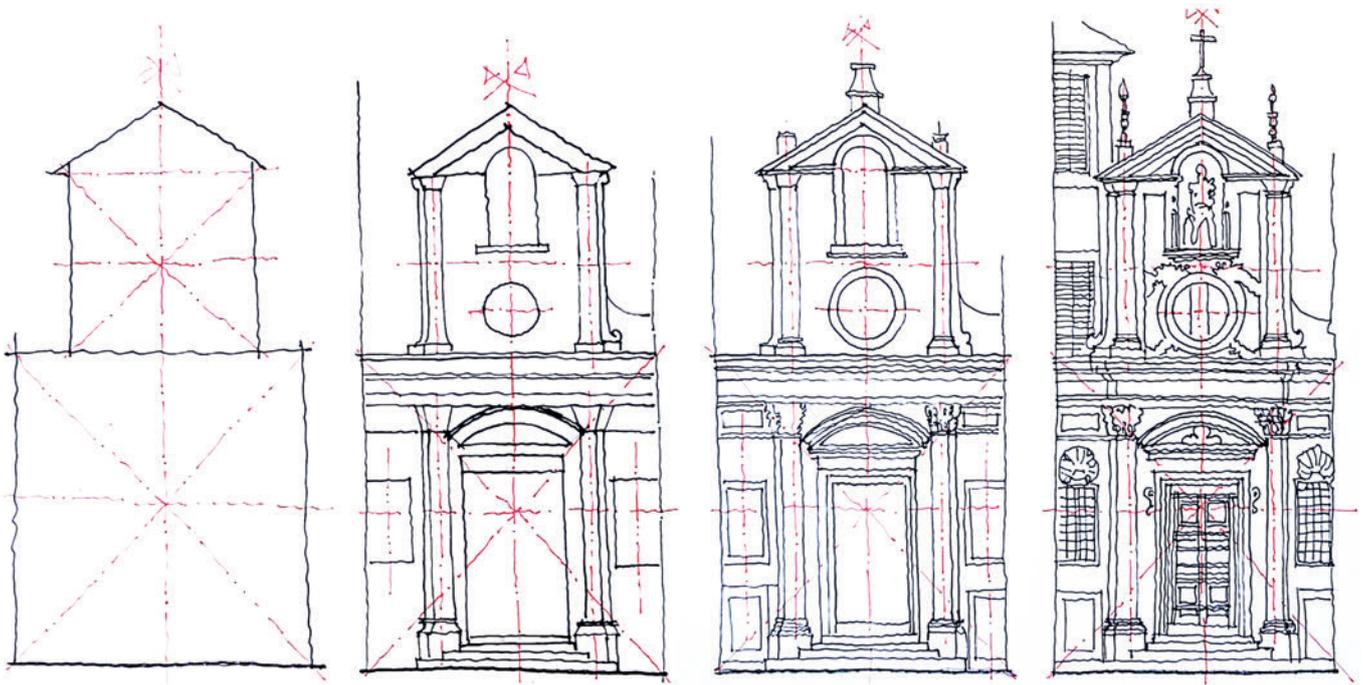


# Freehand architectural drawing Urban sketching

Emanuela Chiavoni and Francesca Porfiri





Freehand architectural drawing  
Urban sketching

2

## Esperienze di Studio e Restauro in Europa – 2

Freehand  
architectural drawing  
Urban sketching

*Emanuela Chiavoni and Francesca Porfiri*



SAPIENZA  
UNIVERSITÀ EDITRICE  
2022

Under the patronage of



**SAPIENZA**  
UNIVERSITÀ DI ROMA



This book is funded with the resources belonging to Sapienza from the Sustainable Urban Rehabilitation in Europe (SURE), scientific Erasmus + project (2016-2019).

Copyright © 2022

**Sapienza Università Editrice**  
Piazzale Aldo Moro 5 – 00185 Roma

[www.editricesapienza.it](http://www.editricesapienza.it)  
[editrice.sapienza@uniroma1.it](mailto:editrice.sapienza@uniroma1.it)

Iscrizione Registro Operatori Comunicazione n. 11420

ISBN 978-88-9377-203-7

DOI 10.13133/9788893772037

Published, february 2022



Quest'opera è distribuita  
con licenza Creative Commons 3.0 IT  
diffusa in modalità *open access*.

Cover: *The four drawing phases for the proportioning of the facade of the Church of S. Barbara dei Librari, Rome, 1999. Drawing by E.C.*

# Index

|  |    |
|--|----|
| <b>Foreword</b>  | 7  |
| <b>Acknowledgements</b>  | 9  |
| <b>Introduction</b>  | 11 |
| <b>1. Perspective drawing</b>  | 13 |
| <b>2. Initial survey achieved by viewing, understanding<br/>and drawing a building on site</b> | 23 |
| <b>3. Freehand drawing from life</b>   | 31 |
| <b>4. Retracing history through drawing</b>  | 39 |
| <b>5. A survey of colour in architectural heritage</b>   | 49 |
| <b>6. Integrated representation techniques</b>   | 63 |
| <b>7. Theory of colour</b>   | 73 |



## Foreword

This book by Emanuela Chiavoni and Francesca Porfiri was written for the students of the international study course at Sapienza University. It illustrates the crucial preliminary procedures required when using drawing to gain information about architectural and urban heritage. In particular it explores the problems regarding the geometry, perspective, proportional and perceptive relationships of built heritage; it also demonstrates the use of manual graphic techniques by presenting numerous real life and freehand drawing exercises, with a special focus on colour. The book is intended as a reference for both professors and students because it not only deals with geometric codes that help to knowingly represent architecture and the city, especially architectural space, but also because it suggests the best traditional and innovative instruments, methodologies and graphics on a case by case basis. The numerous drawings in the book help students get a better understanding of the graphic construction process behind the appreciation of the form, geometries, type and structure of architecture.

A large part of the book is dedicated to freehand, real life drawing used to obtain direct knowledge about the city; it illustrates the three logical steps required to understand architectural works – Seeing/Thinking/Drawing. In this case drawing becomes a powerful tool to understand the drawn object; in fact, only during drawing does a drawer penetrate its complex reality and comprehend its hidden features. In addition the drawn object remains in the profound memory of the drawer. This special process of historically consolidated analysis, comprehension and memorisation continues to be one of the most methodological formative mental processes for all those who wish to study architecture and the city.

The authors focus in particular on the chromatic analysis and representation of architecture and urban spaces, a key subject in order to understand architectural materials and the state of conservation of buildings, as well as propose possible enhancement projects. Buildings are chromatically represented chiefly by drawing samples of colours, artistic details, ornaments and significant elements on the façades of urban fronts or parts of it; watercolour is the preferred technique even in our digital era since it is the best graphic option to provide an objective representation of the survey (chromatic survey). The book contains numerous drawings of important architectural works in many Italian cities; by using integrated colour techniques it is possible to reflect the cultural identity of places.

The goal of the two authors is above all to encourage foreign students, to whom the book is dedicated, to focus primarily on real life drawing as the sole, irreplaceable method to actively become involved in gathering knowledge about architectural and urban heritage throughout the ages and in any country in the world. In particular, I would like to emphasise the strong, intense iconography; it is an incentive for all those who wish to “interpret” architecture and the city using a powerful instrument in order to appreciate an important part of our historical architectural heritage. I believe that the book by Emanuela Chiavoni and Francesca Porfiri is an invaluable teaching tool that can be used to improve the training of all those who use real life drawing to understand architecture.

*Mario Docci*

Emeritus, Sapienza University of Rome



## Acknowledgements

We would like to express our thanks to Prof. Calogero Bellanca for giving us the opportunity to publish several research topics we have been working on for years, and which we hope will be of help to young scholars. The publication has been financed by the European SURE project.

We are particularly grateful to Prof. Marcella Morlacchi for allowing us to use her atelier and publish some of her beautiful drawings of places in Rome and on the island of Ponza.

Finally we would like to express our thanks to the publisher, Sapienza University Press, for making it possible to print this work.



# Introduction

The topics presented in this volume are a collection of seven basic lessons which, according to the authors, assist in the interpretation of architectural and urban heritage.

The objective is to provide students with the first basic tools to tackle Cultural Heritage. The authors will illustrate the elements needed to represent and communicate typical cultural scenarios and design ideas as well as teach students about traditional and innovative graphic techniques.

Students must not only learn the geometric code required to consciously represent existing and imaginary forms, but also study in-depth the geometric, proportional and perceptive tools that will allow them to manipulate those forms.

Students will acquire the manual skills needed to become proficient in the use of simpler and more direct graphic techniques thanks to multiple exercises in freehand drawing and line drawing, with a particular focus on chromatic aspects. Students will also be taught the basic notions of the fundamentals of the geometry of representation and perspective drawing.



# 1. Perspective drawing

*“The convention of perspective centres everything on the eye of the beholder. It is like a beam for a lighthouse [...] Perspective makes the single eye the centre of the visible world. Everything converges on to the eye as to the vanishing point of infinity [...] every drawing or painting that used perspective proposed to the spectator that he was the unique centre of the world.”*

JOHN BERGER, *Ways of seeing*, 1973



Fig. 1. Durer's perspective machine (image taken from the treatise *Underweysung der Messung - Teaching of Measurement*, 1525 edition). Illustration: *Artist Drawing a Female Nude*, projection and section.

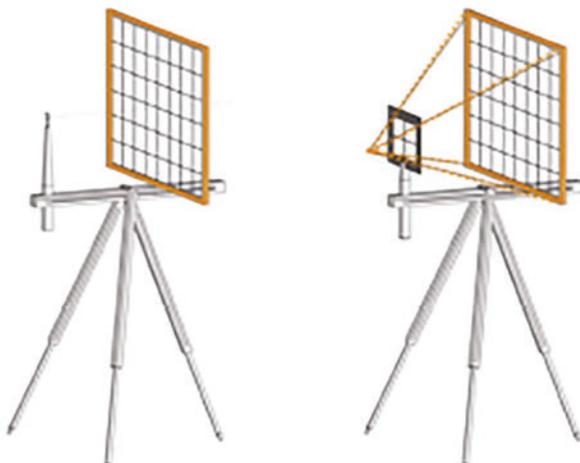


Fig. 2. The reproduction of Durer's perspective machine.

Perspective can depict:

- A real space
- An illusory space

In 1525 Durer invented a perspective machine: a grid to draw with a correct proportional foreshortening of the elements.

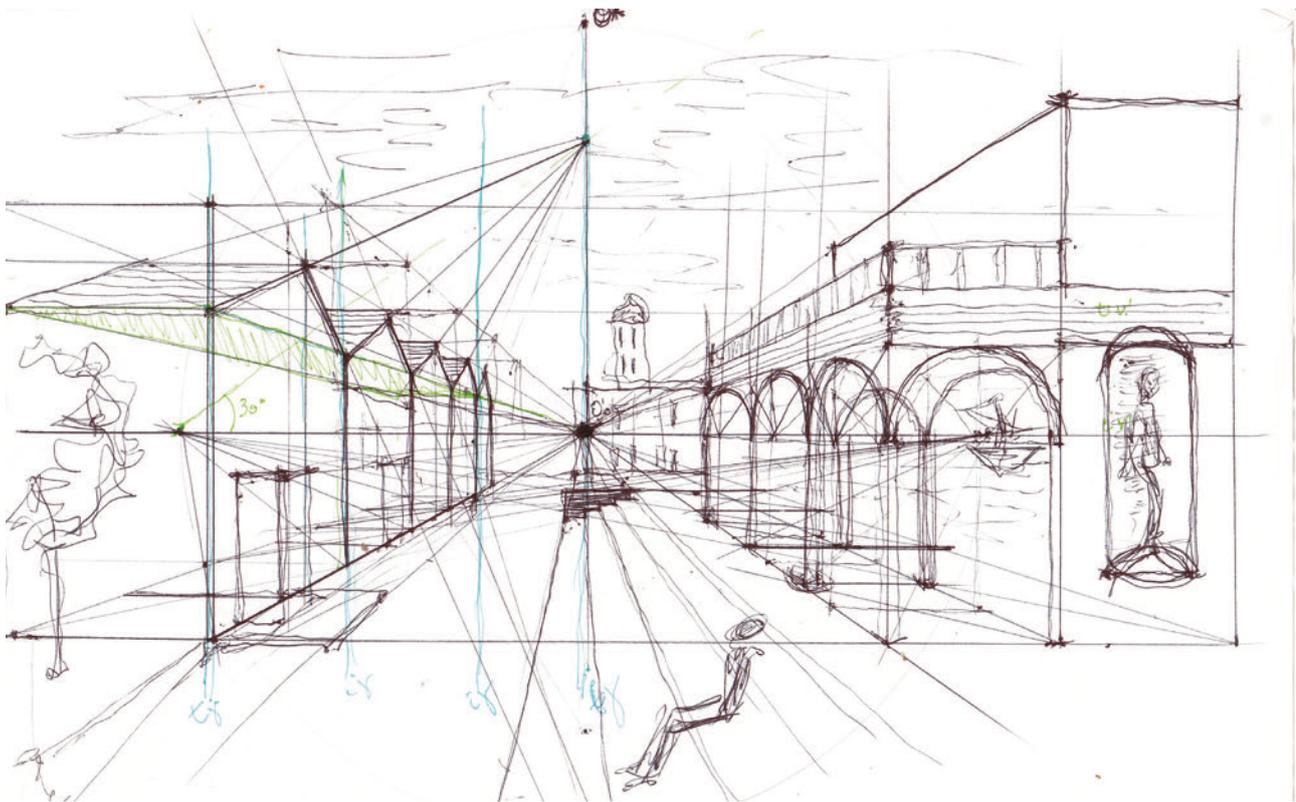


Fig. 3. Perspective construction.  
Sketch with geometric studies.  
Drawing by F. P.

Perspective composition is very similar to human perception.

The objects are scaled in relation to the viewer and everything converges on the vanishing point.

The vanishing point or “point at infinity” is the point where parallel lines seem to conve; this point lies on the horizon line.



Fig. 4. Watercolour with perspective construction. Drawing by F. P.



Fig. 5. A house in Pompeii.

In an illusory painted architecture perspective creates spatial depth on a flat surface, by using the proportional foreshortening technique and a realistic rendering of light.

The artist needed extraordinary painting skills and knowledge of optics and geometry.

In ancient buildings perspective images were placed at the end of a *promenade* through the building, mimicking the wings of a stage.

In the Renaissance many scholars were intrigued by the power of perspective applications, and many of them wrote treatises.

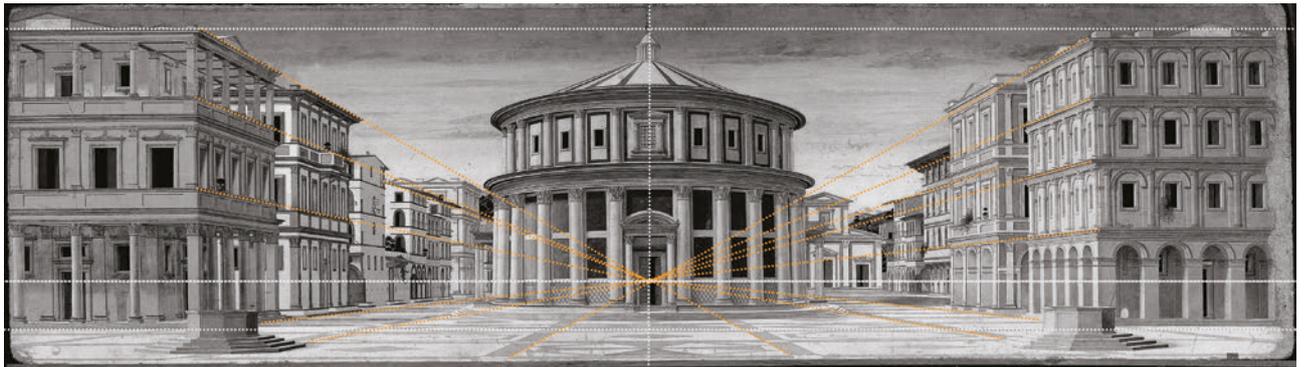


Fig. 6. The Renaissance painting entitled "The ideal city".

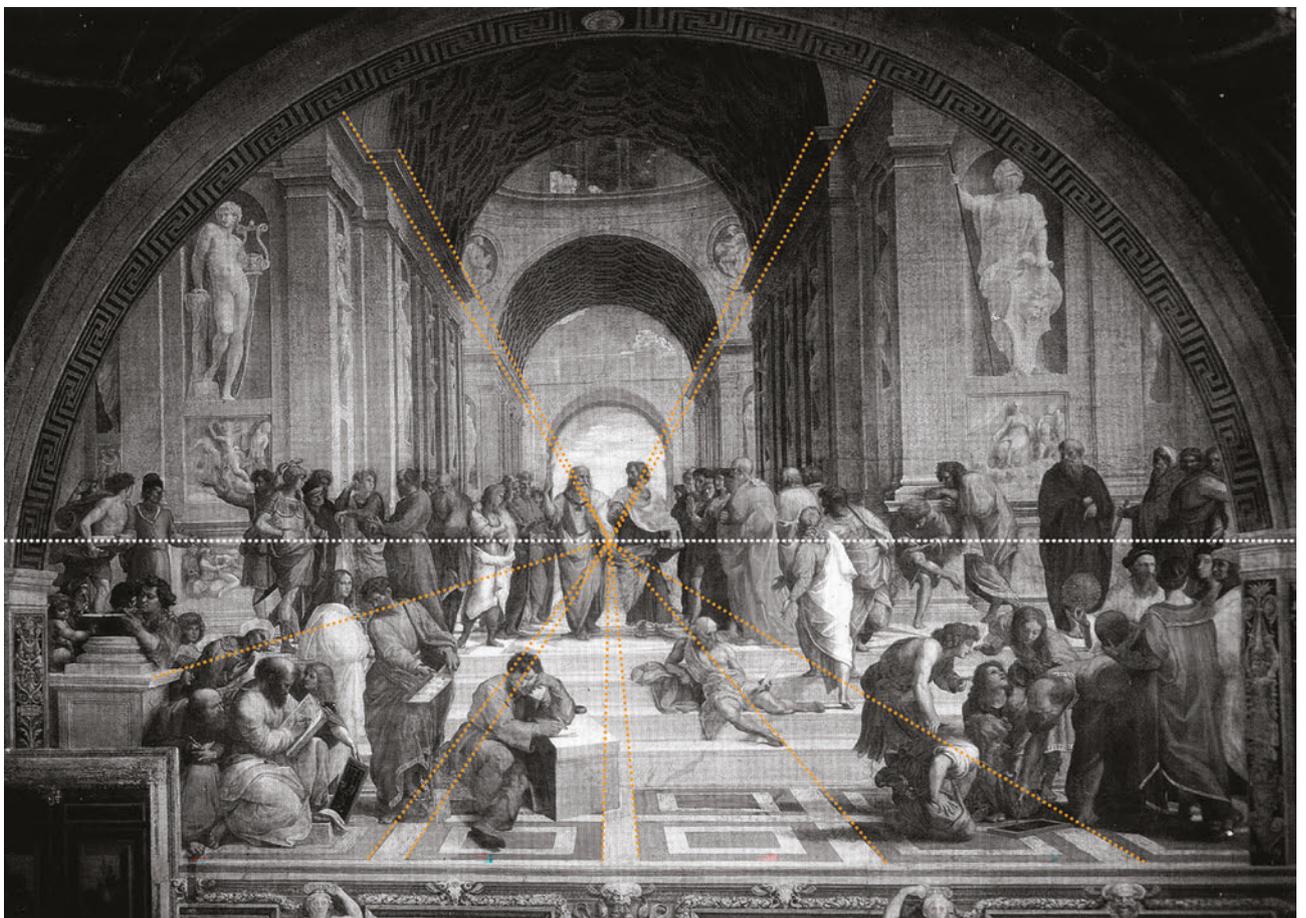


Fig. 7. Rafael, "The School of Athens", 1509.

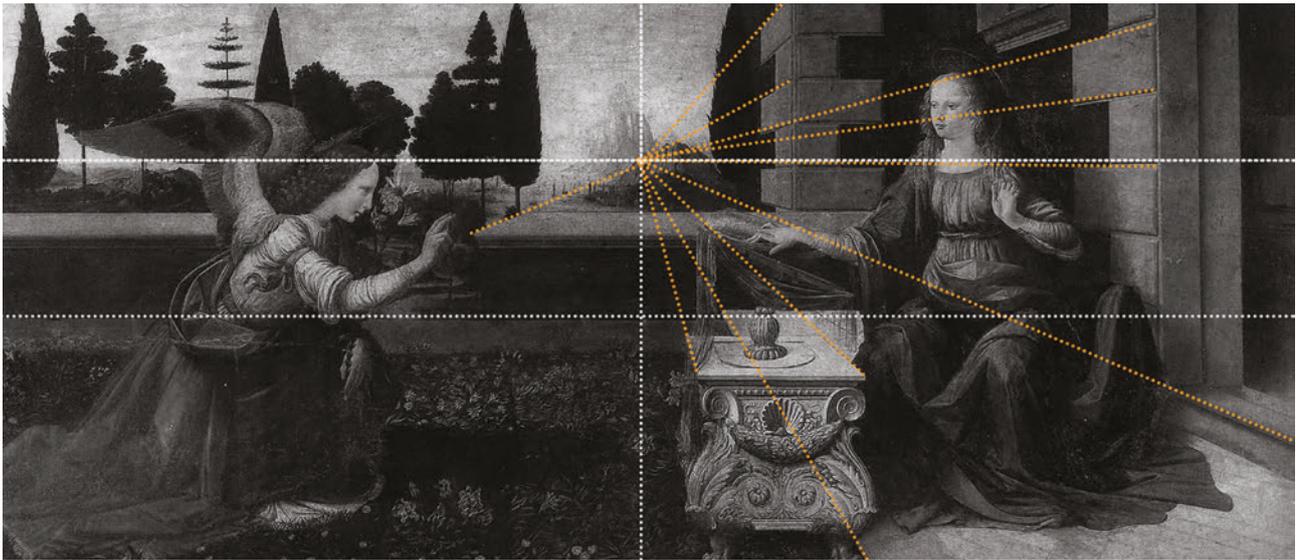
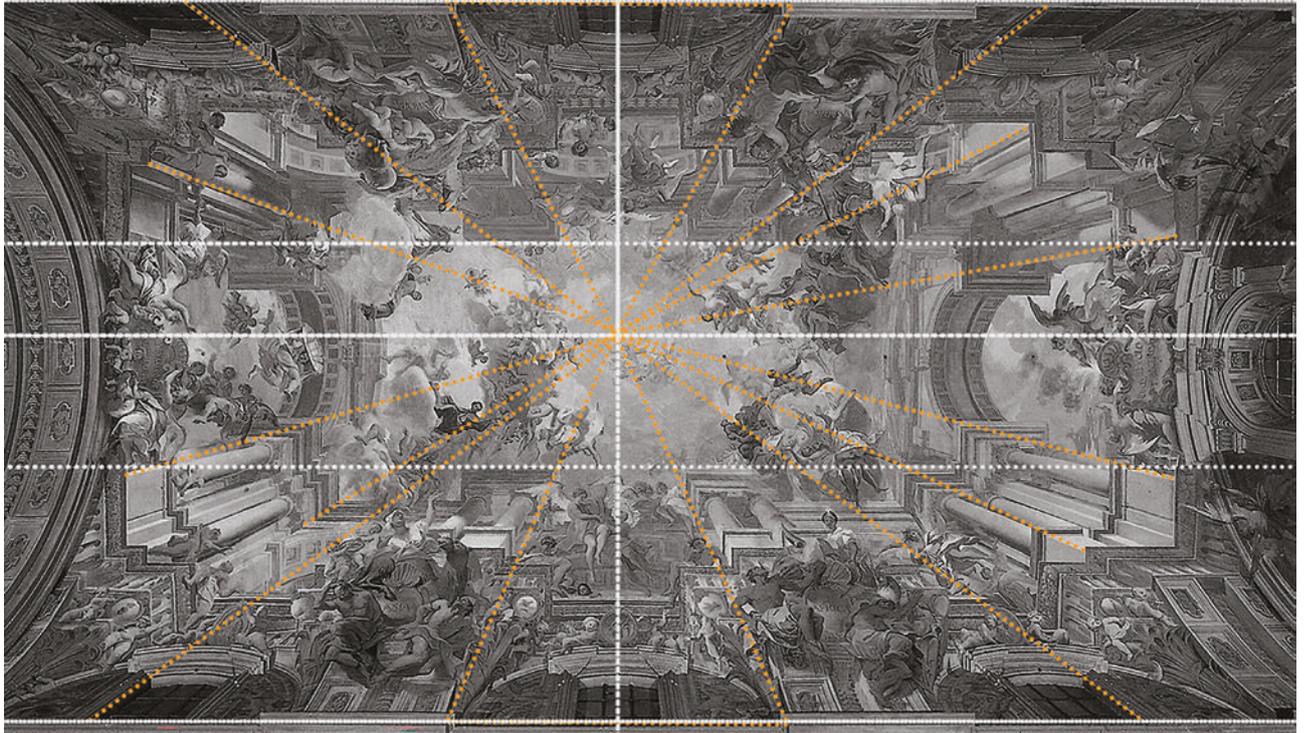


Fig. 8. Leonardo da Vinci "The Annunciation", 1472.



Fig. 9. Piero della Francesca, "The Flagellation of Christ", 1455.



Figs. 10-11. Andrea Pozzo, The Church of St. Ignatius of Loyola, 1685. Perspective creates the illusion of spatial depth.

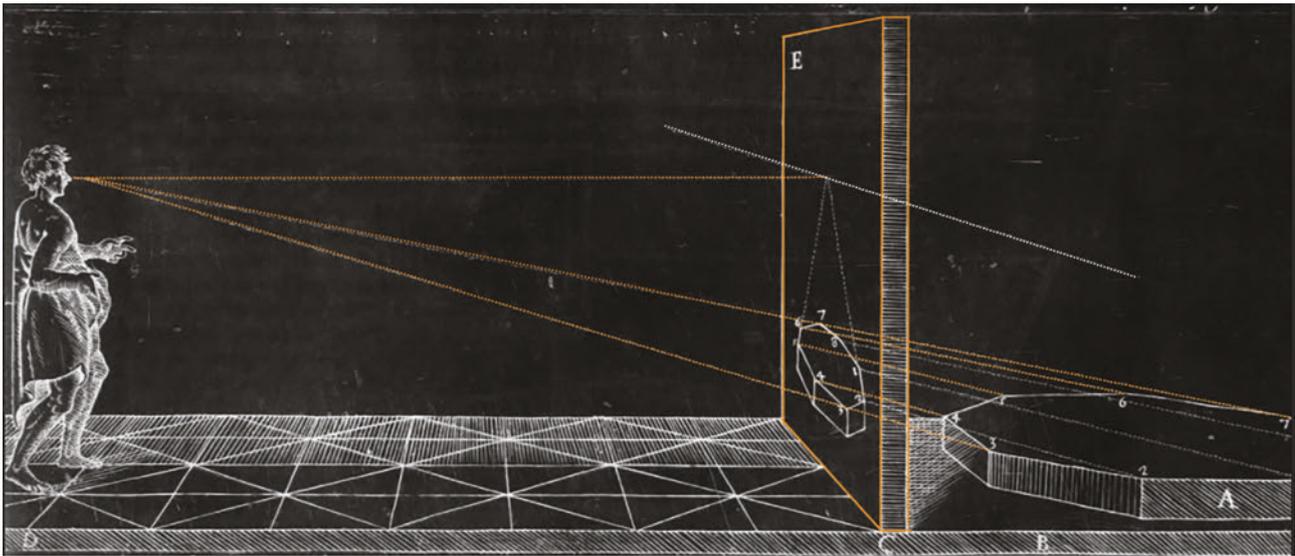


Fig. 12. Jacopo Barozzi da Vignola, 1682, perspective rules, (image taken from the treatise *Le due regole della prospettiva pratica*, 1682).

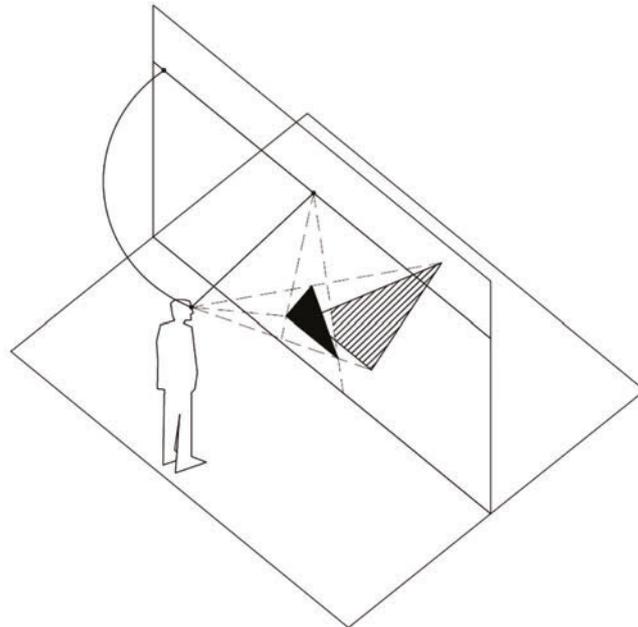


Fig. 13. Perspective rules, projection and section. Drawing by F. P.

Simple geometric entity:

- Surface called “picture plane”
- The eye point of the viewer
- Projective lines
- Horizon line
- Vanishing point

Some guidelines:

- Every parallel line actually converges on the vanishing point on the horizon line
- Vertical lines remain vertical
- Horizontal lines remain horizontal
- Foreshortening of every element maintains the right proportion

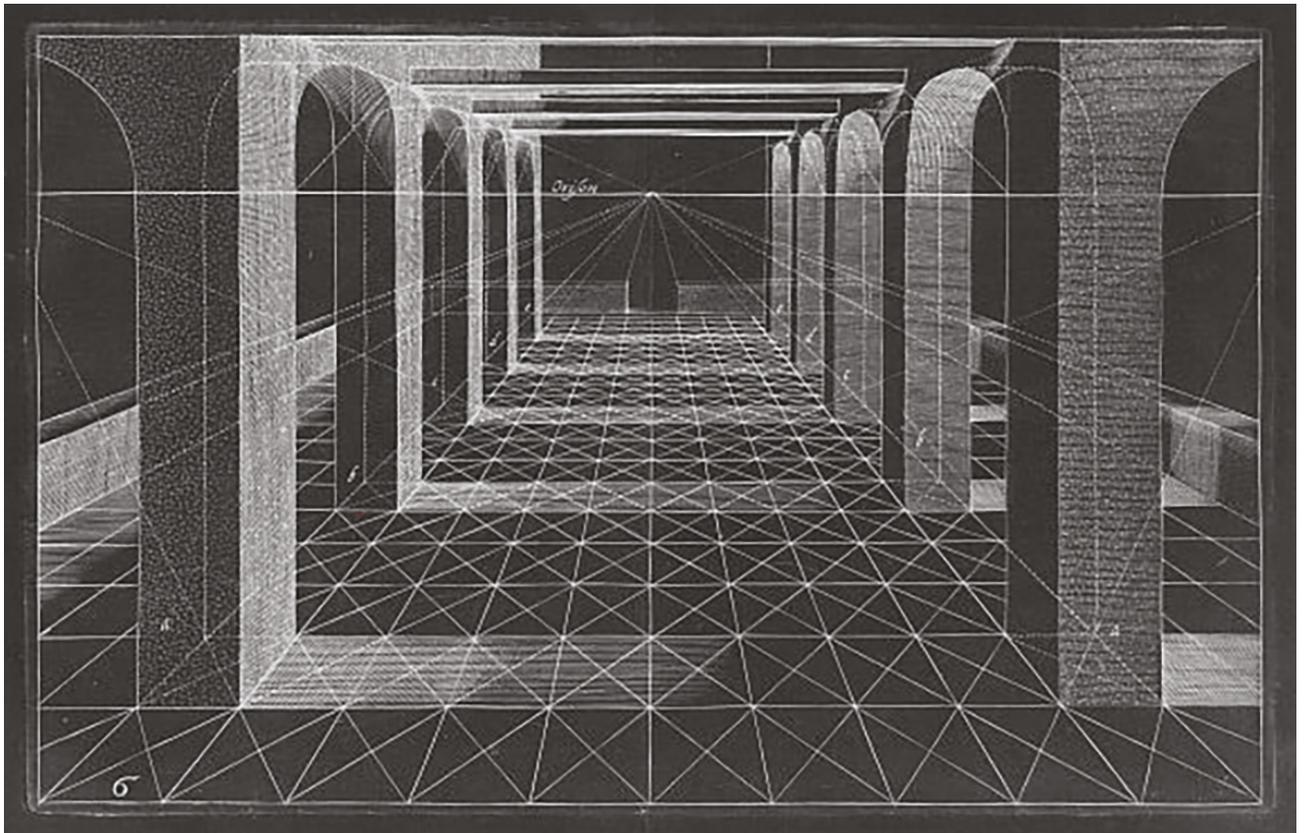
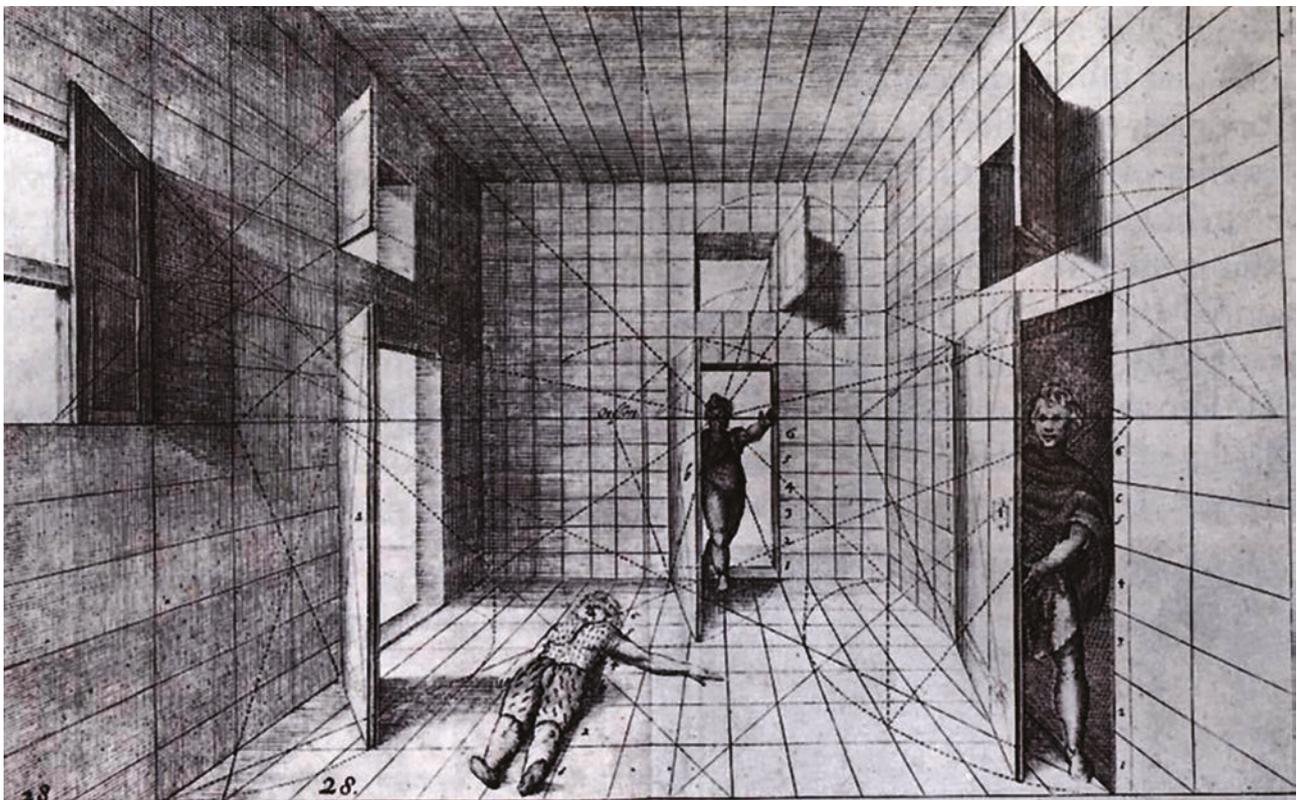
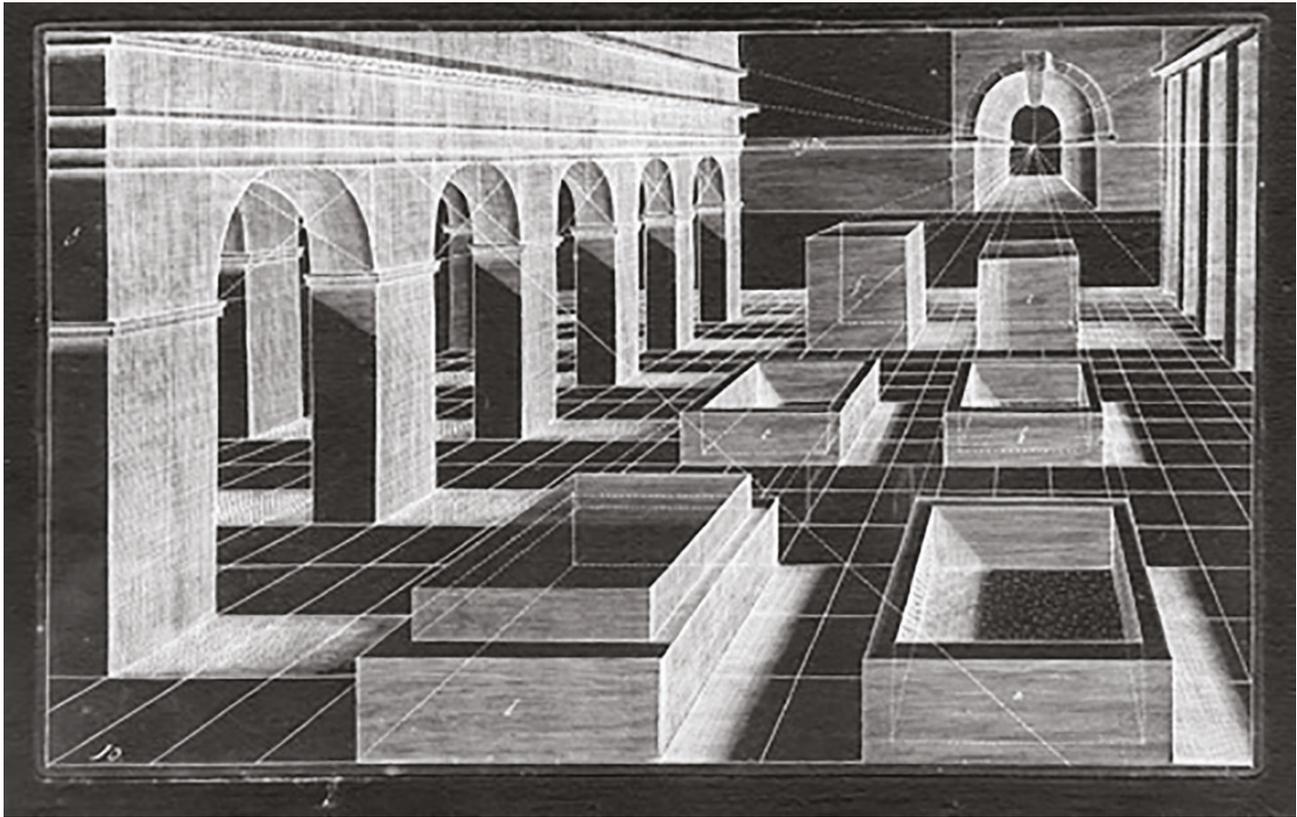
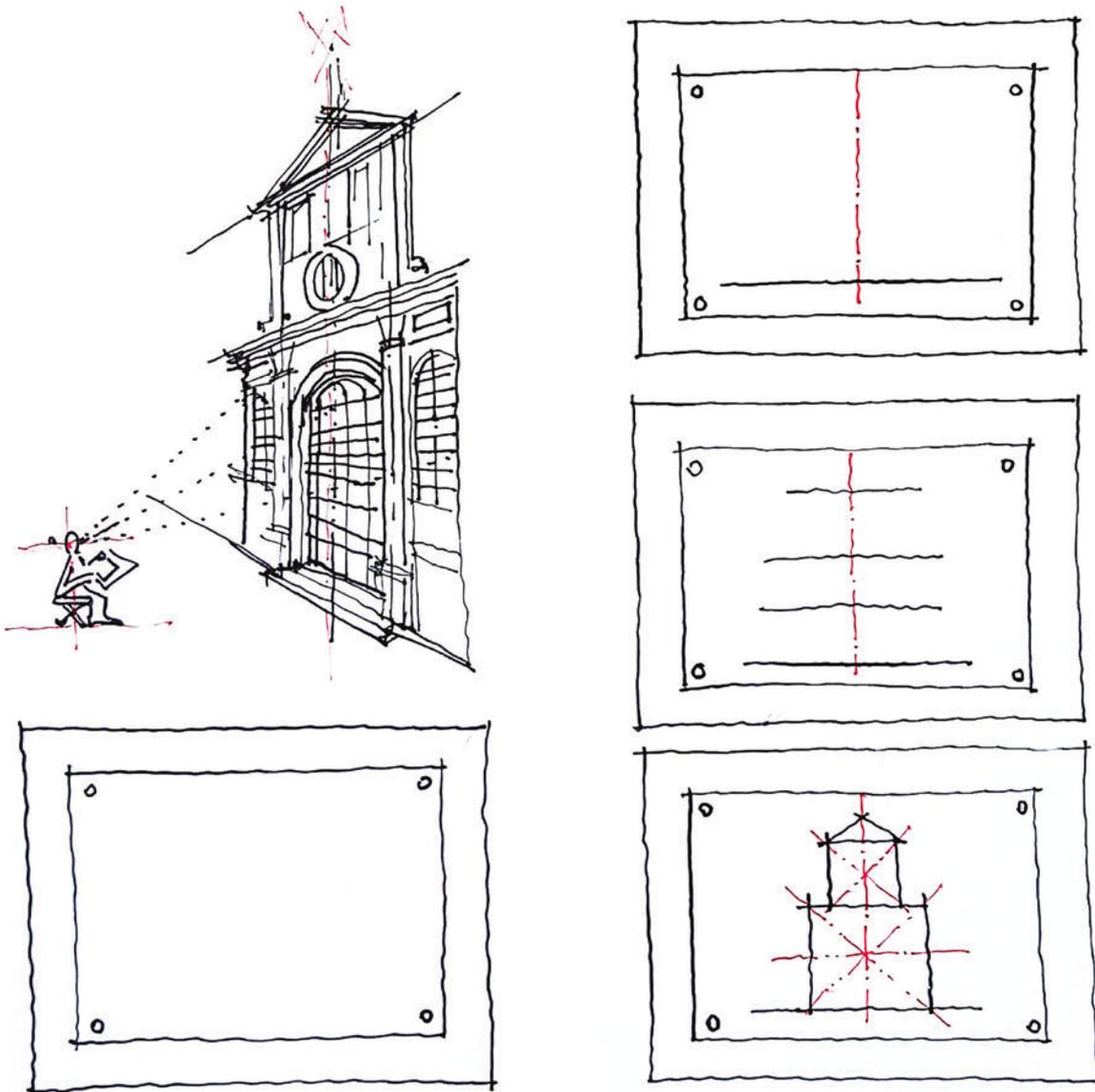


Fig. 14. Hans Vredeman De Vries, 1604, one point perspective (image taken from the treatise *Perspectives id est celeberrima ars inspicientis aut transpicientis oculorum aciei*, 2 voll., 1604-05).



Figs. 15-16. Hans Vredeman De Vries, 1604, one point perspectives (images taken from the treatise *Perspectives id est celeberrima ars inspicientis aut transpicientis oculorum aciei*, 2 voll., 1604-05).

## **2. Initial survey achieved by viewing, understanding and drawing a building on site**



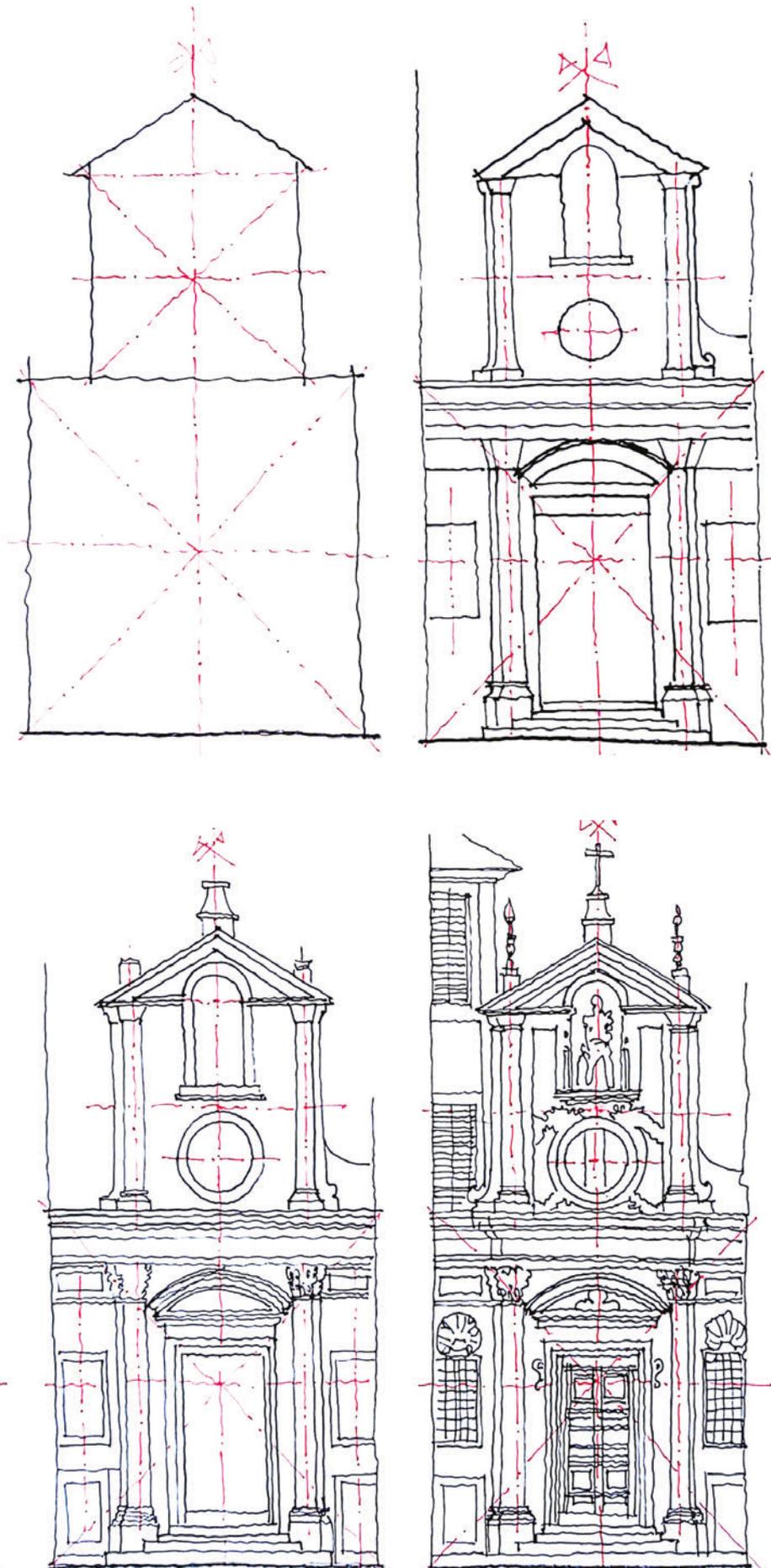
Figs. 17-18. S. Barbara dei Librari, freehand drawing from life on site. Drawing by E. C.

*S. Barbara dei Librari, a church in Rome*

This tiny church, hemmed in by taller buildings on both sides, is tucked away at the end of Largo dei Librari just off Via dei Giubbonari. Like much of the area, its foundations were constructed over the ruins of the Theatre of Pompey sometime in the 11th century. The church was rebuilt in the Baroque style in 1680, and restored in 1858.

*The process of drawing the facade*

- 1\_ To determine the general proportions of the building's facade
- 2\_ To insert the principal elements inside the composition
- 3\_ To define of the elements of the facade
- 4\_ To add the characteristics of the facade



Figs. 19-20. S. Barbara dei Librari, the preliminary handmade sketch process. The final drawing has all the elements, details, characteristics and decorations. Drawing by E. C.

*Freehand drawing from life*

The process of drawing the floor plan

Drawing the horizontal section of the church with its proportions

1\_ To determine the general proportions of the floor plan

2\_ To insert the principal elements in the composition

3\_ To define of the elements of the floor plan

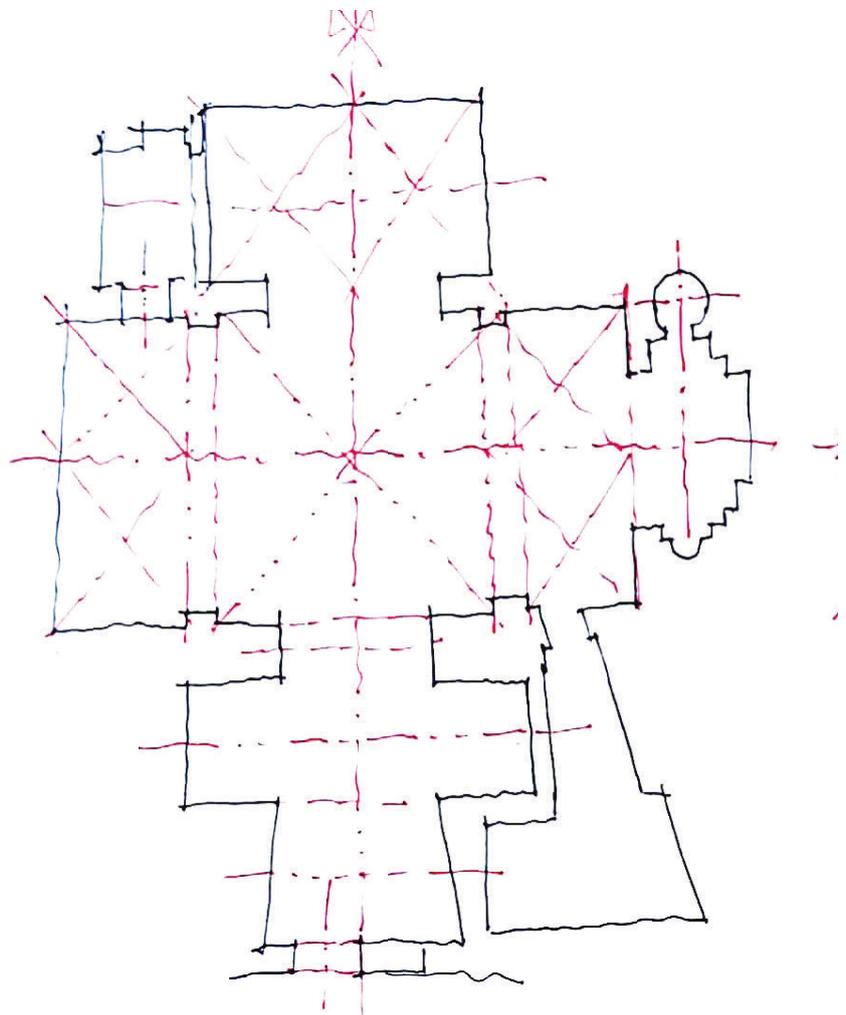


Fig. 21a. S. Barbara dei Librari. Three steps of the preliminary handmade sketch process. First step. Drawing by E. C.

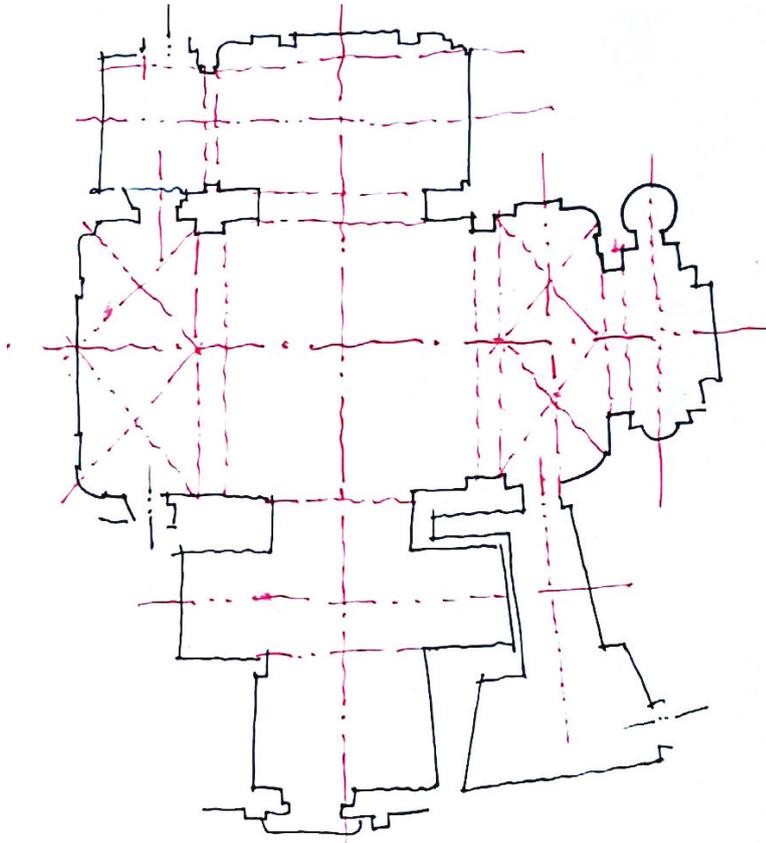


Fig. 21b. S. Barbara dei Librari. Three steps of the preliminary handmade sketch process. Second step. Drawing by E. C.

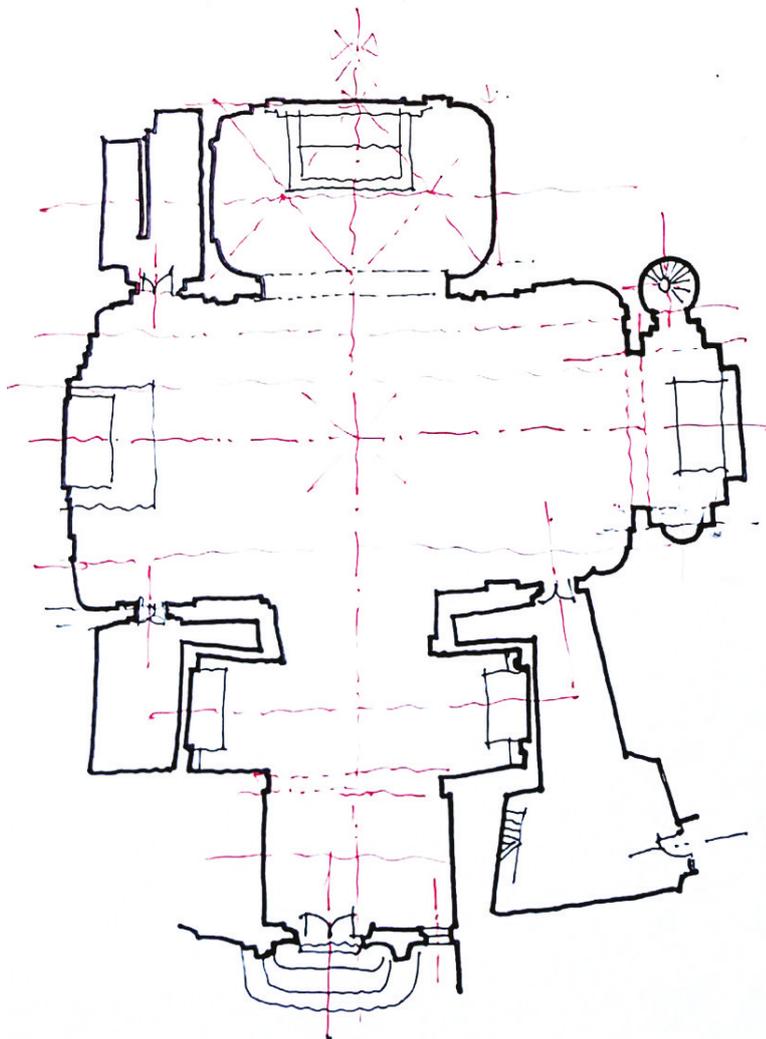


Fig. 22. S. Barbara dei Librari. Three steps of the preliminary handmade sketch process. Details of the interior, decorations, floors, doors and altars can be inserted in the final drawing. Drawing by E. C.



Fig. 23. Perspective drawing of the Church of S. Barbara dei Librari. Drawing by E. C.

When the students draw directly on site they can understand not only the tangible things they observe and draw, but can also grasp the intangible values linked to the history and traditions of the city.



Figs. 24-25. The Church of S. Barbara dei Librari: watercolour with the legend of the materials by E. C.

## Micro-bibliography

- J. ITTEN (1992), *Arte del colore: esperienza soggettiva e conoscenza oggettiva come vie per l'arte*, Il Saggiatore Editore, Milano, 1992.
- M. BRUSATIN (1983), *Storia dei colori*, Einaudi Editore, Torino, 1983.
- F. D. K. CHING (1990), *Drawing a creative process*, published by John Wiley & Sons, New Jersey, 1990.
- F. D. K. CHING (1998), *Design drawing*, published by John Wiley & Sons, New Jersey, 1998.
- P. ALBISINNI a cura di (2003), *Il disegno dell'architettura fra tradizione e innovazione*. Gangemi editore, Roma, 2003.
- F. D. K. CHING (2007), *Architecture, form, space and order*, published by John Wiley & Sons, New Jersey, 2007.
- M. DOCCI, D. MAESTRI, M. GALANI (2011), *Scienza del Disegno*, Città Studi 2011.
- M. MORLACCHI (2008), *Il libro del Disegno*, Gangemi editore, Roma, 2008.
- J. RUSKIN (2009), *Gli elementi del disegno*, Adelphi edizioni, Milano, 2009.
- E. CHIAVONI, M. DOCCI (2014), *Visione, pensiero, disegni: gli insegnamenti di Francis D.K.Ching Vision, ideas, drawings, teachings by Francis D.K.Ching* in *Disegnare, Idee, Immagini*, Anno XXIV, n.49 / 2014.
- E. CHIAVONI (2013), *The drawings concerning artistic techniques in Diderot's and D'Alembert's Encyclopedia*, in *Physics, Astronomy and Engineering. Critical Problems in The History of Science and Society*, Editors R. Pisano, D.Capecchi, A.Lukesova, Siauliai 2013, The Scientia Socialis Press.
- E. CHIAVONI (2012), *Note sul trattato ottocentesco "The Theory and Practice of Landscape Painting in Water Colours" di George Barnard*, in *Elogio della teoria, Identità delle discipline del disegno e del rilievo*, 34° Convegno Internazionale dei docenti della rappresentazione, Unione italiana per il Disegno, Roma 2012, pp.227-234.
- T. BRADECKI, M. STANGEL (2014), *Freehand drawing for understanding and imagining urban space in design education*. ACEE 2/2014.
- E. CHIAVONI, F. PORFIRI, G. L. TACCHI (2017), *La rappresentazione dell'assenza: reinterpretare la storia attraverso un linguaggio contemporaneo / Representing absence: using contemporary language to reinterpret history*, in *Atti del 39° Convegno Internazionale dei Docenti delle Discipline della Rappresentazione*. Roma: Gangemi, 2017, pp. 829-834.
- F. PORFIRI (2018) *Cortili bolognesi tra spazio reale e spazio illusorio. La traccia del tempo che si manifesta attraverso la superficie*. Roma: Sapienza University Press, 2018.

### 3. Freehand drawing from life on site

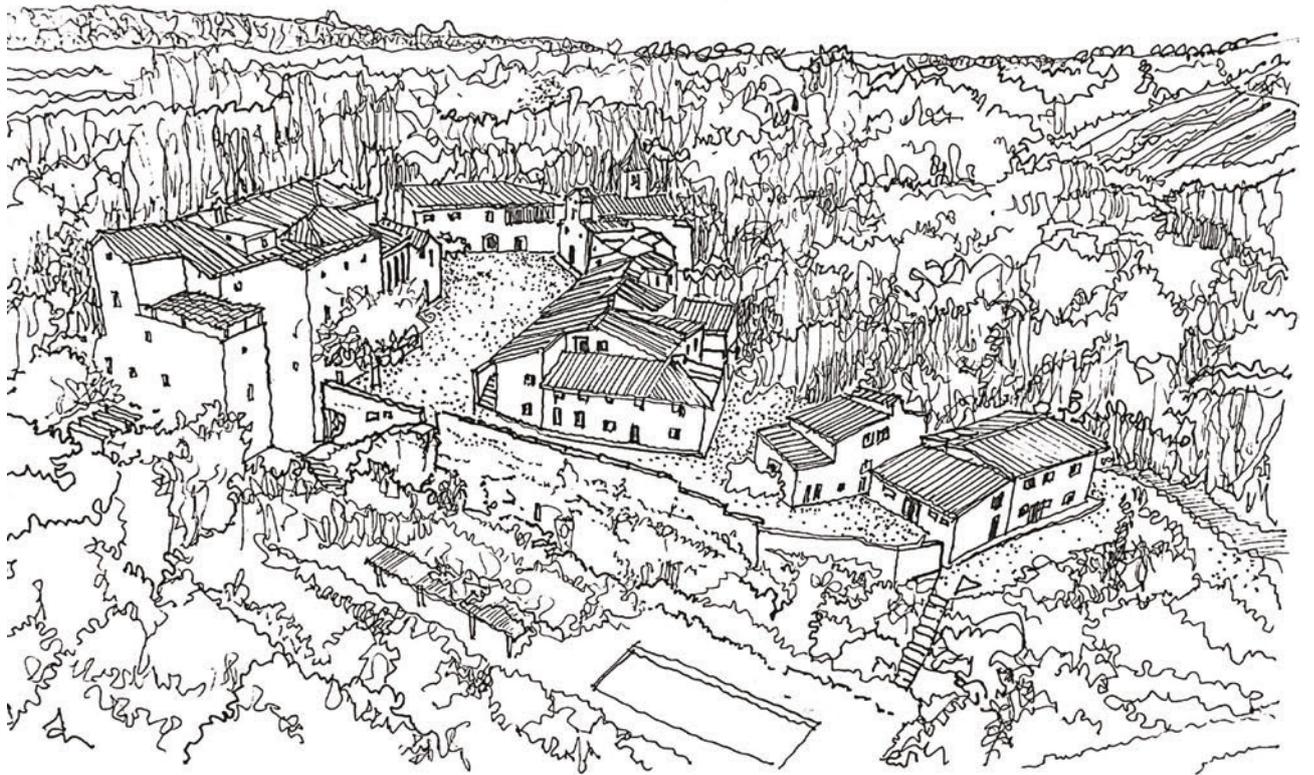


Fig. 26. Aerial view of Titignano. Drawing by E. C.

The village of Titignano, dating approximately to the thirteenth century, is located in Umbria in the municipality of Orvieto, along the old road between Todi and Orvieto, overlooking Lake Corbara.

Fig. 27. The main farm building with its big entrance door. The wall of the building is in stone. Photo by E. C., 2020.



Photograph of the village with the restored medieval buildings; the little church with the bell tower, the main farmhouse and the smaller houses around it. A little swimming pool overlooks Lake Corbara. The beautiful surrounding landscape includes woods, vineyards and olive groves.

Fig. 28. The square in the centre of the castle. The restored medieval buildings. Photo by E. C., 2020.





Fig. 29. Two other much bigger houses, typical of the village of Titignano: watercolour without pencil by E. C.

Coloured images using the watercolour technique improve comprehension of the materials and their state of conservation; this is useful when planning enhancement of the building.



Fig. 30. Titignano: Watercolour by E. C.



Fig. 31. A typical little stone house used by farm workers in Umbria. The house has a very simple layout and design. Photo by E.C., 2020.

Drawings of the two horizontal sections of the detached house with their proportions.

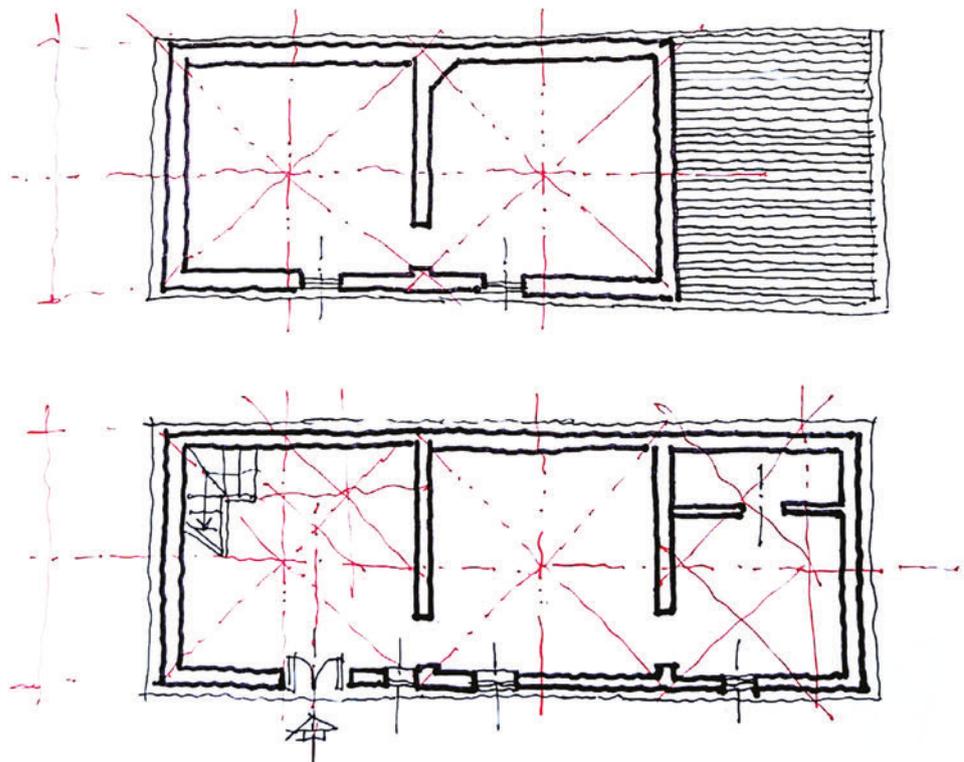


Fig. 32. Horizontal sections.  
Drawing by E. C.

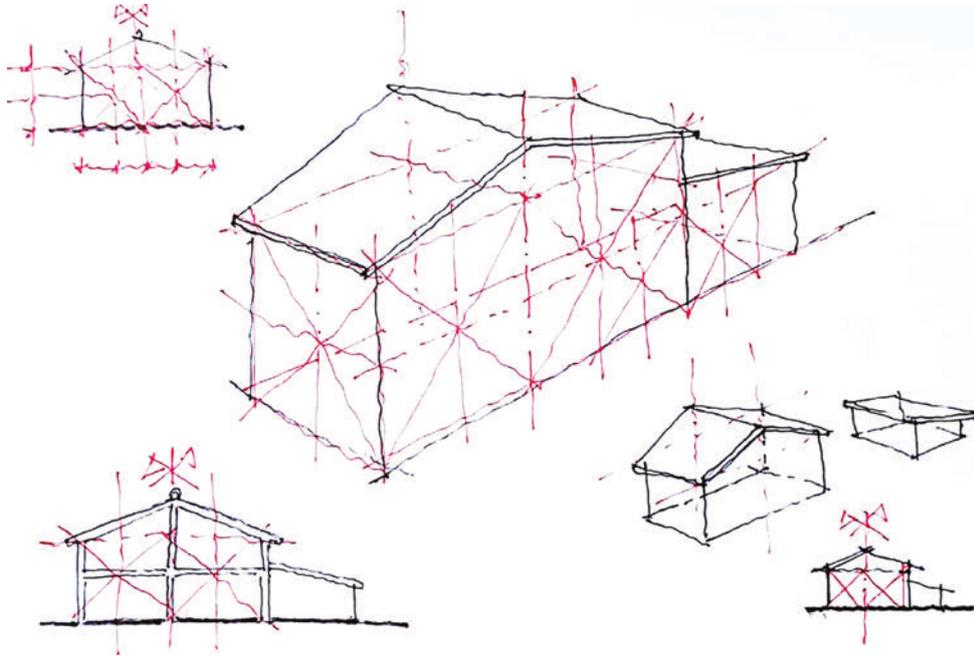


Fig. 33. Study of volume. Drawing by E. C.

Study of the volume of the building: axonometric drawing with 3D proportions.

Study of several details: a door and a window and their position in relation to the surroundings.

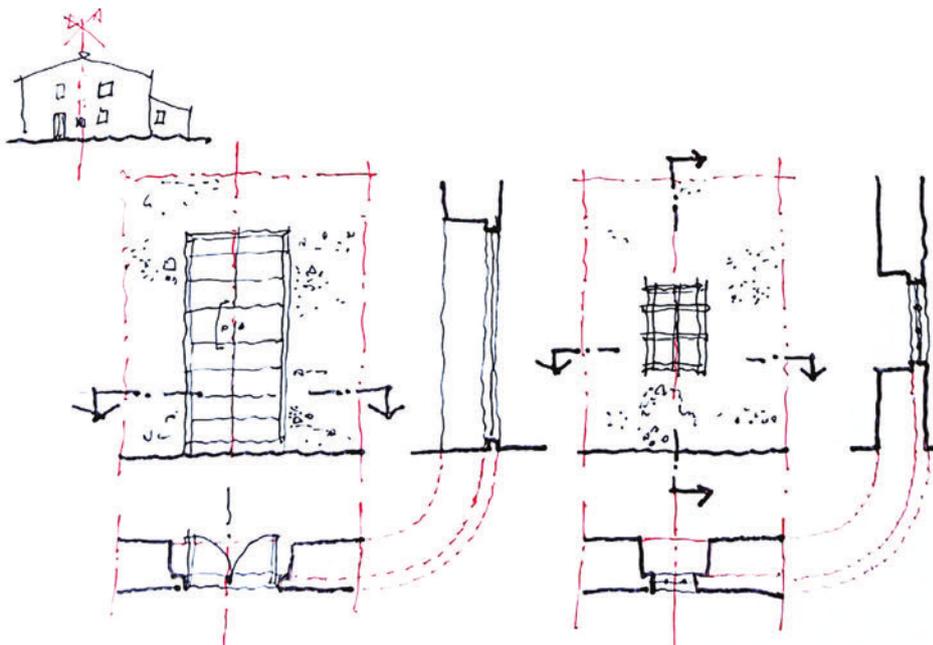


Fig. 34. Study of several details. Drawing by E. C.

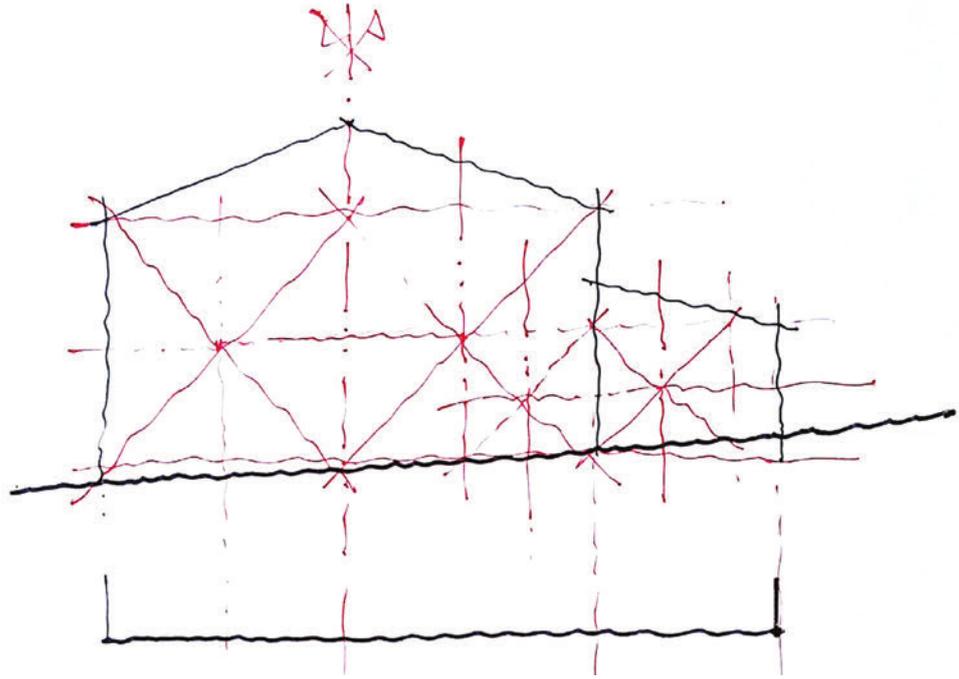


Fig. 35. First phase. Drawing by E. C.

First phase:

To determine the general proportions of the building's facade.

Second phase:

Insertion of the main elements in the composition.

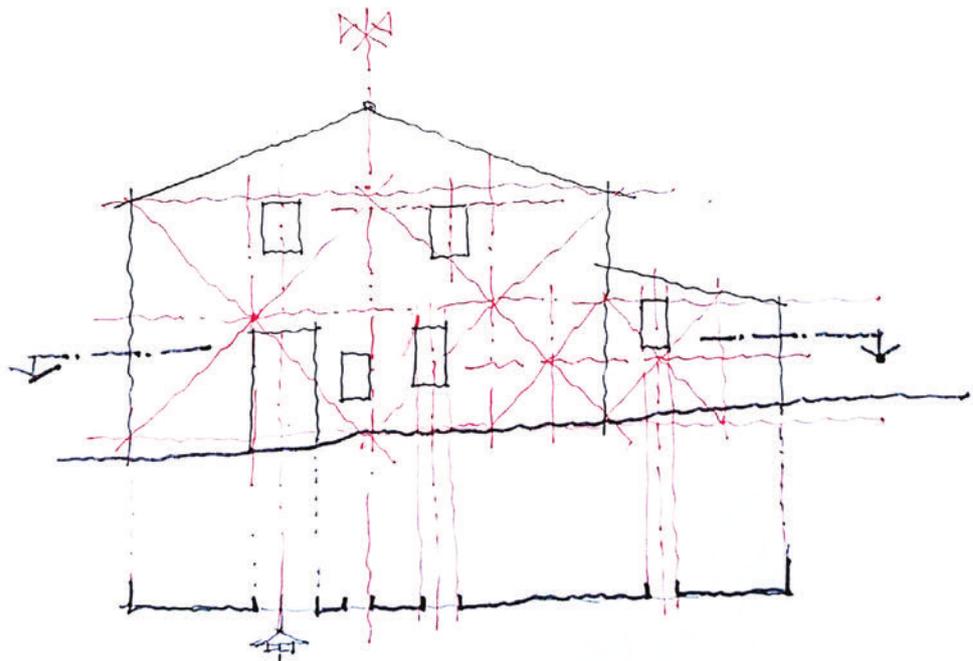


Fig. 36. Second phase. Drawing by E. C.

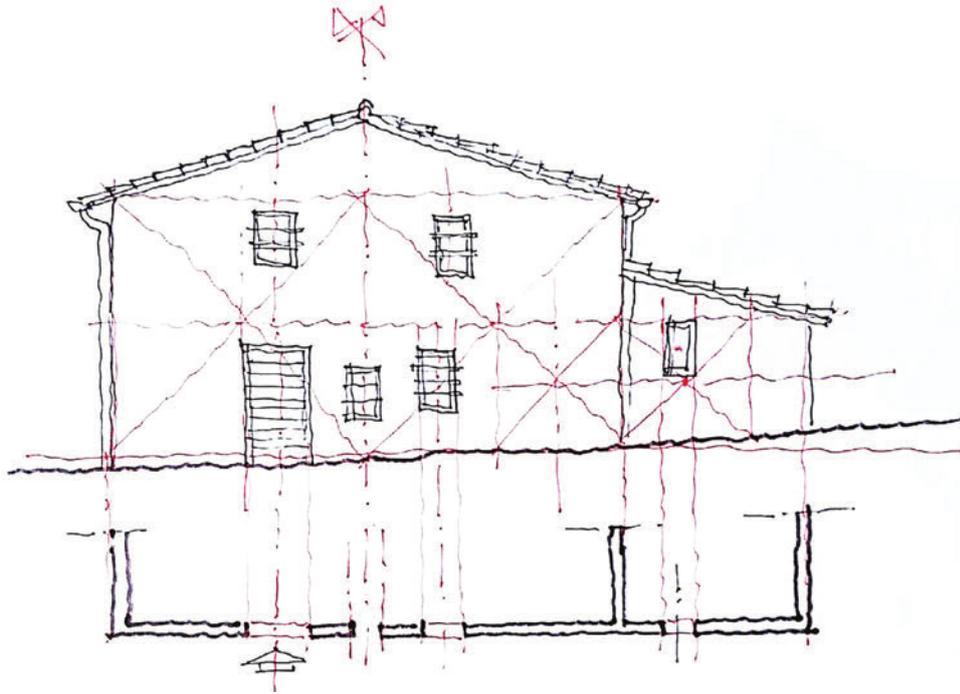


Fig. 37. Third phase. Drawing by E. C.

Third phase:  
Definition of the elements of the facade.

Fourth and fundamental final phase:  
Addition of the characteristics of the facade wall in its present state of repair.

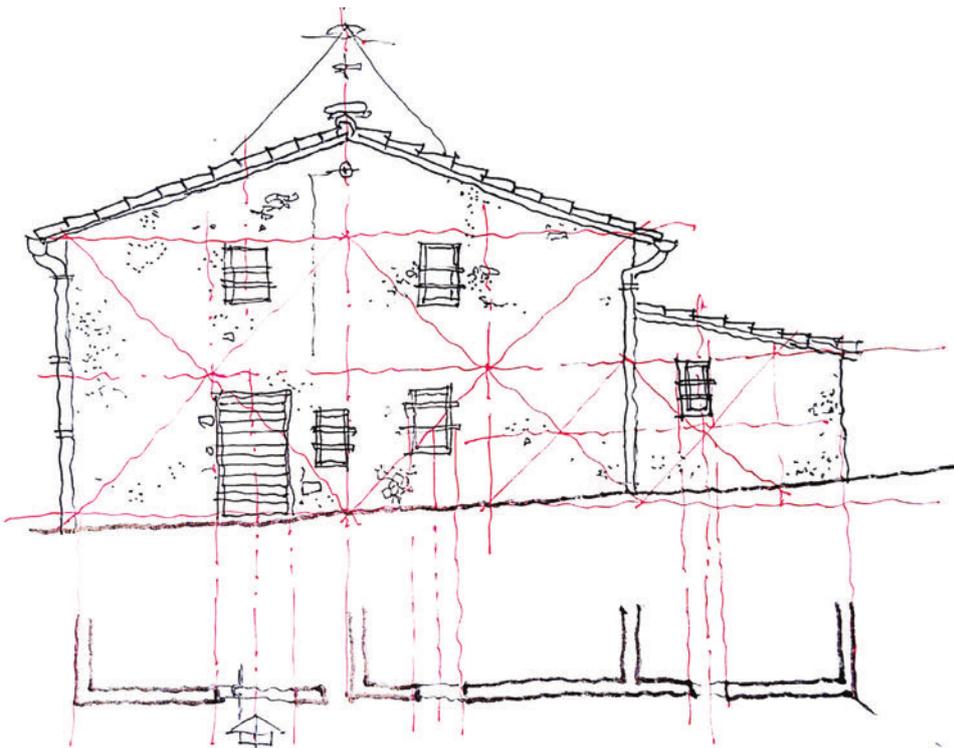


Fig. 38. Final phase. Drawing by E. C.

## Micro-bibliography

- E. CHIAVONI (2000), *Il ruolo del rilevamento a vista nell'analisi dell'architettura*, in Strumenti didattici per il rilievo. Corso di strumenti e metodi per il rilevamento dell'architettura, M. Docci (a cura di), Gangemi Editore, Roma 2000, pp. 22-29.
- E. CHIAVONI (2001), *La rocca di Lanuvio: emergenza architettonica significativa del territorio laziale*, in Atti del Convegno Internazionale: Castelli in terra in acqua e...in aria, Pisa e Lucca 25-26 maggio 2001, pp. 225-230.
- E. CHIAVONI, L. DE CARLO, M. GRECO (2001), *Tra natura e artificio. La gestione dei dati di rilievo nelle architetture vegetali*, in Disegnare Idee Immagini, Anno XII, n. 22/2001, Gangemi Editore spa International Publishing, Roma 2001, pp. 61-72.
- E. CHIAVONI (2001), *La fontana del Mosè come fondale urbano: dalla percezione al rilievo*, in Atti del Convegno Internazionale su Rilievo e forma urbana. Il disegno dei portici. Il disegno della città, Torino 6-7 dicembre 2001, Edizione Celid, Torino 2001, pp. 153-157.
- E. CHIAVONI (2002), *L'archeologia industriale come occasione di riqualificazione urbana*, in Il disegno della Città. Opera aperta nel tempo, Atti del Convegno Internazionale AED, Materia e Geometria 11/2002, Università degli Studi di Firenze, Dipartimento di Progettazione dell'architettura, San Gimignano 28-29-30 Giugno 2002, Alinea Editrice, Firenze, 2002, pp. 1-4.
- R. MAESTRO (2002), *Il bello ed il brutto. Strategie per la difesa della città*. Edizioni Polistampa, Firenze, 2002.
- E. CHIAVONI (2002), *Archeologia industriale a Roma: un'analisi attraverso il disegno*, in Disegnare Idee Immagini, Anno XIII, n. 25/2002, Gangemi Editore spa International Publishing, Roma, 2002, pp. 82-89.
- J. RICHARDS (2013), *Freehand Drawing and Discovery: Urban Sketching and Concept Drawings for Designers*, Wiley, Hoboken NJ, USA.
- E. CHIAVONI, G.L. TACCHI, F. PORFIRI (2015), *Per una raffigurazione contemporanea del paesaggio. I colori dell'Altopiano di Lasithi (Creta)*. In Colore e Colorimetria. Contributi disciplinari XI Conferenza del Colore (10-11 settembre 2015 Milano), pp. 459-468.
- G. AMORUSO, F. PORFIRI (2015), *Matteo Zaccolini e la sintonia spaziale fra prospettiva e colore negli interni illusori del Seicento*. In Colore e Colorimetria. Contributi disciplinari XI Conferenza del Colore (10-11 settembre 2015 Milano), pp. 447-458.
- E. CHIAVONI, F. PORFIRI (2016), *Drawing and Urban Transformations. The Music Bridge over the Tiber in Rome*. In UNISCAPE En-Route International Seminar, Recovering river Landscapes (28-30 agosto 2015 Napoli), a. I n. 3-2016, pp. 245-251.

## **4. Retracing history through drawing**



Fig. 39. Aerial view.

The *Oratorio dei Filippini* is a religious building belonging to the Congregation of *San Filippo Neri* built by the architect Francesco Borromini between 1637 and 1667. It is located in the center of Rome, in via della Chiesa Nuova, next to Corso Vittorio Emanuele, a street renowned for its representative buildings. It is an extraordinary example of Baroque architecture.

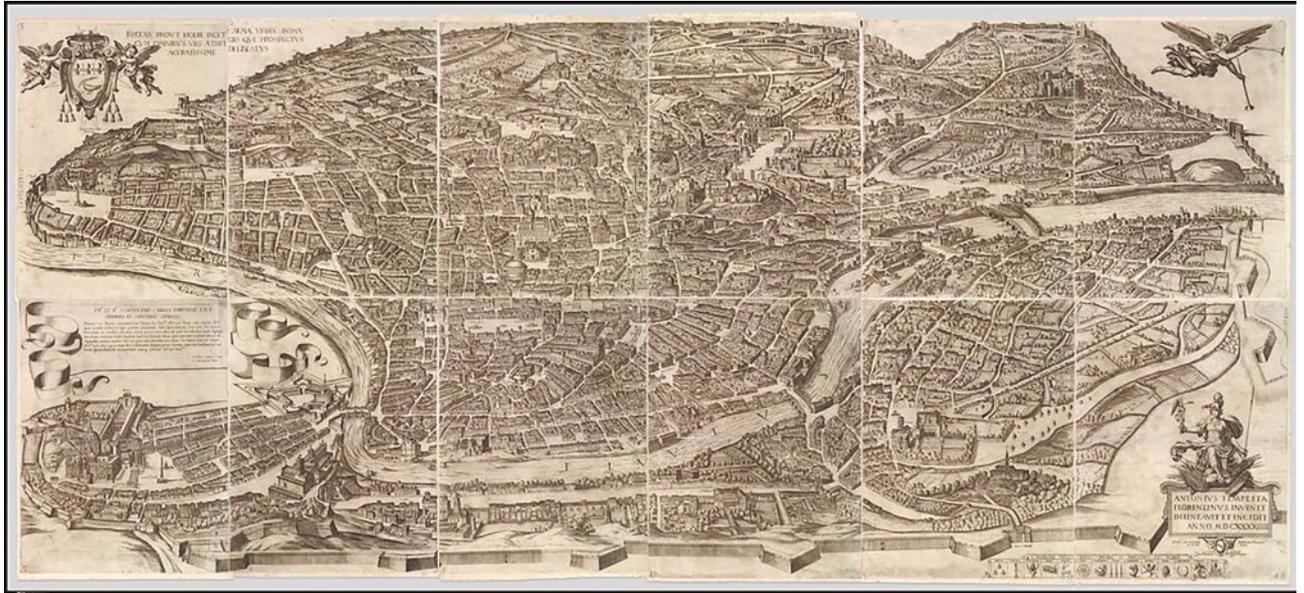


Fig. 40a. Plan of the City of Rome by Antonio Tempesta, 1645.



Fig. 40b. General plan of area. Initial survey through viewing, understanding and drawing a building on site. Drawing by E. C.

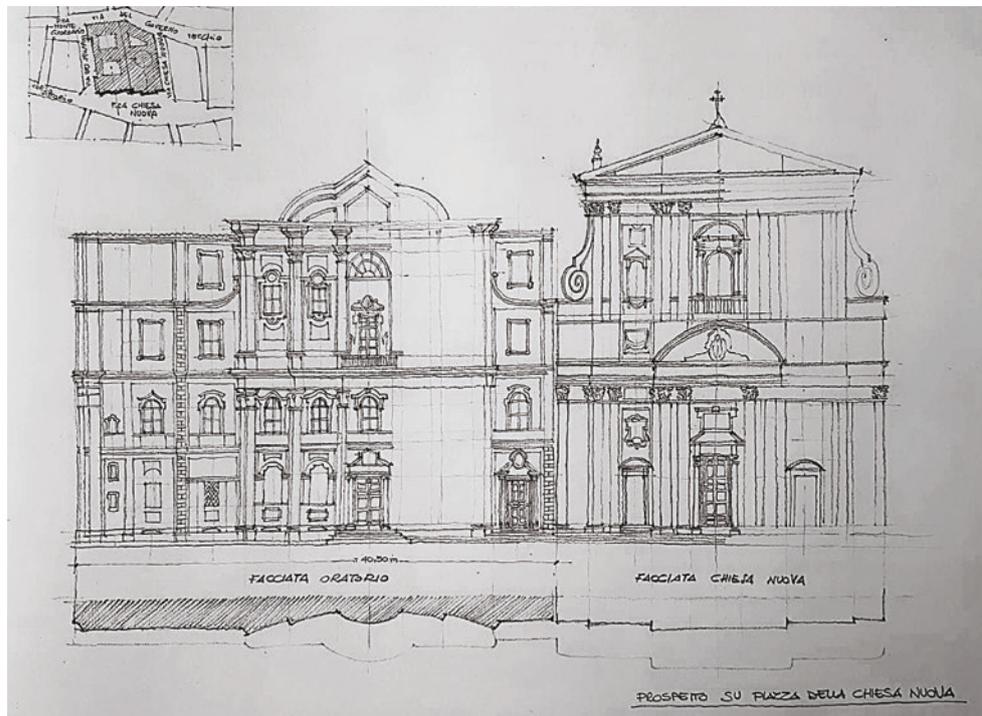


Fig. 41. Main facade.  
Drawing by E. C.

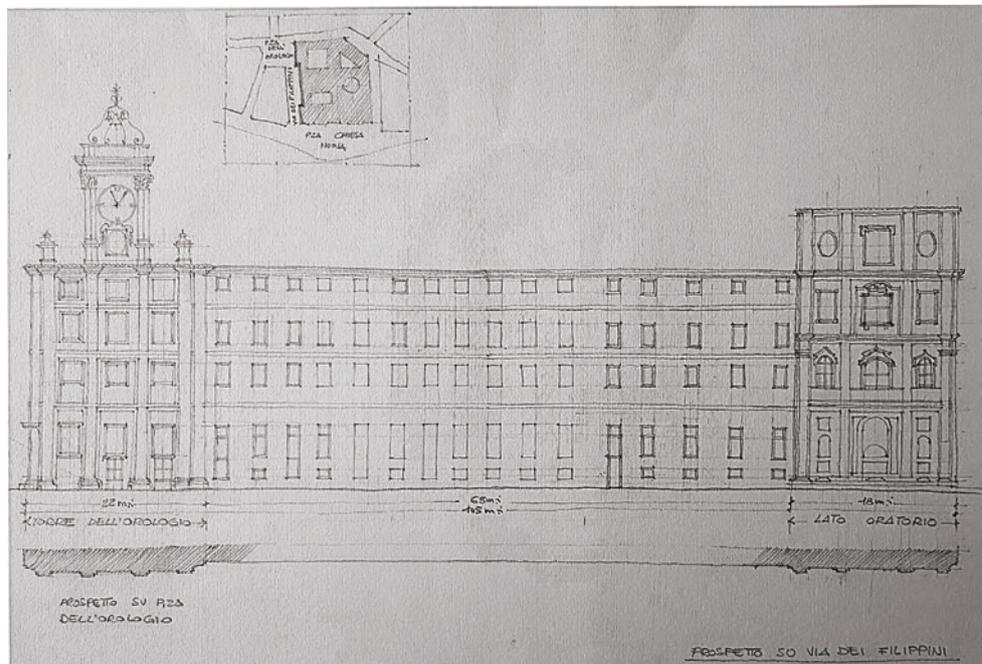


Fig. 42. Facade along Via dei  
Filippini. Drawing by E. C.





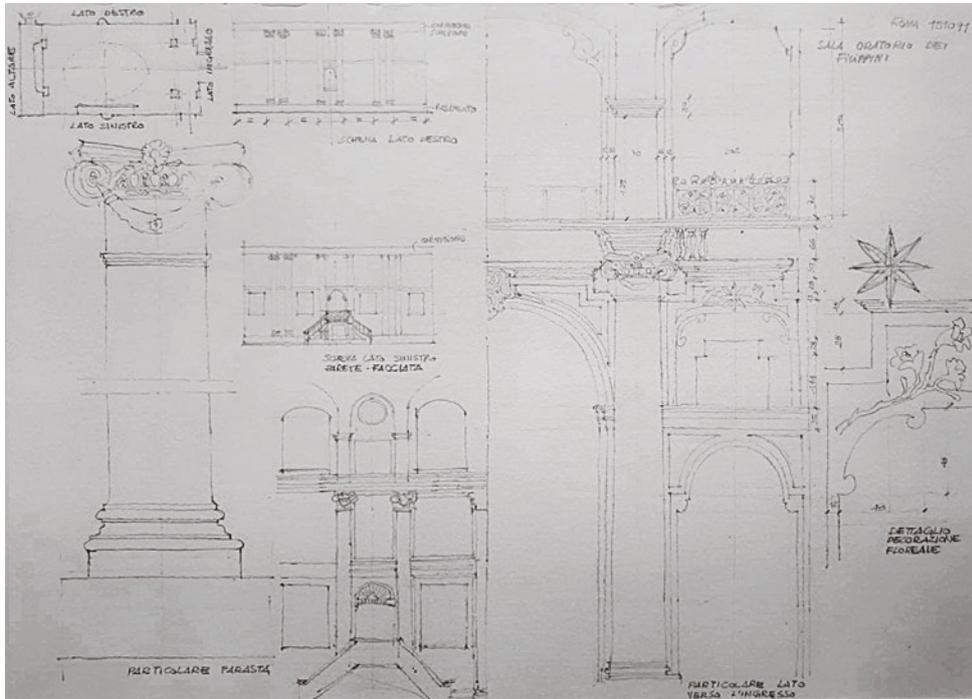


Fig. 47. Graphic reference diagram. Drawing by E. C.

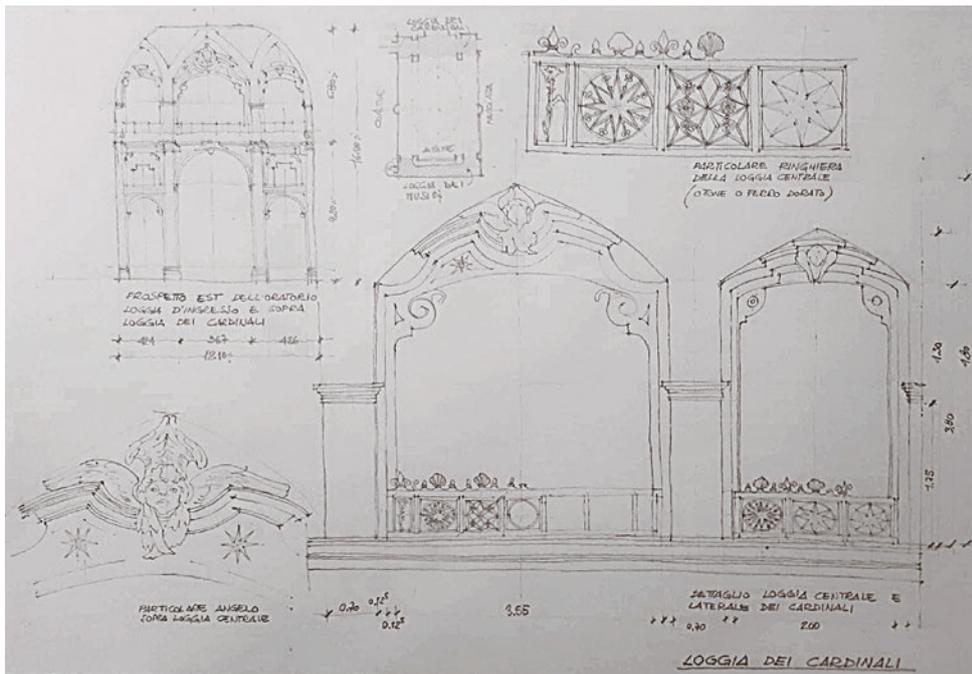


Fig. 48. Details. Drawing by E. C.

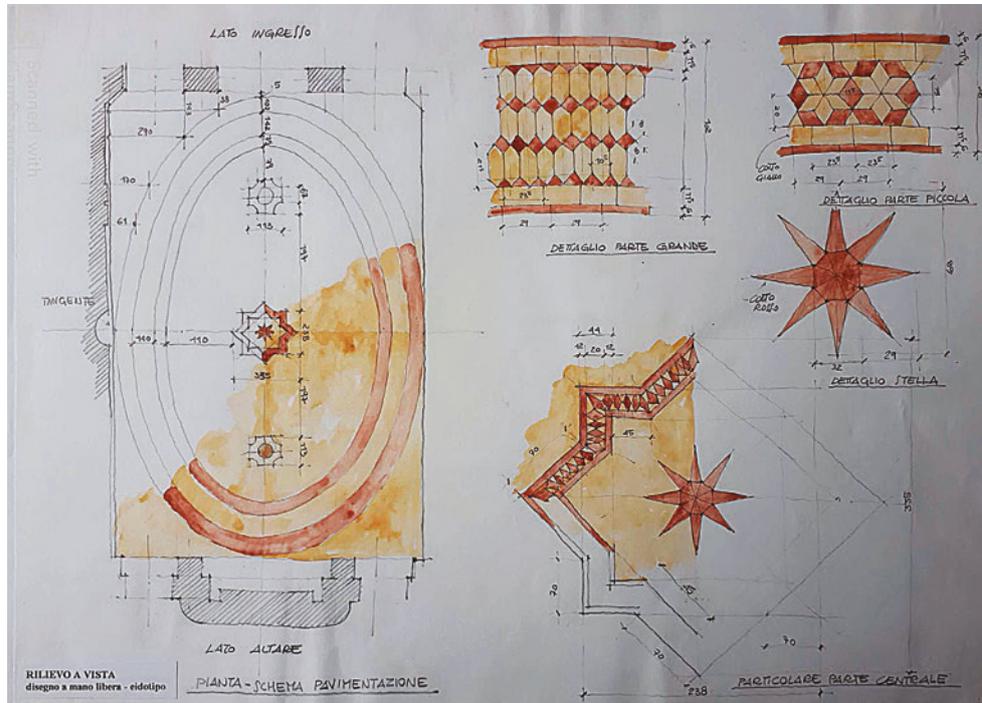


Fig. 49. Details of the floor, watercolour drawings. Drawing by E. C.

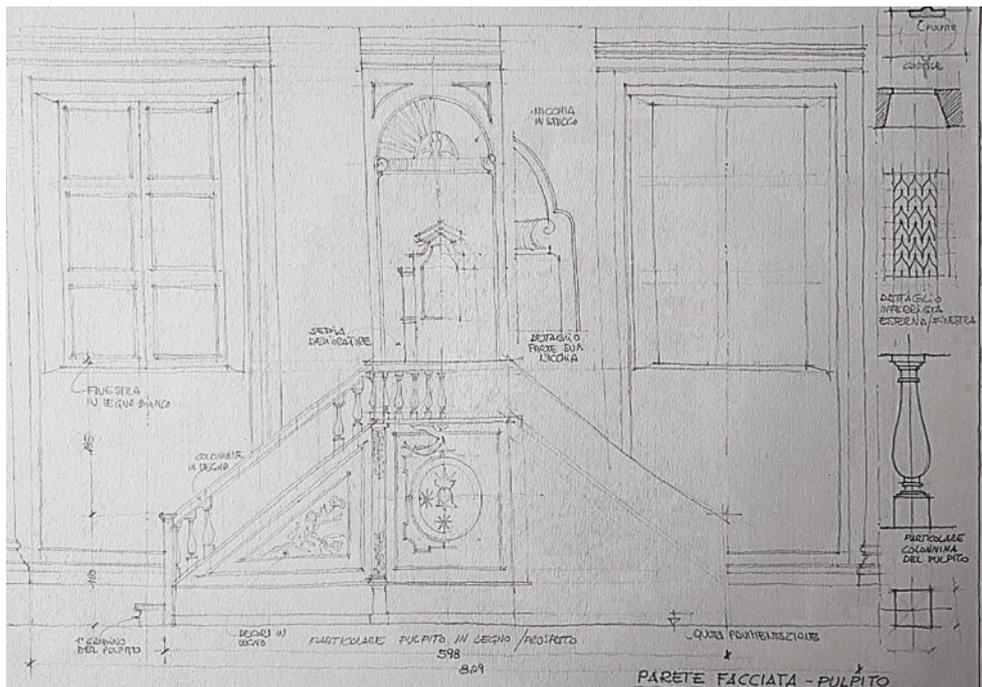


Fig. 50. Interior facade, detail of the pulpit. Drawing by E. C.

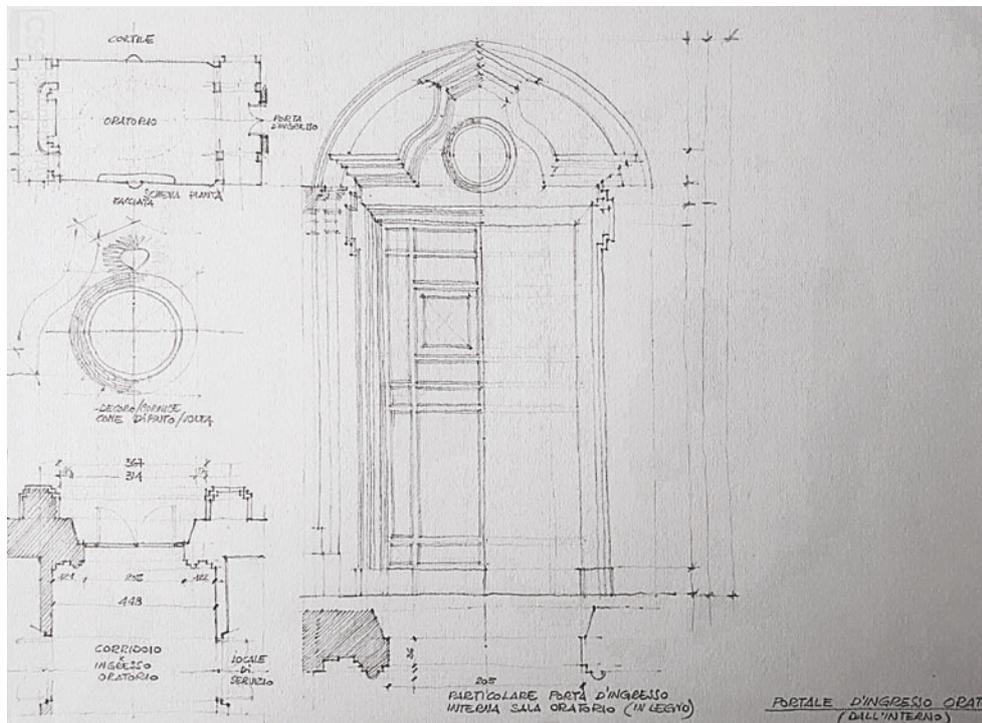


Fig. 51. Basic, concise drawing of the Oratory entrance door. Drawing by E. C.

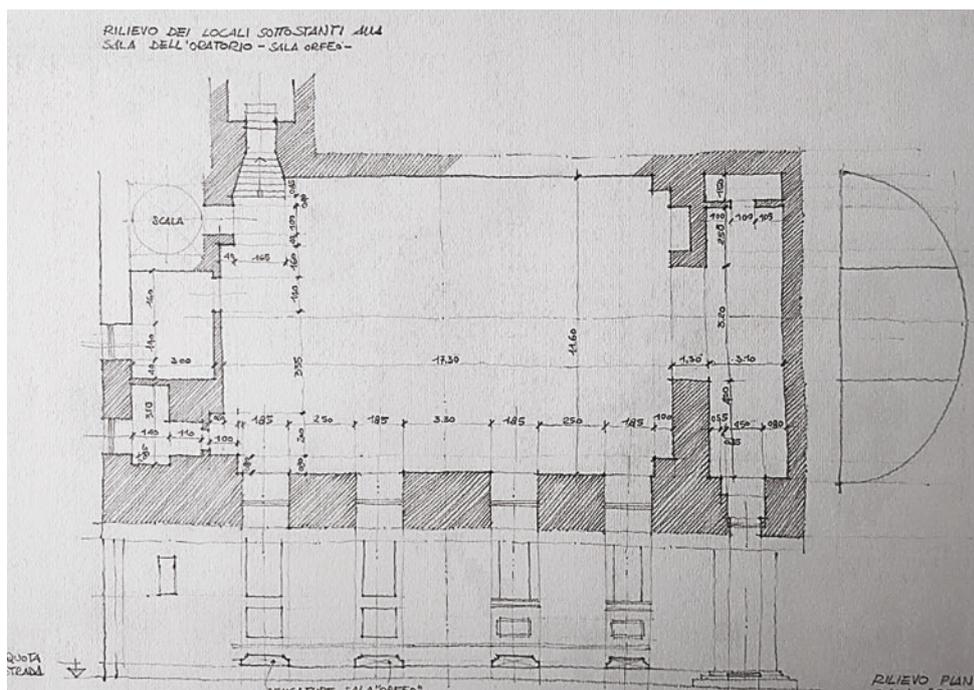


Fig. 52. Sala Orfeo, horizontal section. Drawing by E. C.

## Micro-bibliography

- J. CEJKA (1999), *Darstellungstechniken in der Architektur*, Kohlhammer Architektur, 1999.
- G. BACHELARD (2006), *La poetica dello spazio*, Edizioni Dedalo, Bari, 2006.
- E. CHIAVONI (2008), *Il disegno di oratori romani. Rilievo e analisi di alcuni tra i più significativi oratori di Roma*, Gangemi Editore, Roma, 2008, pp. 1-190.
- A. CONTE (a cura di), *Comunità disegno. Laboratorio a cielo aperto di disegni e rappresentazione nei sassi di Matera*, Collana di Architettura e fenomenologia della città-natura, Franco Angeli editore, Milano, 2008.
- E. CHIAVONI (2010), *Matera: struttura, forma e colore*, in *Disegnare Idee Immagini*, Anno XXI, n. 41/2010, Gangemi Editore spa International Publishing, Roma, 2010, pp. 52-65.
- E. CHIAVONI (2010), *Matita e acquarello per catturare l'immagine urbana*, in *Verso un disegno integrato. La tradizione del disegno nell'immagine digitale*, vol. 2, Albinetti P., Chiavoni E., De Carlo L. (a cura di), Gangemi Editore spa, Roma, 2010, pp. 17-23.
- E. CHIAVONI (2010), *The representation of colour and light in architecture through watercolours*, in *Colour & Light in Architecture*, vol. 1°, Università IUAV Venezia, 11-12 novembre 2010, Edizioni Knemesi, Verona, 2010, pp. 501-505.
- E. CHIAVONI, F. PORFIRI, G.L. TACCHI (2016), *Analisi di un'opera di Bramante attraverso il disegno: dalla lettura del frammento alla genesi progettuale / Using drawing to analyse a Bramante building: from interpretation of a fragment to the design genesis*. In *Le Ragioni del Disegno / The Reasons of Drawing*, Atti del XIII Congresso UID Firenze 2016. A cura di Bertocci Stefano, Bini Marco. Roma: Gangemi, 2016, pp. 195-200.
- M. DOCCI, E. CHIAVONI (2017), *Saper leggere l'architettura*, Gius. Laterza & Figli Spa, Bari-Roma 2017, pp. 1-212.
- E. CHIAVONI, A. DIACODIMITRI, G. PETTOELLO (2017), *Un'analisi attraverso il disegno dell'architettura moderna e contemporanea più significativa a Roma. Conoscenza, documentazione e comunicazione dei valori materiali e immateriali tramite sistemi grafici tradizionali e digitali integrati*, Aracne Editrice int.le S.r.l., Roma, 2017.

## **5. A survey of colours in architectural heritage**

### ***Colour, architecture and city***

#### *The sustainable design culture*

“Light” and colour are fundamental components of architecture characterising and enhancing the identity and cultural, social and environmental character of the city of the future. The many ways in which colour can be used will be explored to confirm that colour cannot be considered a simple decorative element but is also a fundamental element in every architectural and city project.

#### *Conscious use of colour in living and work environments.*

It is also possible to express a new urban quality using colour as a restyling element to redevelop unused or degraded urban areas in order to convey the concept of psycho-physical wellbeing and sustainable development.

**Marcella Morlacchi** (Professor at the University of Rome and Pescara) is an Italian architect focusing on this topic.

Below are some of her watercolours portraying the natural and built heritage of Rome, for example:

- *Piazza di Spagna*
- *Piazza del Popolo*
- *Villa Giulia*
- *Palazzo Chigi*



Fig. 53. Arch. Marcella Morlacchi, Piazza di Spagna, Rome: colour inserted based on a colour-measurement survey.



Fig. 54. Arch. Marcella Morlacchi, Piazza di Spagna, Rome: detail of the steps, watercolour drawing with shadows.



Fig. 55. Arch. Marcella Morlacchi, Piazza di Spagna, Rome: section of the steps, watercolour drawing.

Fig. 56. Arch. Marcella Morlacchi, Piazza del Popolo, Rome: detail of the vegetation, watercolour drawing.



Fig. 57. Arch. Marcella Morlacchi, Piazza del Popolo, Rome: detail, watercolour drawing with the section of Porta del Popolo and the Church of S. Maria del Popolo.





Fig. 58. Arch. Marcella Morlacchi, Villa Giulia, Rome: watercolour drawing.



Fig. 59. Arch. Marcella Morlacchi, Palazzo Chigi, Rome: watercolour drawing.

***Colour plan***

Design tool to control how to paint the walls, equipped with a clear and univocal reference system. The Colour Plan is closely connected to the Urban Furniture Plan; it represents the state of the art chromatic sector of the more general Urban Image Protection Plan.

Understanding the history of the chromatism of facades is crucial in the study of every Master Plan.

The first Colour Plan was invented in Turin in 1978 (Riccardo Zanetta and Germano Tagliasecchi); many other Colour Plans were developed for Italian cities, including:

The first Colour Plan was created in Turin in 1978 by Riccardo Zanetta and Germano Tagliasecchi, followed by numerous other Colour Plans for Italian cities, for example: Pozzuoli; Giulianova; Bergamo; Prato; Ponza; Trieste; Portofino; Cremona; Caserta.

Others include the Plan for the S. Lorenzo district in Florence and the Plan for the Second Municipality in Rome; the latter was considered a Pilot Plan which could also be used for the old city centre. This would require an ad hoc Norm to be inserted in the New Building Regulation.



Fig. 60. The island of Ponza from the sea.



Fig. 61. The island of Ponza from the sea. Several colour details.



Figs. 62-63. Arch. Marcella Morlacchi, watercolour image of the island of Ponza.



Fig. 64. Arch. Marcella Morlacchi. Watercolour drawing of the island of Ponza, detail.

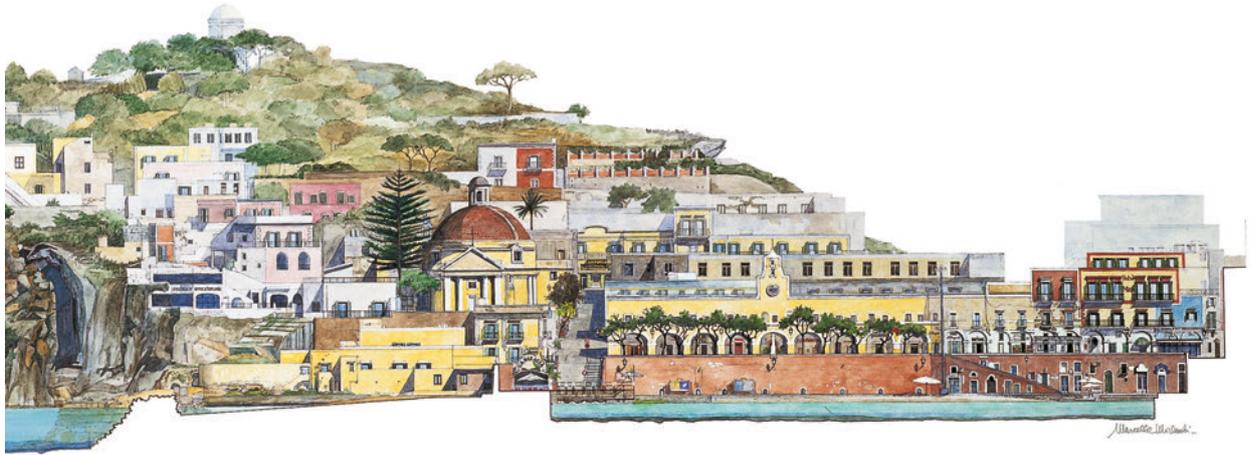
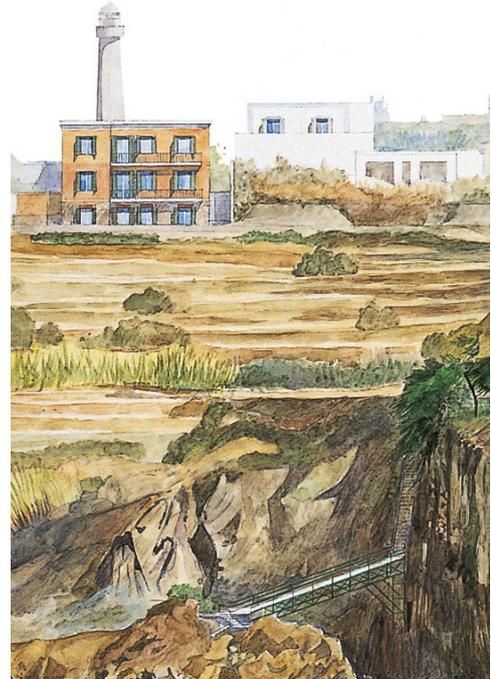
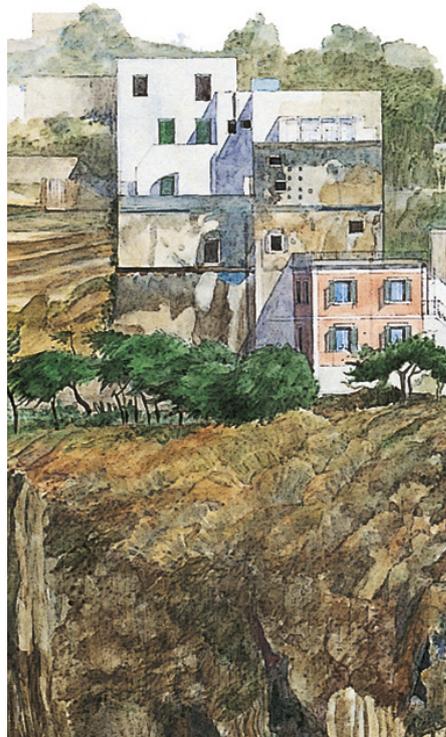


Fig. 65. Arch. Marcella Morlacchi. Watercolour drawing of the island of Ponza, detail.



Figs. 66-67. Arch. Marcella Morlacchi. Drawing of the island of Ponza, landscape watercolour, detail.



Fig. 68. Arch. Marcella Morlacchi. Watercolour drawing of the island of Ponza, detail.

## **COLOUR, ARCHITECTURE AND CITY**

### ***Sustainable design culture***

#### *Recurrent chromatic errors:*

1 - The chromatic tone of the brick applied at the bottom between the windows is also used, without any rule, only on some parts of the architectural orders, for example only on the ashlar of the base, while the rustication of the corner stones is treated with other shades.

2 - The vertical parts of the frames of the doors and, sometimes, of the windows, are treated in accordance with the colour tone of the stone up to a certain height (where the stone was actually placed) and then painted with the colour used for the background walls (where the "simulated" stone replaces the stone).

3 - The architectural unity of the building facade is altered by painting the units of the various condominiums with different colours; the tone of the plasters of the window frames differs from the tone used for the windows and the corner stones. An ashlar-treated wall is painted with the colour applied on the "smooth" bottoms of the upper floors.

4 - The surfaces are painted freely, without respecting the colour tone of the stone, and moreover with variable colours in the individual elements of the architectural order, painting for example the capitals with a different tone to the bases, etc.

*... "the designer of colour is not simply a designer of colour: he must be first and foremost be an architect. But not an architect with a capital A ... an architect able to distinguish a base from a capital, a smooth ashlar from an embossed ashlar; a real brick wall from a fake brick surface created using a brush; a humble architect able to read architecture by creating as it is taught at school: a rough mix of logical analysis and grammatical reflection...this is what is asked of the architect who has to design the colour of the city, house by house. He must give a homogeneous and meaningful colour to the two great antagonists of the architectural façade: the background and the ornate".*

Paolo Marconi (*Italian architect, Professor of Architectural Restoration*)

The architectural unity of the building façade is altered by painting the units of the various condominiums with different colours; the tone of the plasters of the window frames is different from the one used for the rustication of the windows and the corner stones.

An ashlar-treated wall is painted with the colour applied on the “smooth” lower parts of the upper floors;

- the surfaces are coloured freely, without respecting the colour tone of the stone, and moreover with variable colours in the individual elements of the architectural order, painting, for example, the capitals with a tone that differs from the one used for the bases.



Figs. 69-70. Rome, Italy:  
example of colour mistakes.  
Photos by F.P., 2020.



Fig. 71. Rome, Italy: example of colour mistakes. Photo by F.P., 2020.



Fig. 72. Study for the colour plan.

*Micro-bibliography*

- P. MARCONI (1984), *Arte e cultura della manutenzione dei monumenti*, ed. Laterza, Bari, 1984.
- F. MIRRI (1989), *Ferrara 50 disegni*, Gabriele Corbo Editore, Ferrara, 1989.
- A. AVETA, R. AMORE, C. MEGNA (1993), *Il colore della città, note per il restauro delle Cortine Edilizie Napoletane*, Arte Tipografica, 1993.
- D. FIORANI (a cura di), *Il colore dell'edilizia storica*, l'Aquila 13-14 nov. 2000. Soprintendenza B.A.A.A.S. per l'Abruzzo, Dipartimento di Architettura e Urbanistica Università dell'Aquila, ed. Gangemi Roma, 2000.
- M. MORLACCHI (2003), *Colore e architettura – Il linguaggio del colore nel disegno delle superfici architettoniche*, Gangemi Editore, Roma, 2003.
- M. MORLACCHI (2008), *Il Libro del Disegno – Nozioni di base per rappresentare l'architettura con la matita, con la penna, con il colore, con il computer*, Gangemi Editore, Roma, 2008.
- R. LEMME, M. MORLACCHI, Ponza. *L'immagine di un'isola – Architettura colore arredo*, Gangemi Editore, Roma.
- M. MORLACCHI, M. SALIMEI, B.M. TARASCHI (2011), *Castelli, il piano di tutela dell'immagine, i colori del costruito storico nel paesaggio*, Gangemi Editore, Roma, 2011.
- M. DOCCI, M. GAIANI, D. MAESTRI (2011), *Scienza del disegno*, seconda edizione, Città Studi Edizioni, Torino, 2011.
- M. MORLACCHI (2015), *Il colore della città – Il rilievo cromatico per la tutela della bellezza urbana*, Gangemi Editore, Roma, 2015.

## 6. Integrated representation techniques

### *Drawing Venezia*

The beautiful city of Venice has been declared a World Heritage Site by UNESCO. It has many stately palaces overlooking fields, streets, small rivers and canals, and ancient residences of the richest Venetian families of the city's golden age. The numerous churches in the lagoon city are renowned for their architecture and artistic treasures.



Fig. 73. Fast drawing (3 minutes). Drawing by E. C.



Fig. 74. Coloured pencil drawing of Venice as a fish. Drawing by E. C.

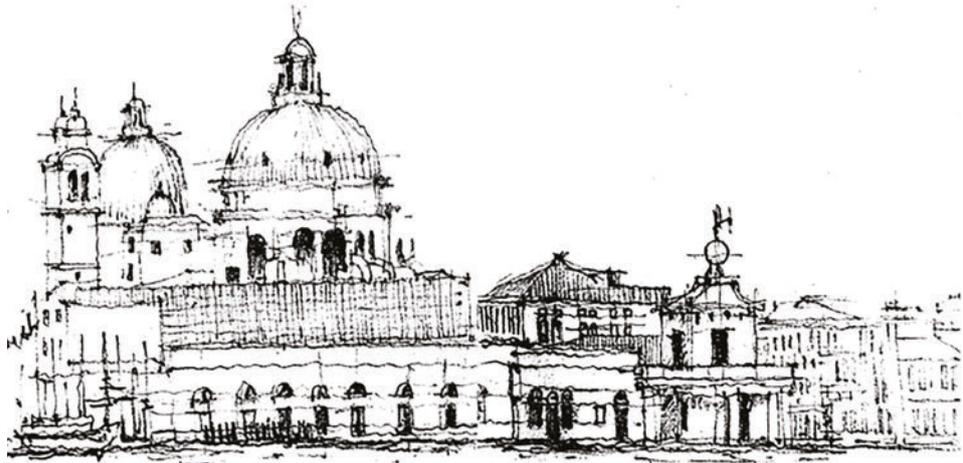


Fig. 75. Freehand Drawing (10 minutes). Drawing by E. C.

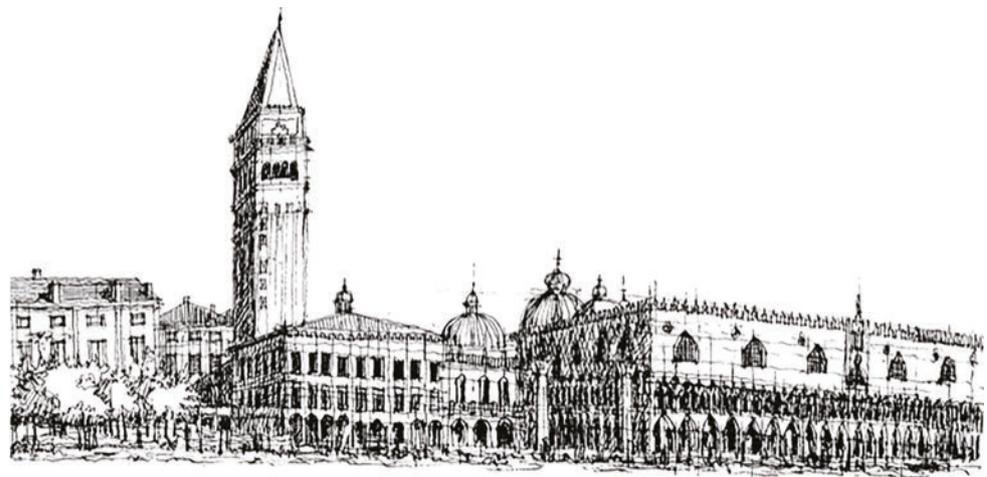


Fig. 76. Black ink pen drawing (20 minutes). Drawing by E. C.

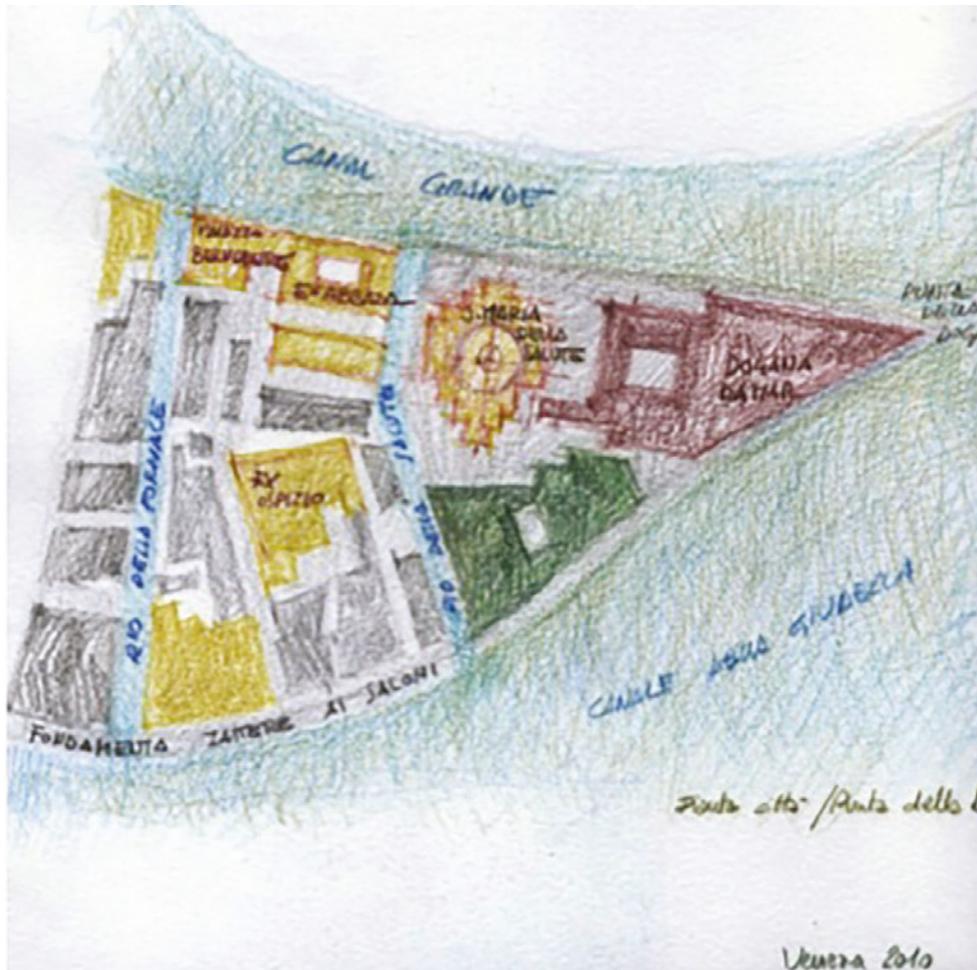


Fig. 77. Plan: detail. Drawing by E. C.



Fig. 78. The Arsenale in Venice. Coloured pencils drawing. Drawing by E. C.

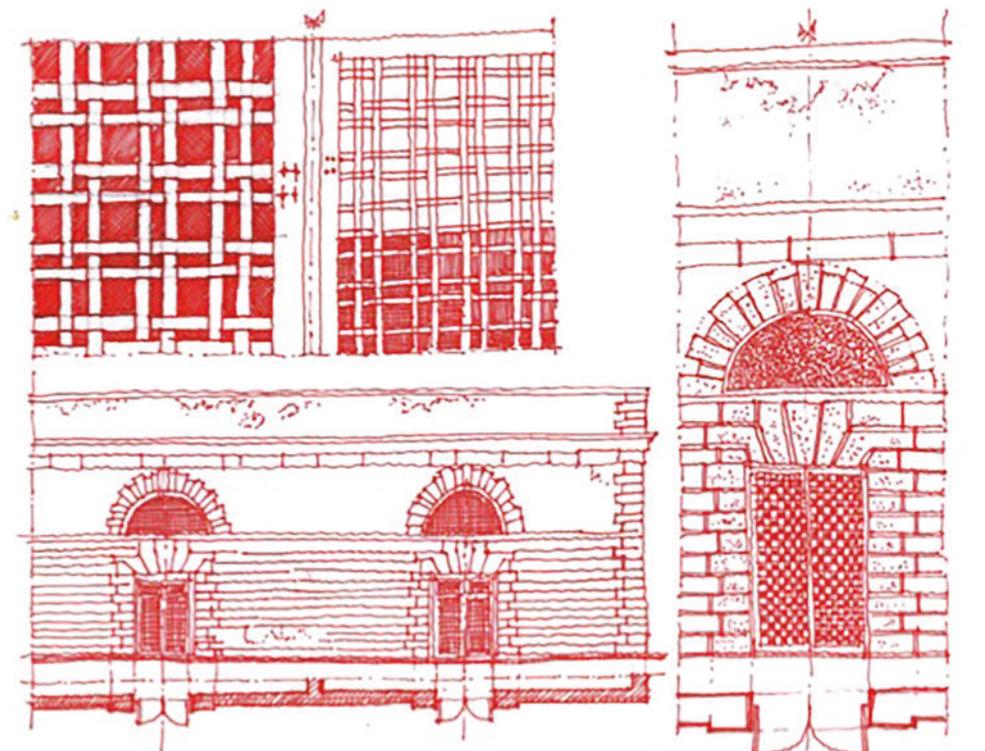
Fig. 79. Drawing at night with artificial light. Drawing by E. C.



Fig. 80. Drawing; detail. Drawing by E. C.



Fig. 81. Details; crayon drawing. Drawing by E. C.



### Drawing Matera

Matera is a city in the Basilicata region. It is known for its historic *Caveoso and Barisano Sassi districts*, with cave houses carved into the mountainside making it one of the oldest still inhabited cities in the world. The *Sassi*, together with the park of the rock churches, have been recognised as a World Heritage Site by UNESCO.



Fig. 82. Photo of Matera.  
Photo by E.C., 2013.



Fig. 83. Pencil drawings.  
Drawing by E. C.



Fig. 84. Pencil drawings.  
Drawing by E. C.



Fig. 85. A small watercolour.  
Drawing by E. C.



Fig. 86. City sights; details.  
Drawing by E. C.



Fig. 87. Monochromatic watercolour. Drawing by E. C.

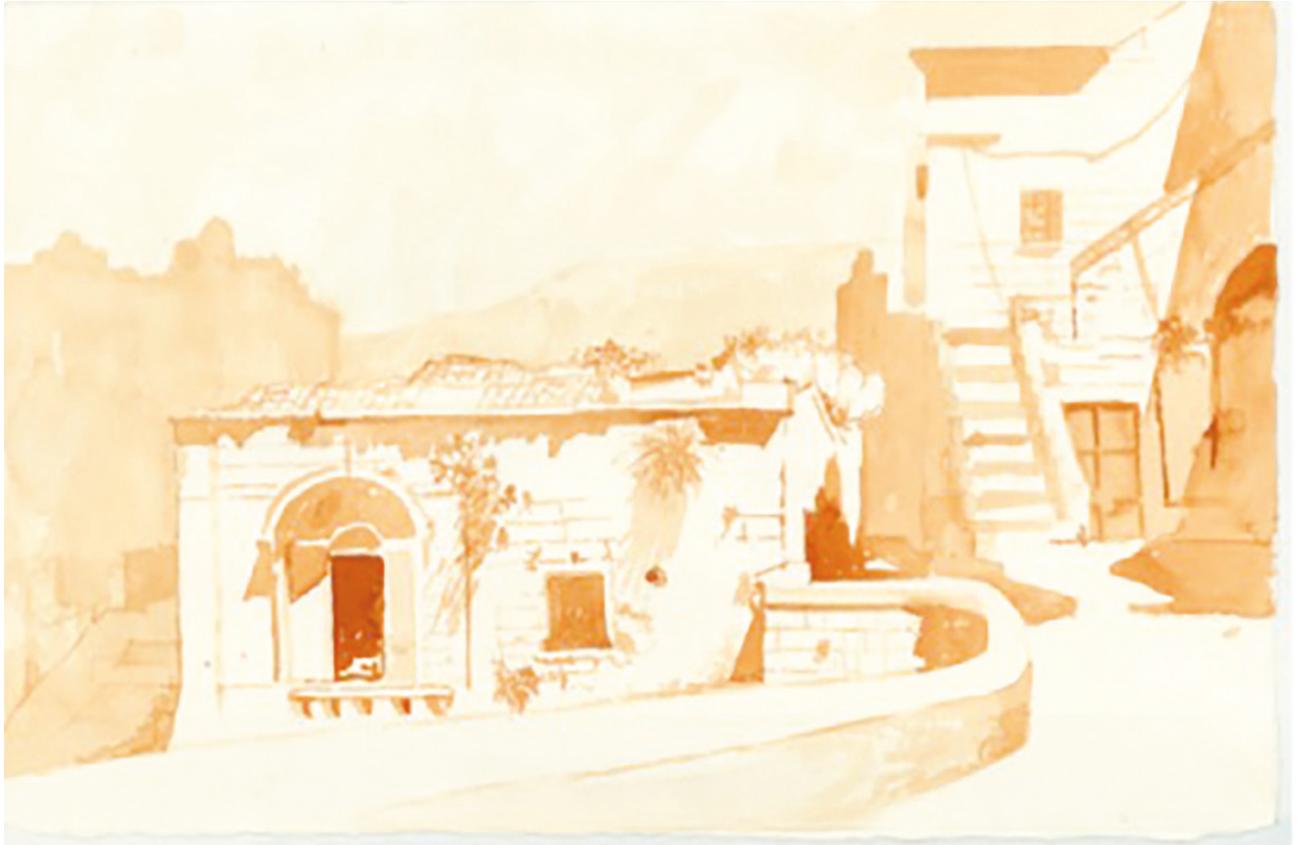


Fig. 88. Monochromatic watercolour. Drawing by E. C.

The monochrome watercolour technique is often used to depict a city, i.e., using a just one colour and water. It enables the artist to focus on the ratios of light and shadow, simplifying verification of other shades of colour.

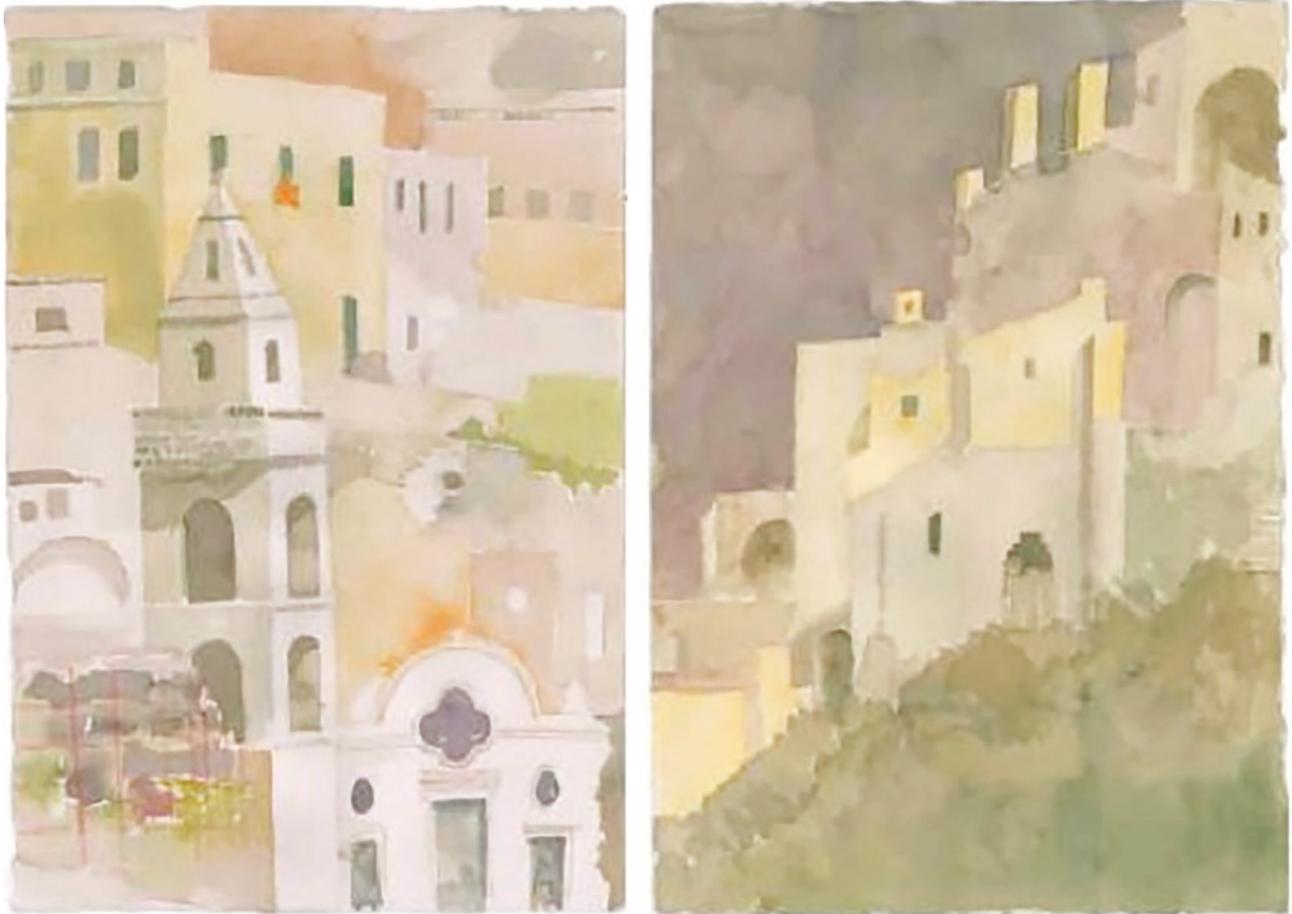
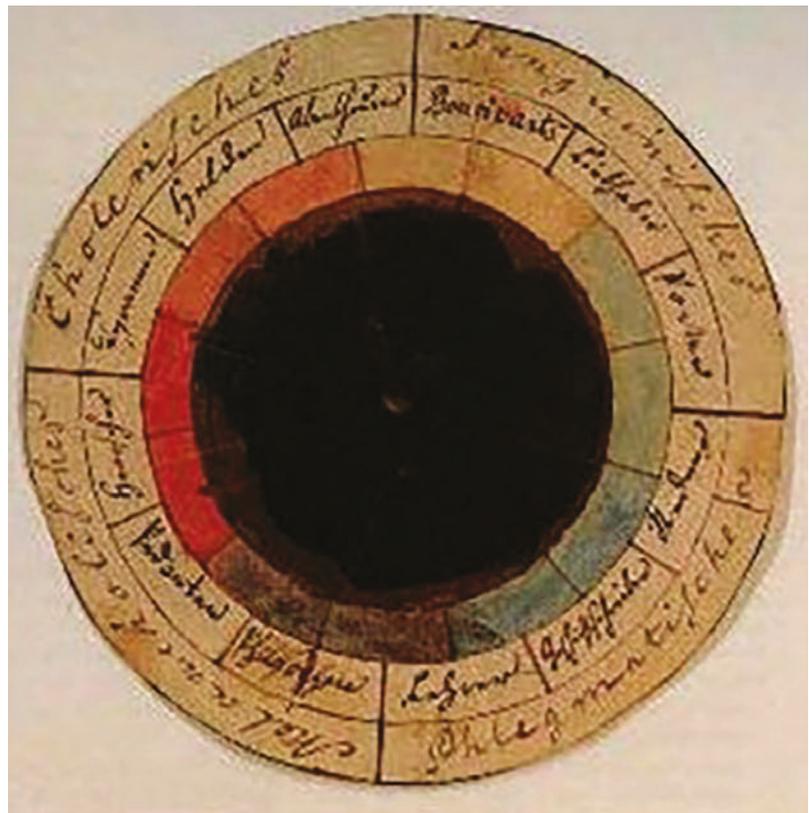
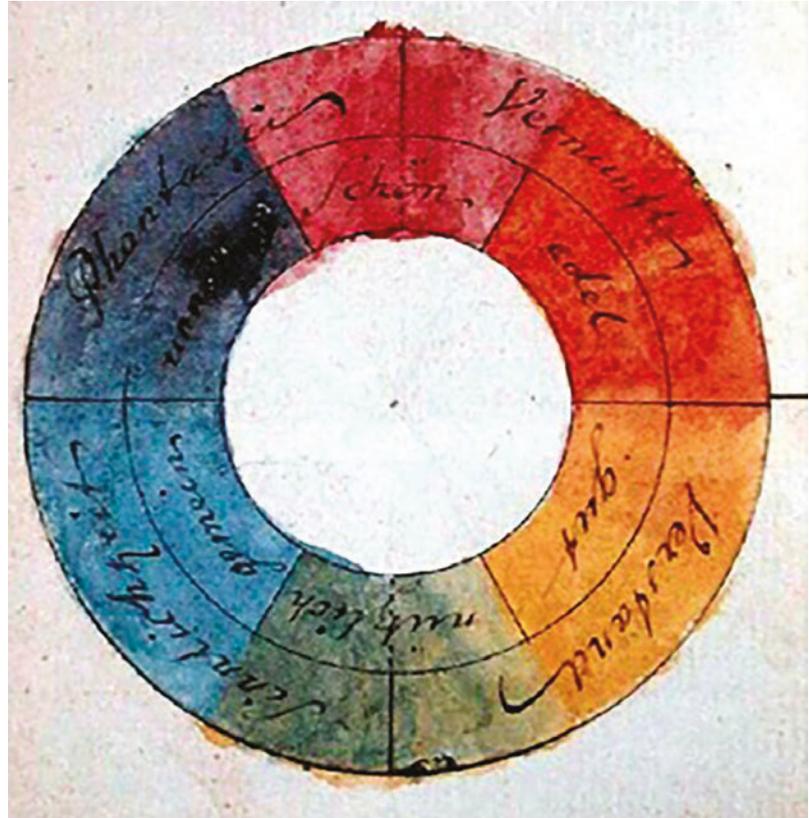


Fig. 89. Watercolour drawings  
by E. C.

## **7. Theory of colour**

Colour is an essential part of how we experience the world, both biologically and culturally.

In 1810 Johann Wolfgang von Goethe published "The theory of colour", a treatise on the nature, function, and psychology of colours.



Figs. 90-91. The colour wheel by J.W. Goethe.

White: balanced reflection of all the hues present in the light spectrum.  
 Black: balanced absorption of that spectrum.

The basic colour wheel consists of the rainbow colours bended to look like circle / wheel thereby easily showing how the colours relate to one another.

Isaac Newton's colour wheel is not equally distributed but the colours are sized according to their wavelenghts and widths in his observation of the spectrum.

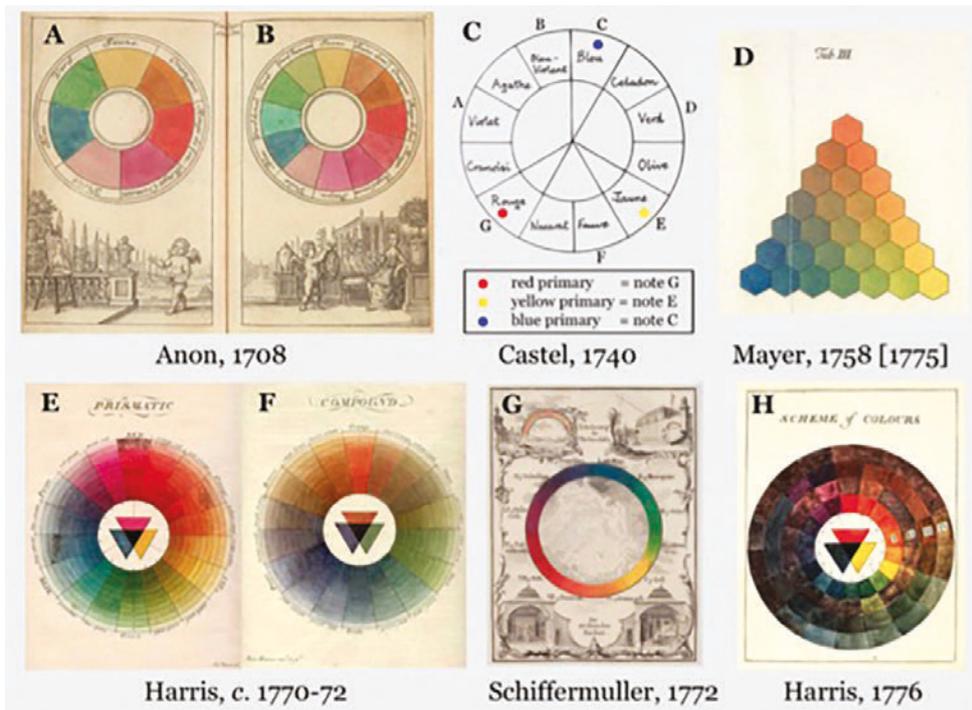


Fig. 92. Some important historical colour wheels.

1772 - Colour pyramid by Johann Heinrich Lambert. He demonstrated the need to order colours in space and thus help textile merchants decide whether to stock all the colours so that contemporary dyers and printers could be inspired when trying to find the right mixtures.

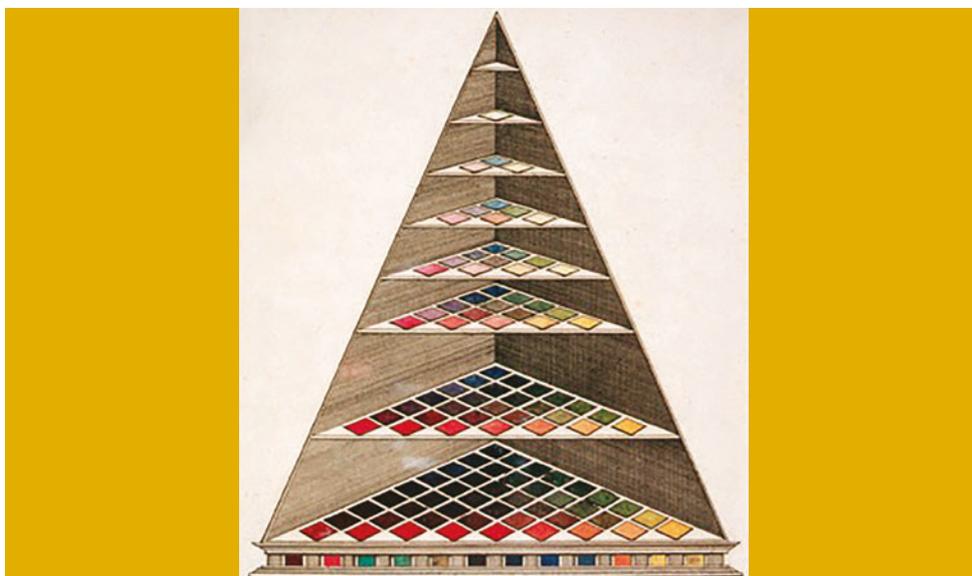


Fig. 93. Colour pyramid by Johann Heinrich Lambert.

1749-1832 - Goethe suggested that darkness is an active ingredient rather than the mere passive absence of light, and that black is a colour itself. He was also the first to talk about the effect of colour on people, so we can say that he is the father of colour psychology; he linked each colour with certain emotions.

Yellow: the colour nearest the light, it appears when there is the slightest mitigation of light, whether by semi-transparent mediums or faint reflection from white surfaces.

Blue: as a hue it is powerful; it appears as a kind of contradiction between excitement and repose.

Red: conveys an impression of gravity and dignity, and also of grace and attractiveness.

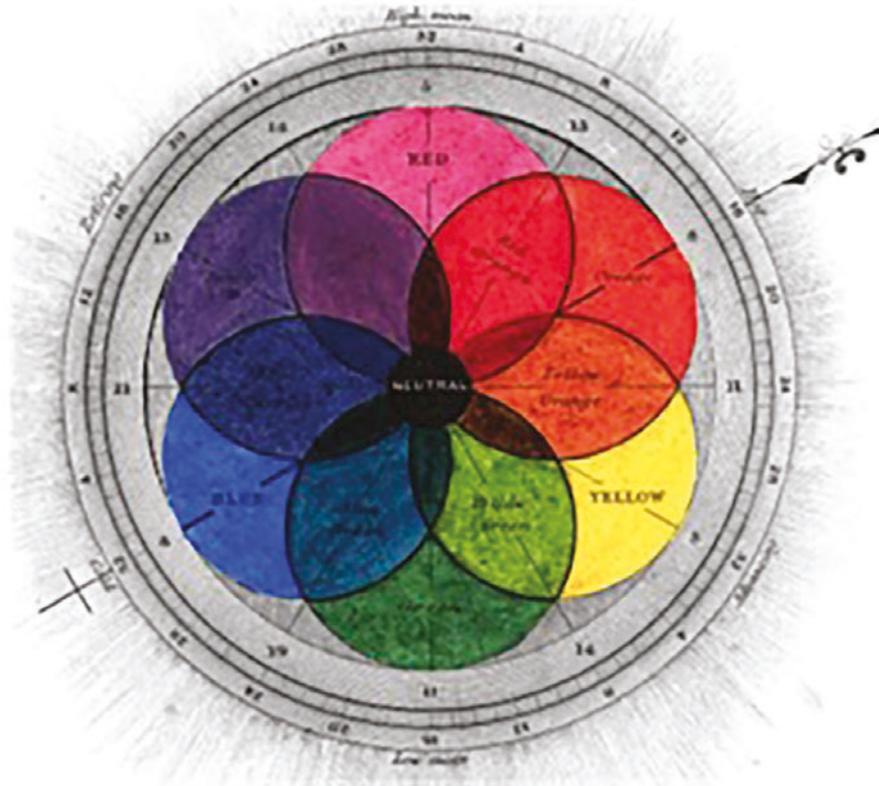


Fig. 94. RYB color chart from George Field's Chromatography.

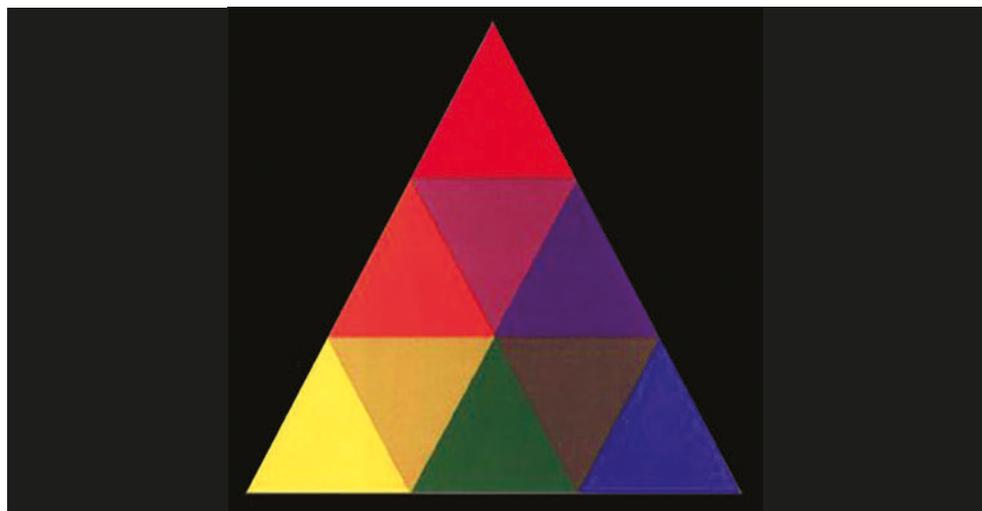


Fig. 95. Colour pyramid.

1810 - Philipp Otto Runge represented the colour wheel in his own way: he was the first to put the original hue at the edge of the wheel. He then drew a 3D sphere and put all the tints, shades and hues in order.

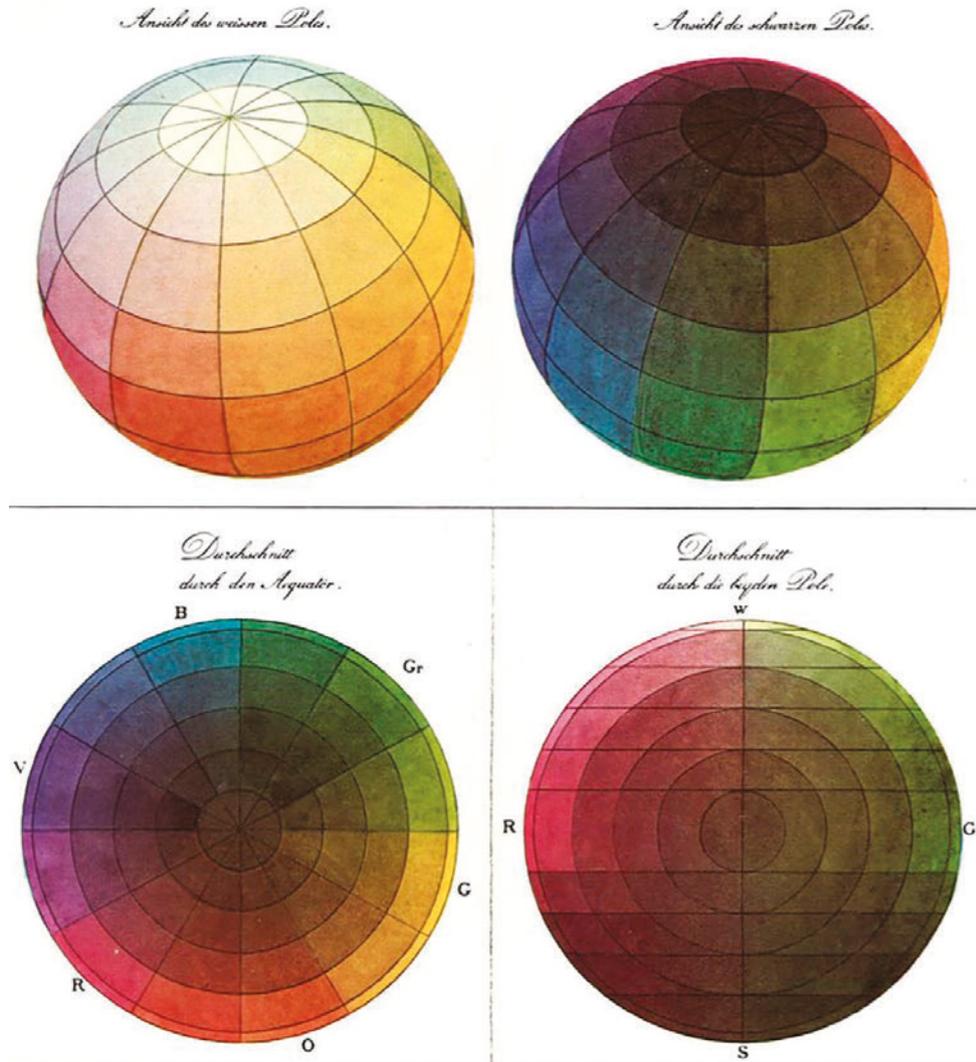


Fig. 96. The 3D colour sphere by Philipp Otto Runge.

Michel Eugène Chevreul designed a 72-part colour circle, 3 primaries (red, yellow, blue), 3 secondary mixtures of orange, green and violet and 6 further secondary mixtures.



Fig. 97. The colour circle by Michel Eugène Chevreul.

1900 - Albert Henry Munsell, an American painter, art teacher and inventor of the Munsell Colour System arranging colours based on three colour dimensions: hue, value, chroma.

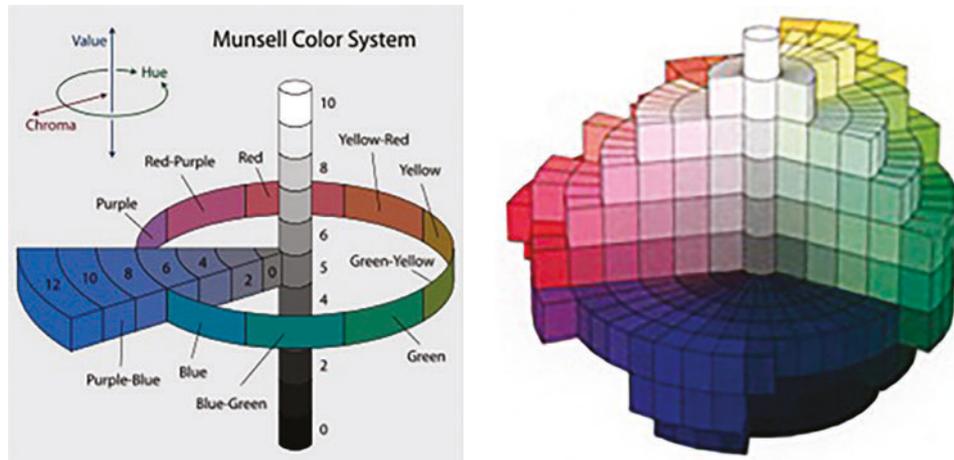


Fig. 98. The Munsell colour system.

Friedrich Wilhelm Ostwald developed a new theory of colour defending the standardisation of the colours. A double cone model represents the three properties of colour: hue, lightness and saturation.



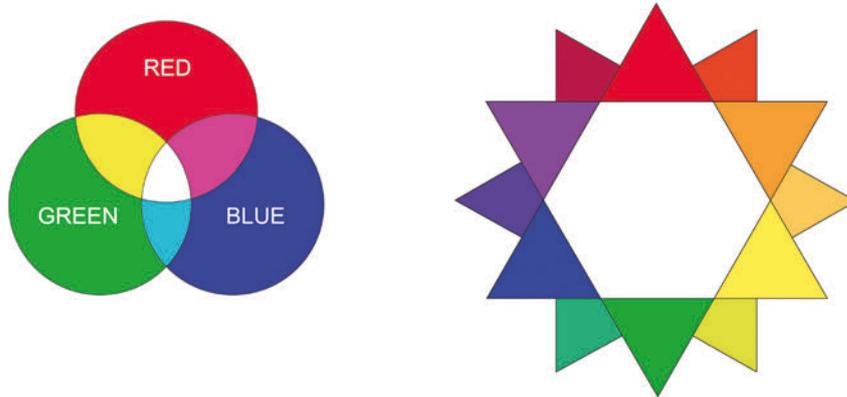
Fig. 99. Friedrich Wilhelm Ostwald's double cone model.

The RGB colour model is an additive colour model in which red, green and blue light are added together in various ways to reproduce a broad array of colours. The name of the model comes from the initials of the three additive primary colours, red, green and blue.

To form a colour with RGB three light beams (one red, one green and one blue) must be superimposed (for example by emission from a black screen or by reflection from a white screen).

A colour in the RGB colour model is described by indicating how much of each of the red, green and blue is included. The colour is expressed as an RGB triplet (R, G, B). Each component of which can vary from zero to a defined maximum value.

If all the components are at zero, the result is black: if all are at maximum the result is the brightest representable white.



Figs. 100-101. RGB colour model and a colour wheel structure. Drawing by F. P.

Colour in design or architecture is very subjective, what causes a reaction in one person may evoke a different reaction in someone else, and this is due to personal preference or cultural background.

Changing the exact hue or saturation of a colour can evoke a completely different feeling.

**HUE:** denotes an object's colour, when we say "blue", "green" or "red" we're talking about the hue.

**CHROMA:** is the purity of a colour, the brightness in comparison to white; combining high and low saturation in the same hue creates a sophisticated and elegant design.

**SATURATION:** how a hue appears under particular lighting conditions.

**TONES:** tones are created when gray is added to a hue. Tones are generally duller or softer-looking than pure hues (it gives a certain vintage feel and sophisticated or elegant look).

**SHADES:** are created when black is added to a hue, making it darker.

**TINTS:** a tint is formed when white is added to a hue, lightening it. Pastels are very light tint colours.

**WARM COLOURS:** warm colours include red, orange and yellow, and variations of those three colours. They refer to colours of fire, of fall leaves, sunsets and sunrises, and are generally energising, passionate and positive. Using warm colours in design means reflecting passion, happiness, enthusiasm and energy.

**COOL COLOURS:** cool colours include green, blue and purple. They are the colours of night, of water, of nature, and are usually calming, relaxing and somewhat reserved. Blue is the only primary colour within the cool spectrum.

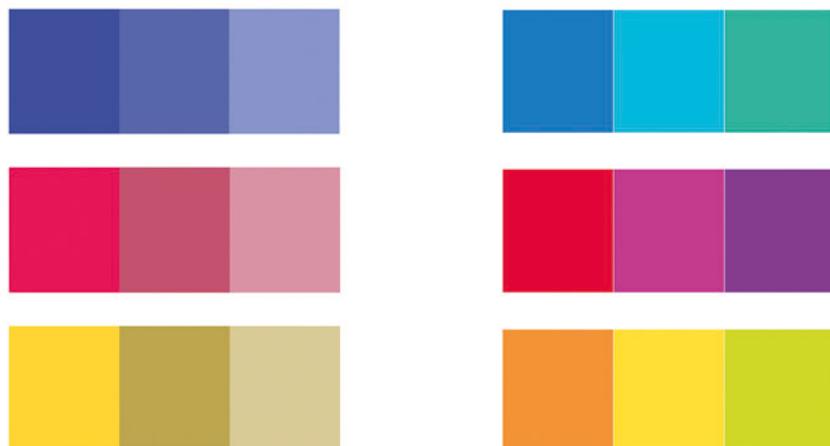
**NEUTRAL COLOURS:** neutral colours often serve as a backdrop in design. They're commonly combined with brighter accent colours, and they can create very sophisticated layouts. They are generally quiet and can often evoke a sense of history.

Fig. 102. Warm colours, cool colours and neutral colours. Drawing by F. P.



The colours you choose can either work for or against the brand identity you are creating. There are a number of predefined colour scheme standards:

- **MONOCHROMATIC COLOUR SCHEMES**, are made up of different tones, shades and tints within a specific hue.
- **ANALOGOUS COLOUR SCHEMES**, are created by using colour with the same chroma level, but using different tones, shades and tints.



Figs. 103-104. Monochromatic colour schemes and analogous colour schemes. Drawing by F. P.

- COMPLEMENTARY COLOUR SCHEMES, are created by combining colours from opposite sides of the colour wheel, they can easily be expanded using tones, tints and shades.

- CUSTOM COLOUR SCHEMES, are the hardest to create, instead of following the predefined colour scheme, they are not based on any formal rules. Examples: similar chroma and saturation level or one colour with an high chroma among other colours with lower chromas.



Figs. 105-106. Complementary colour schemes and custom colour schemes with examples. Drawing by F. P.

Using tints, tones, and shades in your colour schemes is very important, because pure hues all have similar values and saturation levels.

*Micro-bibliography*

- G. STOCKEL (1998), *Percezione rappresentazione comunicazione*, Edizioni Kappa, Roma, 1998.
- P. BALL (2001), *Colore una biografia. Tra arte, storia e chimica, la bellezza e i misteri del mondo del colore*, BUR Rizzoli, 2001.
- L. RENATA, R. POMPAS (2001), *Il colore persuasivo. Grafica, pubblicità, comunicazione, new media*, Il Castello, 2001.
- J. W. GOETHE (2008), *La teoria dei colori*, il Saggiatore S.p.A., Milano, 2008.
- R. STEINER (2009), *L'essenza dei colori*, Editrice Antroposofica, Milano, 2009.
- J. ITTEN (1987-2010), *Arte del colore*, Il Saggiatore, Milano, 2010.
- I. SIDAWAY (2004), *I colori, Come mescolarli per ottenere le tinte indesiderate*, Hoepli, 2004.
- L. LUZZATO, R. POMPAS (2005), *Conoscere e capire il colore/2*, Il Castello Collane Tecniche, Milano, 2005.
- M. PASTOUREAU, D. SIMONNET, "Il piccolo libro dei colori", Ponte alle Grazie.
- G. BRINO (2009), *Italian city colour plans (1978–2007)*. In T. Porter & B. Mikellides (Eds.), *Colour for architecture today* (pp. 30–35). London, UK: Taylor & Francis, 2009.
- L. RENATA, R. POMPAS (2010), *Il significato dei colori, nelle civiltà antiche*, Tascabili Bompiani, 2010.
- E. CHIAVONI, L. FABBRI, F. PORFIRI, G.L. TACCHI (2017), *Il colore per rappresentare e comunicare: lettura semantica di frammenti di paesaggio contemporaneo nella Valle delle Accademie a Roma*. In M. ROSSI, A. SINISCALCO (a cura di), *Convegno Colore e Colorimetria. Contributi Multidisciplinari*, vol. IX A, Maggioli Editore, Rimini 2013, pp. 452-458.
- P. ZENNARO (2017), *Strategies in colour choice for architectural built environment*. *Journal of the International Colour Association*, 19, 15–22, 2017.



**T**he programme objective is to provide students with the first basic tools to understand the world's Architectural Cultural Heritage.

The course teaches the methodologies for the representation of architecture and landscape and the graphic systems to communicate the beauty of typical cultural scenarios and to use traditional and innovative graphic techniques.

Students must learn not only the geometric code required to consciously represent existing and imaginary forms, but will also study in-depth the geometric, proportional and perceptive tools that will allow them to manipulate those forms.

Students will acquire the manual skills needed to become proficient in the use of the simpler and more direct graphic techniques thanks to multiple exercises in free-hand drawing and line drawing, with a particular focus on chromatic aspects.

Students will also be taught the basic notions of the Fundamentals of the Geometry of Representation.

**Emanuela Chiavoni** Full Professor, ICAR 17 Drawing Sector, Faculty of Architecture of the Sapienza University of Rome. Her main research topics are: the role of drawing in understanding the tangible and intangible architectural, archaeological and landscape heritage and the methodologies, tools and techniques of survey. Part of the departmental team involved in the preparation and evaluation of several proposals for national and international research.

**Francesca Porfiri** is a Ph.D. Architect. On July 2014 she graduated Ph.D., in Representation and Survey Sciences at Sapienza University. She has attended several workshops and seminars on survey, representation and descriptive geometry. She made several publications and speeches in national and international conferences. Actually she is a Research Fellow in the Department of History, Representation and Restoration of Architecture and since 2016 she is an adjunct professor at Sapienza University of Rome.

ISBN 978-88-9377-203-7



9 788893 772037

