INTRODUCTION

Together we will explore some of the trails of culture, the trains of thought, the footpaths of feeling. … Feeling is everything. Without feelings motivating a thought, it risks being abstract and the knowledge it imparts will not affect one's whole being. . . . We may also see what is happening elsewhere, meet other cultures and, who knows, discover unsuspected echoes there.

Kenneth White, *L'Atelier du Héron*, 1994, p. 67

For centuries, people have preserved documents containing color samples, creating a treasure trove for future generations of researchers. This book is a tribute to them, and to those who, by studying and publishing color charts, began to trace the rich past of these documents.

The history of what we today call "color charts" is a field that is still being discovered. In this book, I offer almost two hundred examples, the majority of which are previously unpublished, in the hopes of contributing to our understanding of this area of study. Ranging from modest to splendid, these charts illustrate the evolution of color sampling from the fifteenth century to the present day.

This book is a sample of an extensive corpus, over several thousand charts in total, that I was able to examine due to the trust of both private collectors and public institutions. This corpus is very diverse, including a watercolor teaching manual from the seventeenth century, a nineteenth-century exercise book with notes written by an apprentice dyer, flyers distributed by department stores in the 1870s, thick volumes published by the chemical industry in the 1920s, color scales for determining the ripeness of an apricot, and leaflets to help choose the right color for a tractor or blush for the cheeks.

Each of these charts embodies a small piece of the larger story. But to be understood, each must be placed in its original context, asking when, where, and why it was produced, who produced it, and for whom. It was necessary to establish timelines and chronology, identify long-lost materials, research the traces of forgotten skills, and sketch a picture of the women and men who once worked with these materials.

This archaeological and anthropological research became something of a balancing act. I had to find links between the few archives that have come down to us across the ages and the profusion of charts that emerged starting in the early twentieth century. It was also necessary to find the right balance between the desire to include as many details as possible to help future researchers and the impulse to produce a book that would be accessible to all.

I would have loved to reveal all these splendid examples in their immense variety! But there came a point when I had to make choices. After selecting the best examples for outlining the rich history of the color chart, I chose to emphasize a few categories (such as garment manufacture and artists' supplies) to be able to convey the genre's evolution and variety more accurately. I then identified within these categories the chart that would best provide the key information and, finally, its most relevant page or plate.

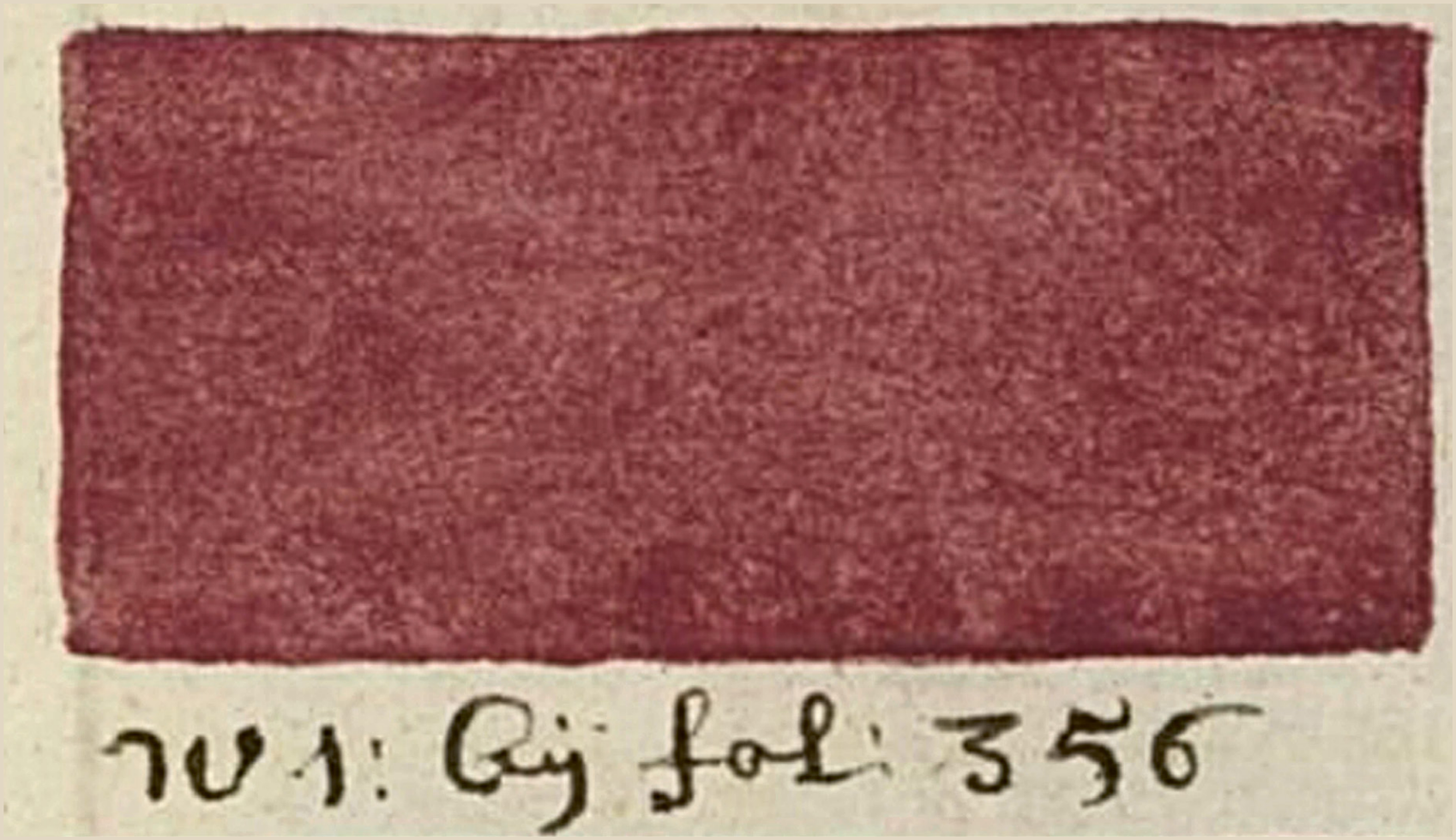
This book is rather like a color chart of color charts.

The term "color chart" did not appear in France until the 1930s and corresponds to a specific color presentation tool. Its logic and design came about over centuries, coexisted with other color sampling methods, and only really became established in the late nineteenth century. The topics covered here go far beyond the current generic term "color chart" to include referencing systems, sample collections, formula and laboratory notebooks, and teaching manuals.

This book is written for all those with a passion for color, so that everyone can explore the multiplicity, ingenuity, poetry, and beauty of the methods that were developed over centuries in very diverse contexts to present color selections and to communicate their chromatic richness with accuracy. It has been designed for all those who wish to discover the world of color charts. Readers can browse at will: each chart is accompanied by a short text highlighting its characteristics and placing it in the broader context of a particular category of use, which is situated within its historical period. Readers can also dive in deeply: notes at the end of the book provide additional information and indicate the sources used.

This book also aims to highlight how color tools have functioned as active interfaces between scholars, artists, artisans, industrialists, merchants, and society. They brought about key changes in the way color is conceptualized, which we have inherited today. This research also reveals that from its beginnings color sampling has held a powerful fascination that transcended functionality. Color charts have long provided fertile ground for the imagination, and in recent decades they have even abandoned the very functions that inspired their existence, as they have increasingly become images themselves.

Perhaps this is ultimately their most lasting influence.



GRASPING COLOR

FIFTEENTH TO SEVENTEENTH CENTURIES

From the fifteenth through the seventeenth centuries, European civilization underwent radical transformations of all kinds—political, economic, social, scientific, and philosophical. These had significant effects on the approach to color. Several documents illustrate the fertile ground in which the history of color sampling took root.

AN AGE-OLD INTEREST IN COLOR

I pray you, My Lord, that the red be as red as possible; likewise the white and the yellow must be exquisite. . . . The siglaton dress[1] *is of the greatest beauty, but it is not exactly what I wanted, because it is white and blue, whereas I would have wanted . . . an onion color, an open color. The lead-colored dress is superb, it is the most beautiful of all.*

Letter ordering fabrics,
Cairo, early twelfth century

These words published by Dominique Cardon and taken from a document in the genizah (an archive of sacred documents) in the Ben Ezra Synagogue in Cairo indicate that people have been interested in color throughout human history.[2]

While many physical traces of colors have deteriorated or been lost over the centuries, numerous texts evoke this sensitivity to shades and the pleasure the subtlety of their harmony or the power of their contrast provides. For instance, in fourteenth-century Europe, documents list the colors of woolen fabrics using the following terms: blood, vermilion, crimson, peony, columbine, peach blossom, or heather reds; clove or gladiolus purples; yellows associated with marigold, saffron, and lion fur; cheerful or meadow greens; heavenly sky blue; and leaden or donkey-back gray.[3]

These archives demonstrate that in the world of textiles, customers expressed very precise expectations to their suppliers. But the names of such specific shades were probably understood only within the context of close interactions between a manufacturer and a buyer at a specific time, because words describing color quickly become insufficient. When we approach the subtlety of shades, color "causes the failure of language . . . , [as] no evidence can describe it with certainty."[4] Even with a great deal of practice, it is very difficult for a human being to describe and remember shades of colors.

Color is a characteristic that evades language as well as memory and can only be grasped by example. A precise approach to color, both for those producing it and those receiving it, could only be accomplished with reference tools. These tools made it possible to closely associate a term such as *mulberry* with a dyed fabric. This was especially important as the names given to shades were connected to specific practices (painters did not use the same terms as dyers), which were linked to local terminology and could come in and out of fashion.

THE SAMPLE, A TINY WORLD

The primary reference tool was the color sample.[5] It was used in the textile trade beginning in the fourteenth century and probably earlier.[6] It is also likely that selections of pigments were circulating among artists.[7] These samples offered the opportunity of accurately identifying such an elusive element as color, and their benefits were perceived very early on. The philosopher Nelson Goodman, however, pointed out their limits: "A sample is a sample of—or exemplifies—only some of its properties; and the properties with which it has this relationship of exemplification vary according to the circumstances."[8] For Goodman, the very act of sampling alters the information that is communicated. Although the sample's reduced dimensions are part of its appeal, they also mean that it cannot replicate the drape of a fabric or the effect of a larger pattern. Its format can also generate a distortion of perception: the color often appears less light and more vivid.

Yet, over the centuries, the sample has remained the most relevant tool for remembering or communicating color. Doctors, artists, dyers, and naturalists included fragments or swatches (product samples) or attempted to replicate as accurately as possible the color of a substance that they could not preserve (reproduction samples).

The need to identify color more precisely than allowed by standard terms such as *white*, *black*, *purple*, *pink*, and such, while conveying its physical and material existence as much as possible, was at the center of a wide range of endeavors and gave rise to a variety of tools, including the color chart.[9]

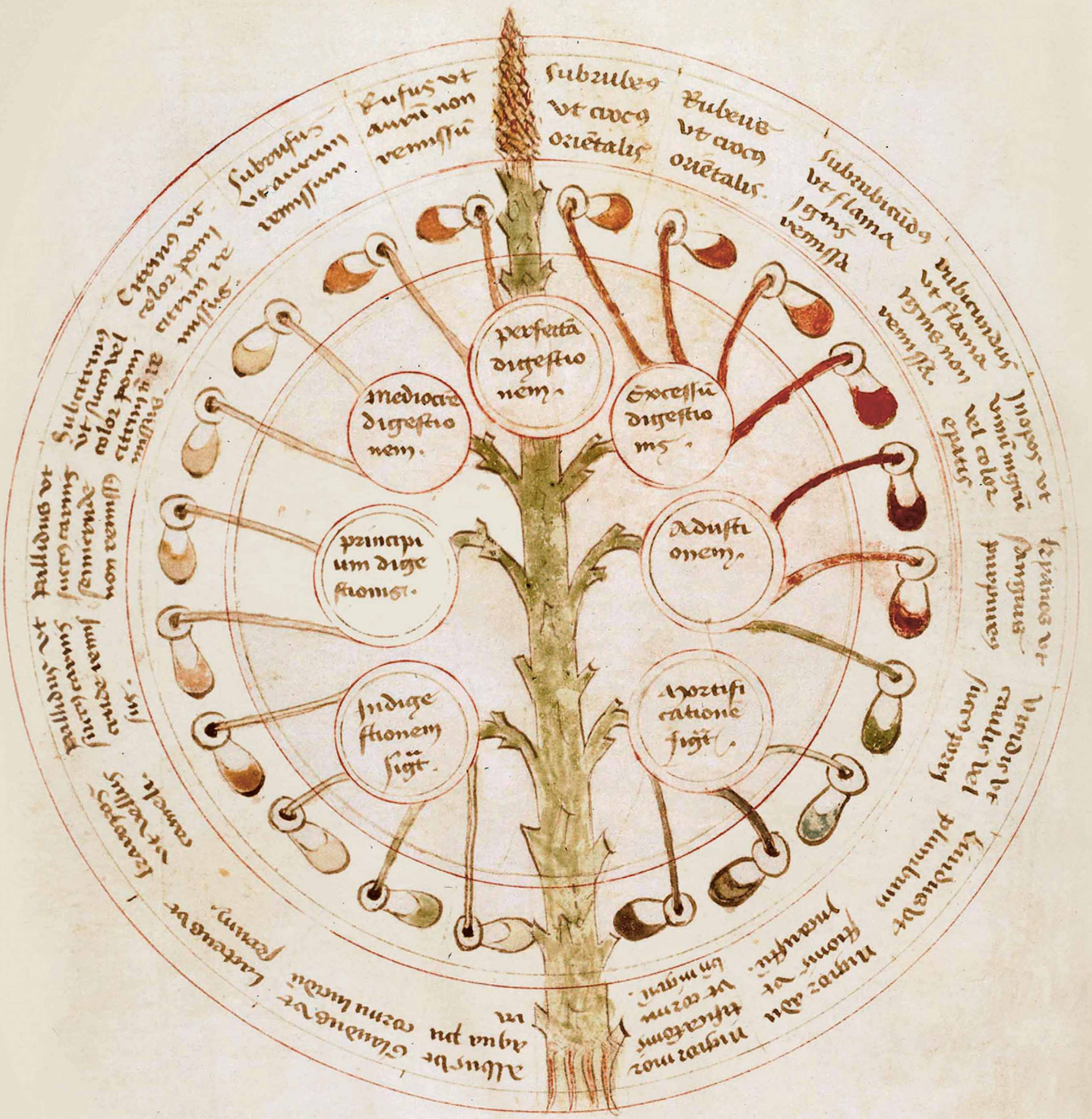
OPPOSITE

The *Rotae Urinarum*: Identifying Shades of Urine

The quality of fluids excreted from the body after circulating within it has been a factor in treating disease since ancient times, as these fluids have been perceived as conveying valuable information about the patient's health.[10] This is especially true of urine. Beginning in the thirteenth century, some medical manuscripts presented a circular classification called the *rota urinarum*, showing the range of colors urine can present, so that they could be identified by name and used to determine a diagnosis.[11] A physical sample of urine would not be functional, as its color would quickly change or fade. Something perishable therefore had to be made permanent, which could be done by reproducing the characteristics of the sample on paper using a longer-lasting medium such as ink or paint. Johannes de Cuba, a doctor practicing in Frankfurt in the second half of the fifteenth century, made use of this technique in his essay on herbalism, "The Garden of Health." Before the eighteenth century, shades of color were often illustrated, as in this example, by a series of *matulae*, spherical containers of clear glass.[12] While their number varied, they were always classified in a logical order based on Hippocrates's theory of humors, which associated color tones with the four temperaments: red for sanguine, white for phlegmatic, black for melancholic, and yellow for choleric. Since these reference documents were intended for teaching, the subtle differences in color were accentuated to make them easier to distinguish and commit to memory.

The *rotae urinarum* are some of the few surviving signs of how medieval Europeans relied on the accuracy of the sample in order to identify subtle shades of color and to learn to distinguish them from one another. They are also a very early example of how samples were arranged and presented. Finally, they reveal that the color of a sample was imitated by artistic means as early as the thirteenth century, a transformation that would be very significant in the history of color sampling.

Urine wheel, *Hortus sanitatis* (*The Health Garden*), Johannes de Cuba, Germany, fifteenth century, Bibliothèque Nationale, Paris, MS lat. 11229, folio 19v



Ex coloribus urine sunt quatuor citrinitatis sicut subcitrinus citrinus
ps flauus deinde rufus postea citrangularis prea igne qui tin
cture crocee assimulatur. Et iste quidem est vehementer citrinus p
crocee q assimulatur capillis safiram. Et iste est quem vocant

IN THE SEVENTEENTH CENTURY, A GROWING RANGE OF TOOLS

In this era, science began to be organized as a discipline based on experimentation, measurement, and the publication of results. As naturalists studied the world, color also became a subject of research and was better understood.[13] In this new order of things, color became one of the most immediately accessible parameters for distinguishing or bringing together elements in a set and communicating these differences or similarities.[14] The need to consider color according to increasingly precise observation protocols required developing accurate and suitable techniques for its representation. This would be the naturalists' great endeavor.

Science also became increasingly focused on the application of its discoveries, and the materials with which colors were produced benefited from this. New pigments and dyes were developed, drawing on the fabulous natural resources imported from the New World. These products supplied the workshops and then the factories, which took off during the second half of the seventeenth century, responding to a high demand for colorful products brought about by the improvement of living standards in European countries.

Demonstrating or Teaching Artistic Practices

The Renaissance saw profound changes in artistic techniques, and watercolor and oil painting became a pastime for the wealthy. In the seventeenth century, artists still had to make their own colors by combining crushed pigments with a binding agent. Practical manuals for teaching artistic techniques to amateur artists had proliferated since the sixteenth century.[15] They sometimes listed the names of pigments and explained how to recognize imitations. Indeed, these products, which were expensive whether imported (lapis lazuli blue) or manufactured (vermilion red made with sulfur and mercury, orpiment yellow from sulfur and arsenic), were sometimes replaced by others offering similar colors of lower quality.

Among these collections of artistic practices, two stand out in particular because their authors included color samples as early as the seventeenth century.

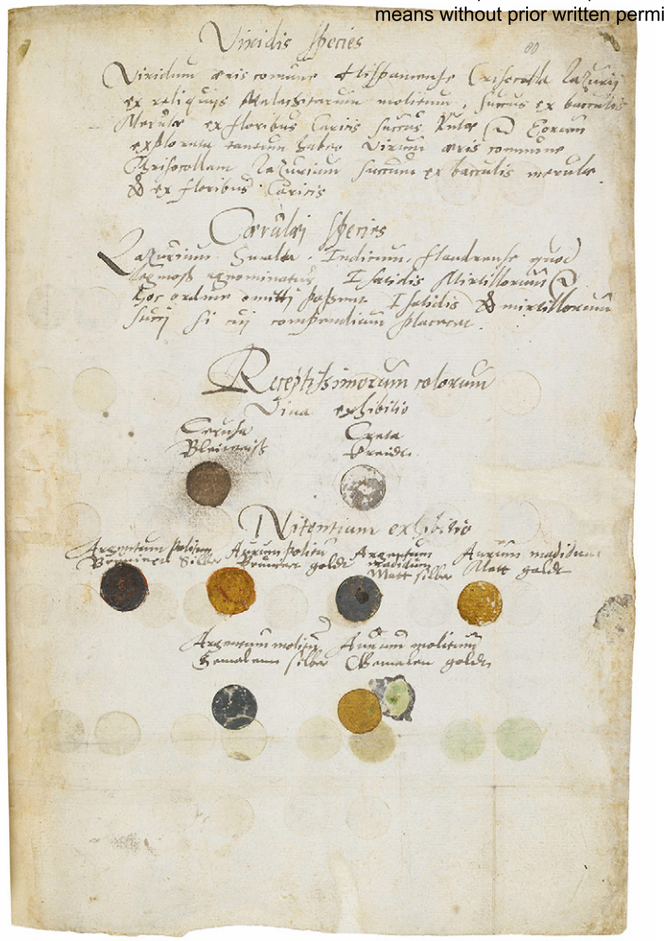
OPPOSITE

Experimenting with the Manufacture of Color Inks

Théodore de Mayerne was a French Protestant doctor with a curious mind who was passionate about alchemy and wrote a variety of books ranging from travel guides to treatises on medicine or cooking.[16] He recorded various practices, especially related to artistic techniques, which he found in written works and through his contacts with a vast network of informants all across Europe. His notes were later gathered in an eclectic collection, *Pictoria, Sculptoria et quae Subalternarum Artium*.

This manuscript contains 170 folios, and four of them, dated 1634, concern colored inks made by mixing pigments, water, and various binding agents.[17] The information was collected from those who used these inks, including not only artists but also printers, leather curriers, botanists, and even cooks. The author transmitted this knowledge using a true sampling approach. He recorded the list of pigments in both Latin and a Flemish-German dialect, organized his remarks according to the different binding agents (such as egg white, egg yolk, or bile) or additives (such as wine vinegar or honey), and tested the formulas. For instance, he recommended "egg white for lead white, lime, cinnabar and all light colors." Most importantly, he accompanied his remarks with circular-shaped samples made with the ink described (292 in all). He also sorted them by shade. Readers could thus easily perceive within the same color the different shades that could be made depending on the process used.

By establishing a direct relationship between the materials, the formula, and the color they produced, Théodore de Mayerne took a prescientific approach that was resolutely rational and empirical. But his goal was also to enable precise



communication with the many artists of his circle, including the Flemish painter Van Dyck. Without samples, conveying such information would have been almost impossible, and Mayerne understood this very early on.

Pictoria, Sculptoria et quae Subalternarum Artium (Painting, sculpture, and minor arts), Théodore de Mayerne, 1620–1640, British Library, London, Sloane MS 2052, folios 80r to 81v

OPPOSITE AND FOLLOWING PAGE SPREAD

An Enchanting Treatise on Watercolor

Rectangle, square, line: the garden is at the center of a geometry in which the greens frequent each other, complement each other, play with all the degrees of mixture between yellow and blue, in plates fringed with the blue glow of the lark's feet, the limited heliotropism of the white daisies, the pink-flowered odorless verbena, or this thin, flowering saxifrage that we call "the painter's despair" because its color is so fine and vivid.

Marie Rouanet, *Every Garden is Eden*, 2010

This manuscript by the Dutch painter A. Boogert opens with a discussion of the use of color in painting and the manufacture of watercolor paints. Whereas this information was common in artist manuals of the time, the rest of this almost eight-hundred-page book is exceptional because it is entirely devoted to formulas explaining how to obtain specific shades, all of which are illustrated with color samples.

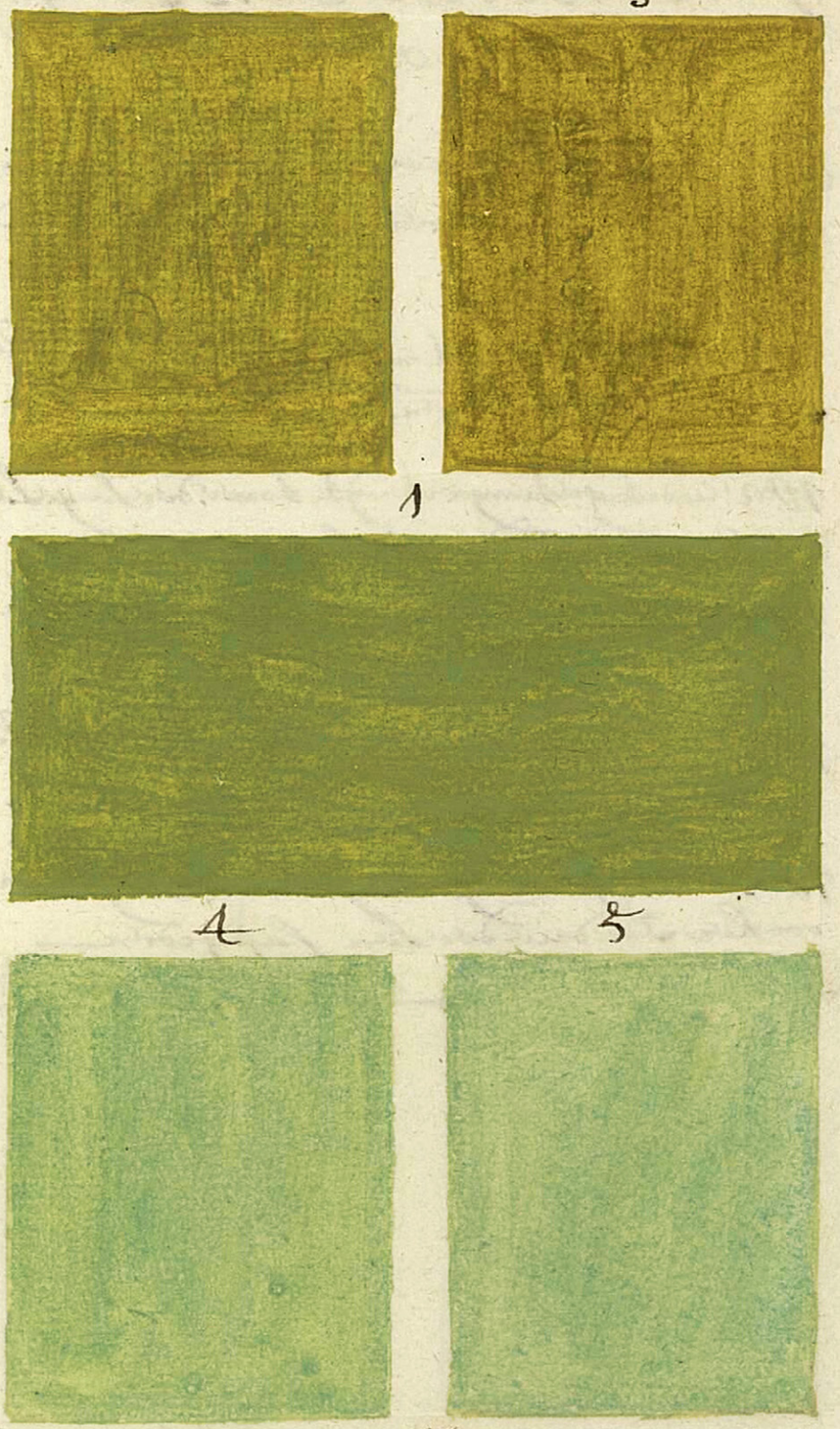
The book is made up of three main parts.[18] The first contains approximately forty folios of watercolors made with a single pigment, often illustrated in three different concentrations in gum arabic. The second part concerns the shades obtained by mixing these pigments with black and white. This perfectly accomplished structure is already complex, but Boogert creates an even more elaborate branching structure: in the third part, he presents five shades from a mixture of two pigments, obtained by varying the percentage of each color. And the grand finale is an index of thirty-three tables, each with two columns and six rows next to a corresponding shade (388 in all). Each is identified by a number, making it possible to refer to the page in the first or second part of the manuscript where the pigment or combination of pigments is presented.

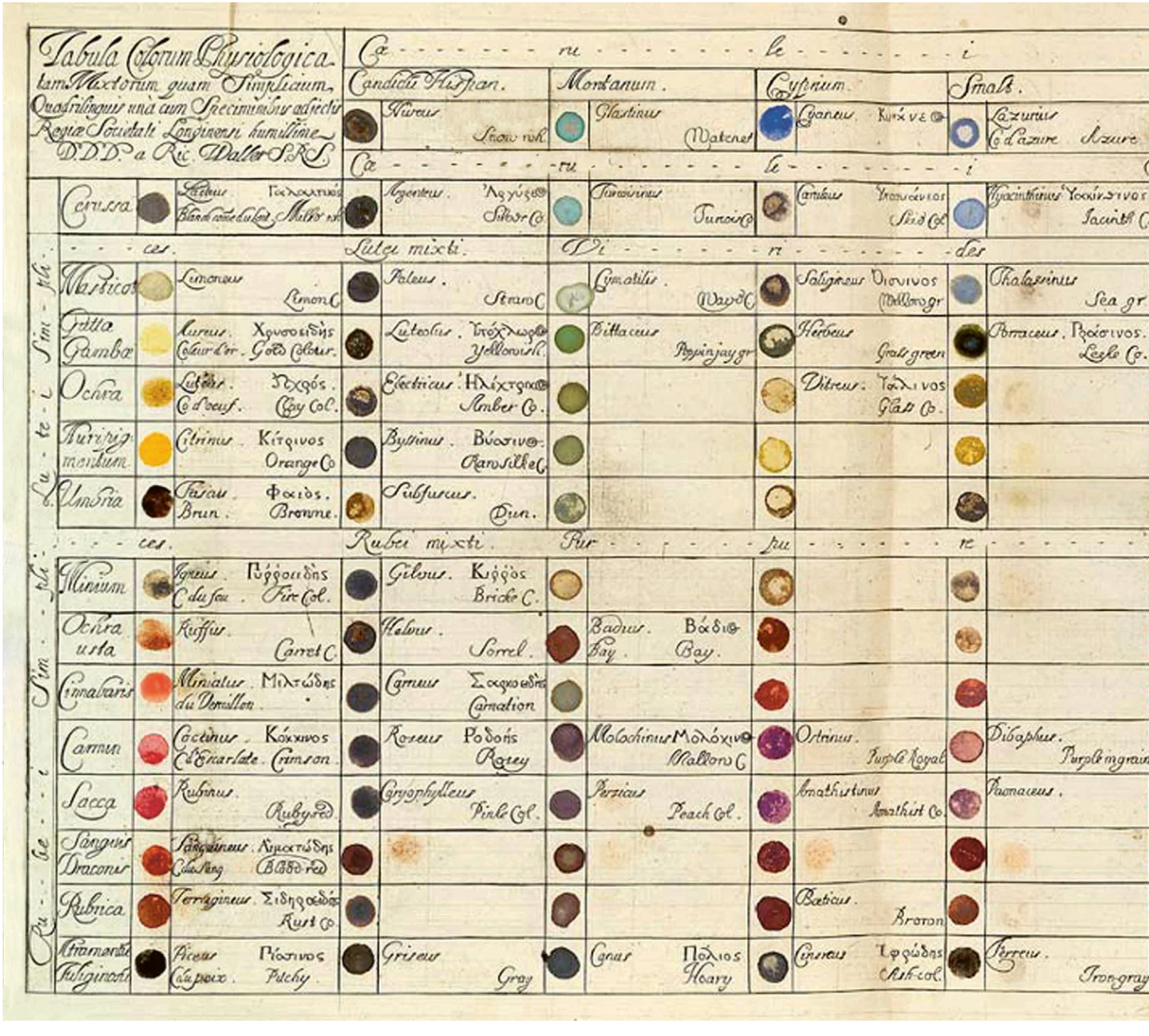
Boogert thus classified, named, and described nearly seven hundred pigments or mixtures of pigments. The structure of the book was perfect. Readers could leaf through the index to identify the desired shade and then refer to the technical instructions explaining how to make it, while taking note of the pigment's origin and the names used to describe it. However, there was at that time no technique that could accurately reproduce the approximately 2,100 watercolor samples that constituted the exceptional value of this work.[19] Even if the text had been printed, its publication would have required the painstaking task of applying colors with a brush to preserve the subtlety of water-based painting techniques.

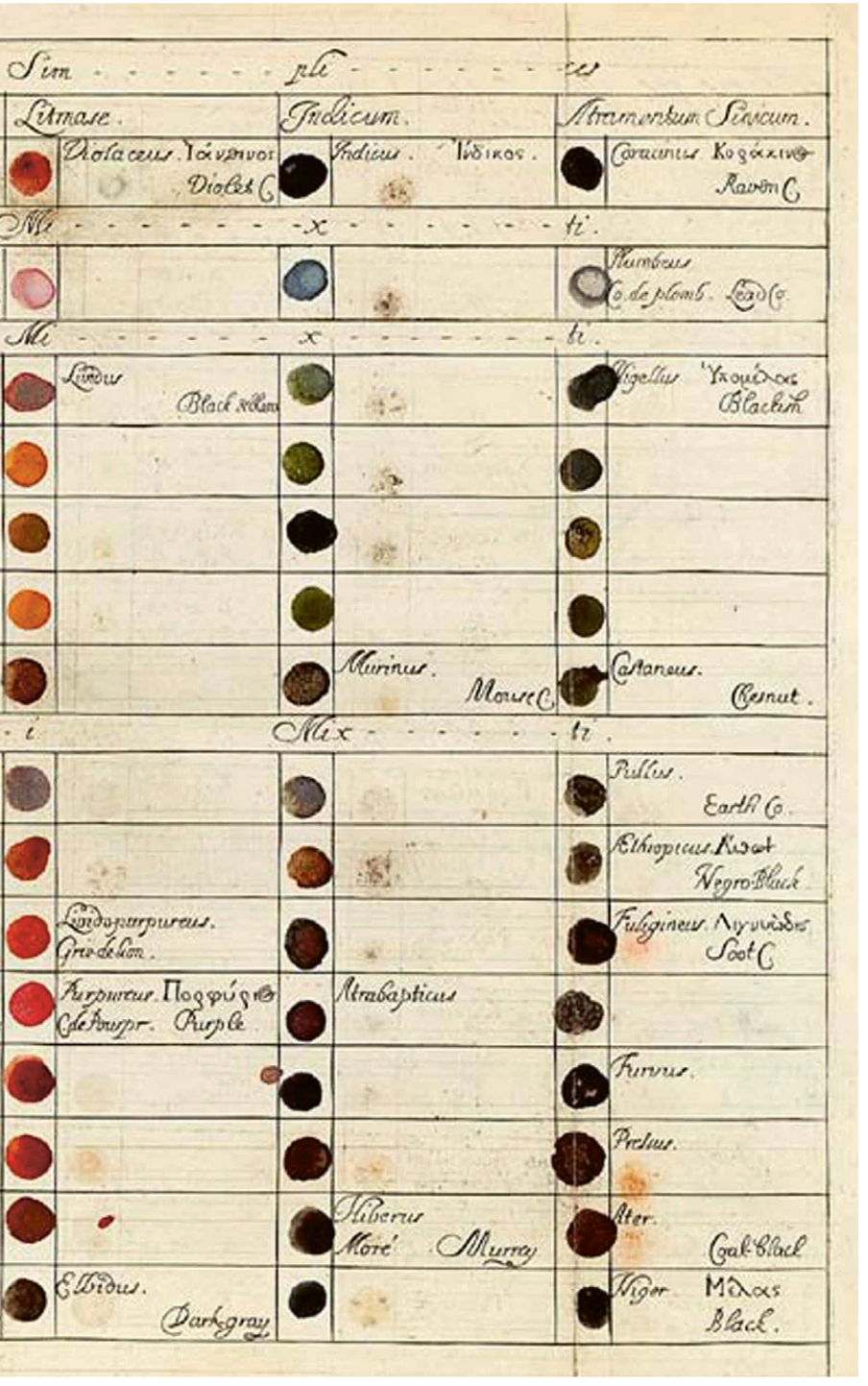
Not only does this color chart have a particularly elaborate and complex structure for the late seventeenth century, but it also reveals an impressively designed layout. The architecture of each page evokes the gardens of medieval monasteries that were subdivided into square or rectangular plots.[20] In this simple design, separate garden beds (preventing any mixing of plant varieties) are framed by paths for tending to the plants. In the color chart, it is no longer the gardener's body that moves around, but the eye, passing from one sample to the next, each contained in its frame as if in a flower bed. But these gardens are also places of contemplation and meditation. They evoke both the lost paradise of Eden and the heavenly reward promised to the blessed. Boogert's manuscript possesses an aesthetic power and an ability to appeal to the imagination that would continue in later color charts, which would adopt this orderly arrangement interspersing areas that stimulate the eye with others that are left empty, so that the eye may rest.

We know virtually nothing about this manuscript and its author or about the examples that might have inspired his approach. It remains a unique phenomenon in the history of color sampling.

Treatise on Colors Used for Water-Based Paint, A. Boogert, Delft, Holland, 1692, Bibliothèque Méjanes, Aix-en-Provence, Ms 1389 (1228), folios 35, 264, 378, 387, 399







Naturalists Use Samples to Describe the World

The supremacy of appearance is a fact of daily life from which neither the laboratory technician nor the philosopher can shirk, which he must constantly find at the end of his experiments or his studies and which proves its strength by never being modified or influenced by what they have discovered by turning away from it.

Hannah Arendt, *The Life of the Mind*, 1981

At the end of the seventeenth century, naturalists worked to develop color references so that their taxonomic descriptions would match reality as closely as possible,[21] for observations that ranged from algae to feathers. These reference charts played a decisive role in mastering the subtlest shades of color, because they were simultaneously transcription techniques, methodological tables, and standards for an observational method whose conditions were constantly being refined in a struggle to eliminate persistent flaws.

OPPOSITE

Waller *Tabula Colorum Physiologica*

In the introduction to his *Tabula Colorum Physiologica*, English naturalist Richard Waller clearly stated his ambitions: readers should be able to use this work to describe living things, whether plants or animals, and to communicate this exact information to other readers provided with the same table, regardless of their language. For example, a naturalist could describe a bird with *Carmine* wings and a *Negrus* throat to a correspondent. This was an attempt to solve the problem posed by the ambiguity of terms used for colors by providing color samples. The field of exploration was vast and the objects to be described were perishable. Waller could not include petals, fur, or skins in his table. He therefore reproduced their colors, with each shade being painted on the paper. The aim of his *Tabula Colorum* was thus very different from that of Boogert's contemporaneous manuscript. It was more related to the *rotae urinarum* that had been in circulation since the thirteenth century.

Starting with a row of seven colors and a column of fourteen, Waller organized a table by color groups, moving from the lightest shades to the darkest. The origin of each was presented with varying degrees of accuracy. For instance, the naturalist associated the sample *Ultramarine* with lapis lazuli, but was unsure of the one named *Litmase* or *Litmose* ("I suppose the juice of a plant") and described indigo as "foam collected at the foot of reeds." By using single pigments or mixtures, Waller managed to present 119 shades and named them when possible in Latin, Greek, French, and English.

This grid arrangement for presenting color samples was quite advanced for its time and perfectly functional in more ways than one. It established a clear structure so that users could easily find their bearings, making the best use of the available space while leaving a margin around each sample. This prevented them from mixing during the application of the paint. When the tool was used, this also ensured that the samples were far enough apart so as not to be confused, while being close enough for comparison. The conditions for identifying a color were therefore optimal.

The layout of the table, which can be read vertically as well as horizontally, from right to left and from left to right, merits further examination. It seems to correspond to the way in which numbers are arranged, especially measurements. The structure of the *Tabula Colorum* makes a statement that color can be controlled, quantified, and measured.

But reading along the vertical axis also resembles what Umberto Eco calls in *The Infinity of Lists* a "list *et cætera*." Eco states that this type of list is used when "we do not know the limits of the things that we wish to represent, when we do not know how many there are and we presuppose a number that is, if not infinite, at least astronomically large, when we cannot give something a definition by essence and that, to make it understandable, more or less perceptible, we list its properties."[22]

Hence this chart may reveal the new ambition of cataloging the world, at a time when this goal was still in its infancy and everything was still to be discovered. The context of the *Tabula Colorum* may thus separate a relatively controlled internal world from an unlimited external world, that of colors and their combinations, which resembled the universe itself, both of them immensely appealing, yet overwhelming.

However, this first step toward arranging color samples to satisfy the imperatives of scientific description does not seem to have had the impact it deserved, and it was not until one hundred years later that another naturalist, Abraham Gottlob Werner, attempted this endeavor. But the potential power of the color chart was already present in the *Tabula Colorum*. ●

Tabula Colorum Physiologica, in "A Catalogue of Simple and Mixt Colours with a Sample of Each Colour Prefixt Its Properties," Richard Waller, *Philosophical Transactions of the Royal Society of London*, 1666, vol. 6 for the years 1686 and 1687, Smithsonian Libraries and Archives, Washington DC

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