 1840s for his production of Alhambresque vases and who authored a treatise on ceramics and aesthetics based on universal analogy, *Études céramiques: recherches des principes du beau dans l'architecture, l'art céramique et la forme en général*, published in 1850 (Labrusse 38-41). A second important figure was Owen Jones, whose Alhambra Court in the reconstructed Crystal Palace at Sydenham he had seen in 1864. Soon afterwards, Panciatichi acquired his first copy of Jones' *Grammar of Ornament*, the pattern on the cover of the book appears in stucco in one of the villa's rooms (Varela Braga, "Building a Dream" 301-302).

Like Ziegler and Jones, Panciatichi believed in the union of art and science. A true amateur, he made experiments in several fields, including optics. Participating in the microscope mania of the second half of the nineteenth century, Panciatichi not only rejoiced in the use of the instrument but was also engaged in the creation of his own models. He was a friend of Giovanni Battista Amici (1786-1863), one of the inventors of the achromatic microscope, and was especially interested, as was David Brewster, in the use of jewels as optical lenses. With the help of Parisian optician Charles Chevalier, he created several microscopes, some of which were exhibited at the National Exhibition in Florence in 1861 (*Esposizione Italiana* 389-390).

This knowledge of optics and color theory was put into practice in his orientalizing experimentation in Sammezzano, in the painting of the rooms, and through the use of colored glasses. A striking example is the villa's dining room, the so-called "Peacock Room", characterized by its multicolored gothic fan-vaulting (fig. 9). This is perhaps the most "psychedelic" space in the villa, but it actually displays a precise polychromatic scheme, which corresponds to the division of the light spectrum in seven colors, as theorized since Newton's experiment with the prism. At a closer look, we remark that colors are separated by more—or less—largely depicted dark lines, which demonstrated striking similarities with the experiment on the spectrum made by Joseph von Frauenhofer, popularized through volumes such as Ernest Brücke's *Les couleurs au point de vue physique, physiologique, artistique et industriel* (1866), which was present in Panciatichi's library.

Figure 9: Ferdinando Panciatichi Ximenes d'Aragona. *Peackock Room*. Villa of Sammezzano, Regello.

In other instances, color is introduced by the means of glass, such as in the Hall of Stars, where pieces of colored glass contrast with the whiteness of the walls and vault (fig. 10). Sarah Keller has shown that stained glass constituted an essential feature of many neo-Moorish buildings (Keller 303). However, Panciatichi's decoration is unusual: instead of having stained-glass windows, the glass elements have been inserted directly in the stucco paneling of the walls. In the upper portions of the walls, which turn their back to the gallery above the ingress hall, light passes through the glass, transforming the walls into so many colored *transannea*, echoing Jones' metropolitan experiments in a room in which the cover pattern of the *Grammar of Ornament* was displayed.

Figure 10: Ferdinando Panciatichi Ximenes d'Aragona. *Hall of Stars*. Villa of Sammezzano, Regello.

However, while Jones believed that his "neutralised bloom" (7) would be created by a precise combination of red-yellow-blue according to the mathematical proportions exposed by Field, Panciatichi follows another system, replacing yellow with green. Would green and red refer to Chevreul's theory of the complementaries? While no written information on Panciatichi's motivation survives, the choice of the triad red-green-blue might more probably reflect contemporary changes in color theory. The theory of trichromatic color advanced by Thomas Young in the beginning of the nineteenth century, and further developed by Hermann von Helmholtz in 1850 (thus known as the Young-Helmholtz theory) had stated that the eye's retina consists of three different kinds of light receptors for red, green, and blue (Millington). In 1857, James Maxwell had proved the validity of the Young-Helmholtz's theory, which was diffused through popular scientific journals or publications such as Brücke's volume. In the 1860s (when Panciatichi decorated this room), the primaries were therefore no longer considered to be red-yellow-blue but red-green-blue. Despite the lack of archival information regarding his intentions, we may assume that Panciatichi, as a passionate amateur of optics, would have been aware of such scientific discoveries and that he would have attempted to put them into practice in his visual experiments in Sammezzano.

In the nineteenth century, the study of the ornamentation of the Alhambra, color theory, and optics dialogued closely. As demonstrated by the examples of Owen Jones in Great Britain and Ferdinando Panciatichi Ximenes d'Aragona in Tuscany, it could result in concrete architectural and decorative realizations ranging from contemporary interpretations to eclectic experimentations. In both cases, the model of the Islamic arts played a crucial role. Islamic arts would continue to inspire many twentieth-century color theories, as demonstrated by the Bauhaus and Johannes Itten's spiritual and metaphysical interpretations. That, however, is another story.

Bibliography

Adams, H. G. "Courts of the Crystal Palace. Chap. VI, The Alhambra Court." *The New Monthly Belle Assemblée; a Magazine of Literature and Fashion*, vol. 44, 1856, pp. 304-307.

Ball, Philip. *Bright Earth: Art and the Invention of Color.* Farrar, Straus & Giroux, 2002.

Blashfield, John. *Designs for Mosaic and Tessellated Pavements.* John Weale, 1842.

Brewster, David. *A Treatise on the Kaleidoscope*. Archibald Constable, 1819.

---. *The Kaleidoscope, its History, Theory, and Construction, with its Application to the Fine and Useful Arts.* John Murray, 1858.

Brücke, Ernest. *Les couleurs au point de vue physique, physiologique, artistique et industriel.* J.B. Baillière et fils, 1866.

Calla, M. "Rapport." *Bulletin de la société d'encouragement pour l'industrie nationale*, no. 447, 1841, p. 371.

Canavah Murphy, James. *Arabian Antiquities of Spain.* Cadell & Davies, 1815.

Crary, Jonathan. *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century.* MIT Press, 1990.

Darby, Michael. *Owen Jones and the Eastern Ideal*. PhD thesis, University of Reading, 1974.

Darby, Michael and David Van Zanten. "Owen Jones' Iron and Glass Buildings of the 1850s." *Architectura*, no. 1, 1974, pp. 53-75.

Esposizione Italiana tenuta in Firenze nel 1861. Vol. 2, G. Barbèra, 1864.

Esquiros, Alphonse. "L'Angleterre et la vie anglaise. Le Crystal Palace et les Palais du Peuple." *Revue des deux mondes*, vol. 45, June 1863, pp. 636-669.

"Exposition of the Late Researches on the Cohesion Figures of Liquids." *Journal of the Society of Arts*, 23 December 1864, pp. 97-98.

Ferry, Kathryn. "Printing the Alhambra: Owen Jones and Chromolithography." *Architectural History*, vol. 46, 2003, pp. 175-188.

---. "Owen Jones and the Alhambra Court at the Crystal Palace." *Revisiting al-Andalus. Perspectives on the Material Culture of Islamic Iberia and Beyond*, edited by Glaire Anderson and Mariam Rosser-Owen, Brill, 2007, pp. 225-245.

Flores, Carol A. H. *Owen Jones, Design, Ornament, Architecture and Theory in an Age of Transition*. Rizzoli, 2006.

Gage, John. *George Field and his Circle, from Romanticism to the Pre-Raphaelite Brotherhood*. Fitzwilliam Museum, 1989. Catalogue of the eponymous exhibition, 27 Jun. 1989 - 3 Sept. 1989, Fitzwilliam Museum, Cambridge.

---. *Color and Culture. Practice and Meaning from Antiquity to Abstraction.* University of California Press, 1993.

---. *Color in Art.* Thames & Hudson, 2006.

Goury, Jules and Owen Jones. *Plans, Elevations, Sections, and Details of the Alhambra, from Drawings Taken on the Spot in 1834 by Jules Goury, and in 1834 and 1837 by Owen Jones*. Owen Jones, 1836-1845. 2 vols.

Hay, David R. *Original Geometrical Diaper Designs, Accompanied by an Attempt to Develop the True Principles of Ornamental Design, as Applied to the Decorative Arts.* D. Bogue; J. Menzies; D. Dryce, 1844.

Huhtamo, Erkki. "'All the World's a Kaleidoscope': A Media Archaeological Perspective to the Incubation Era of Media Culture." *Rivista di estetica*, no. 55, 2014, pp. 139-153. https://journals.openedition.org/estetica/982. Accessed 8 Feb. 2022.

"Introductory Address." *The Haileybury Observer*, 15 October 1851, pp. 169-170.

Jones, Owen. *The Grammar of Ornament. Illustrated by Examples from Various Styles of Ornament.* Day & Son, 1856.

Keller, Sarah. "Oriental Carpets and Gothic Windows. Stained Glass in Neo-Moorish Architecture." *Mudejarismo and Moorish Revival in Europe. Cultural Negotiations and Artistic Translations in the Middle Ages and 19th-century Historicism*, edited by Francine Giese, Brill, 2021, pp. 303-326.

Labrusse, Rémi. *Face au chaos. Pensées de l'ornement à l'âge de l'industrie*. Les Presses du Réel, 2018.

Maillet, Arnaud. "Kaleidoscopic Imagination." *Grey Room*, no. 48, 2012, pp. 36-55.

Merrifield, Mary. "The Harmony of Color as Exemplified in the Exhibition." *The Art Journal Illustrated Catalogue: The Industry of All Nations*. George Virtue, 1851.

Millington, E. C. "History of the Young-Helmholtz Theory of Colour Vision." *Annals of Science*, vol. 5, no. 2, 1942, pp. 167-176. https://doi.org/10.1080/00033794200201421

Monuments, souvenirs, mœurs de l'Espagne. Fragment d'un voyage inséré dans la revue française. Imprimerie Fournier, 1829.

Moser, Stephanie. *Designing Antiquity. Owen Jones, Ancient Egypt and the Crystal Palace*. Yale University Press, 2012.

Roque, George. *Art et science de la couleur. Chevreul et les peintures, de Delacroix à l'abstraction*. Jacqueline Chambon, 1997.

Ruskin, John. *The Stones of Venice*. Vol. 1: *The Foundations*. Smith, Elder & Co, 1851.

---. *The Stones of Venice*. Vol. 2: *The Sea-Stories*. Smith, Elder & Co, 1853.

---. *The Stones of Venice*. Vol. 3: *The Fall*. Smith, Elder & Co, 1853.

---. "Lecture III on Modern Manufacture and Design, delivered at Bradford, 1 March 1859." *The Two Paths, Being Lectures on Art, and its Application to Decoration and Manufactures, Delivered in 1858-9,* John Wiley, 1869, pp. 90-135.

Thornbury, Walter. *Life in Spain: Past and Present.* Smith, Elder & Co, 1859.

Van Zanten, David. *The Architectural Polychromy of the 1830s*. Garland, 1977.

Varela Braga, Ariane. *Une théorie universelle au milieu du XIXe siècle : La Grammar of Ornament d'Owen Jones*. Campisano Editore, 2017.

---. "How to Visit the Alhambra and 'be home in time for tea': Owen Jones's Alhambra Court in the Crystal Palace of Sydenham." *A Fashionable Style. Carl von Diebitsch und das maurische Revival*, edited by Francine Giese and Ariane Varela Braga, Peter Lang, 2017, pp. 71-84.

---. "Building a Dream: the Alhambra in the Villa of Sammezzano." *The Power of Symbols. The Alhambra in a Global Perspective*, edited by Francine Giese and Ariane Varela Braga, Peter Lang, 2018, pp. 293-308.

Wornum, Ralph Nicholson. *Analysis of Ornament. The Characteristics of Styles: An Introduction to the Study of the History of Ornamental Art.* Chapman & Hall, 1856.

Biography

Ariane Varela Braga is a historian of art and architecture. She is currently a Visiting Professor at the University of Milan. In 2021, she was a Chastel Fellow at the French Academy and a Fellow at the Bibliotheca Herziana in Rome, where she worked on a book manuscript titled "Crafting the Moresco: Orientalism, Architecture and Material Culture in 19th and Early 20th-Century Italy" (Habitation project, University of Zurich). Her research is located at the intersections between visual and material culture, and architecture and cultural history in the late modern period. Her first book was about Owen Jones' *Grammar of Ornament* (Campisano, 2017). She has published volumes and articles on the history and theory of decorative arts and architecture, polychrome marble, and the European appropriation of non-Western art, and curated exhibitions on nineteenth-century art and architecture, as well as on contemporary art.