

Industry and Ideas

Neilson, Quemiset, Homassel

Dyers and Chemists at the Gobelins Manufacture

This is a long story. It really begins in the fifteenth century, with the establishment of a dyehouse along the Bièvre, a tributary of the Seine that now runs underground through Paris. The founder was a man named Gobelin; the specialty of the dyehouse was Venetian scarlet, a brilliant and intense red for wool and silk. The excellent quality of those goods made a fortune for the Gobelin family.

Because this is such a long story, I will jump about two hundred years, to the later seventeenth century. Holland scarlet (Drebbel's red), a textile color based on cochineal in a tin mordant, was replacing the kermes- and alum-based Venetian scarlet as the most common, and the most desirable, bright red color. Holland scarlet-dyed cloth, a specialty of Dutch and English dyers was not regularly produced in France. To address this deficiency, Jean-Baptiste Colbert encouraged the emigration of dyers skilled in the processes of Holland scarlet. So the history of the Gobelins tapestry manufacture includes the employment, about 1662, of a man named Kerchove or Kerchoven, who brought the secret of Holland scarlet dye for wool to the Gobelins dyehouse. Kerchoven was Dutch or Flemish. His family continued as dyers at Gobelins for almost a century.¹

About the same time, 1663, and after several prior changes of hands, Louis XIV purchased the Gobelins estate and its surrounding properties. The dyehouse had by then passed to another family, which ultimately sold it to a Dutch dyer named Gluck. Together with Kerchoven, Gluck and an associate, Julienne, supplied red-dyed wools to the *compagnies rouges* (musketeers) of Louis XIV. The Julienne family also maintained a longstanding connection to the dyehouse. Colbert's reorganization of the dye industry, also in progress at this time, had a great effect on the Gobelins dyehouse, as the regulations maintained strict prohibitions on certain materials.² Gobelins produced fabrics dyed in *bon teint* colors.

In 1668, a royal tapestry manufacture was established at Gobelins, supplying to the royal household and at the king's pleasure.³ Under its first director, the court painter Charles Le Brun, the Gobelins produced remarkable work in a new style. The quality of paintings or drawings used as cartoons for the tapestries improved, in part because Le Brun hired members of the Paris Academy of Painting and Sculpture to create them. Art historians usually describe the resulting tapestries as woven pictures rather than mere hangings or designs. The Gobelins manufacture became famous and a symbol of the quality of French goods. As the word *arras* had entered English vocabularies centuries before, *gobelins* became a

synonym for tapestry hanging, regardless of the place of origin.

Histories of the Gobelins Manufacture

The Gobelins tapestry manufacture has existed for more than three hundred years. Historians and art historians have written about the manufacture for at least two-thirds of that time. Pamphlets and articles about the manufacture have been published at least since the mid-nineteenth century: often they were issued to supplement workshop or architectural tours.⁴ Yet few histories of the Gobelins consider social interactions or technology changes at the institution: These are incidental to the goal of the manufacture, the creation of beautiful and valuable sets of tapestry. Maurice Fenaille and Jules Guiffrey, in their multi-volume history of the Gobelins, suggest the structure of the manufacture and include maps and lists of tools drawn from the periodic inventories made.⁵ But that publication is most valuable and is best known for its wealth of information about provenance—which atelier undertook which commissions and when, how well they were executed, who received them. In the 1940s, the then-head of the dye laboratories at the Gobelins and Beauvais tapestry works, which by then had been combined, described that division's use of natural colorants in a series of articles: because of the subject they mention the workings of the dyehouse in the eighteenth century.⁶ In sum, we have an incomplete understanding of life in this microcosm of artisanship, a village of about 800 at times, often family-generations of dyers, weavers, designers, goldsmiths, woodworkers, apprentices, and journeymen and others needed to produce large sets of woven pictures.

Financing was a constant problem at the *manufactures royales*. The Gobelins closed between 1694 and 1699 because of the bankruptcy of the state treasury, but there are letters complaining about unpaid bills dated throughout the eighteenth century. Charles Meriel, a *marchand teinturier* in Paris, complained for several years about monies owed to him by the Crown for work he had undertaken on behalf of the Gobelins.⁷ Weavers were fined for accepting unauthorized work outside of the atelier system, in which an *entrepreneur* was paid by the manufacture to purchase supplies, hire workers, apportion tasks, and oversee production of a set of tapestries. The excuse for these illegal undertakings always involved poor or slow payment.⁸ An anecdote about conditions in the dyehouse tells of the discovery that the wives of journeyman dyers used the dye vats to take in laundry, tying up and occasionally ruining tools and making it impossible to carry out the proper work of the manufacture.⁹

These stories hint at a foundering or ill-managed enterprise. The archives suggest ongoing concern for the poor quality of products, a concern that was more than a general anxiety about maintaining the reputation of the manufacture. Some well-designed and well-made tapestries created within the chaos of the workplace

suggest that the problems of the manufacture affected results inconsistently. We have no way now to put all information into a broader context, but we can be certain of several things. We do know, for example, that members of the Kerchoven family continued to be dyers for the Gobelins manufacture until 1757. We know that other dyers worked with the last of the Kerchoven family and that several people were brought in to replace him, but none stayed for very long. Ultimately two of the three *entrepreneurs* responsible for the ateliers, Jacques Neilson, and Michel Audran, assumed oversight of the dyehouse operations, instructing the journeymen dyers according to their needs.

Tapestries and Quality

The success of any tapestry as an aesthetic work depends equally on the quality of the design and the ability to articulate subtle gradations of color in order to model figures, architecture, landscapes, or flora and fauna. As Jacob Christoph Le Blon's unsuccessful attempt to apply color printing techniques to weaving demonstrated, the beauty of the product depends on the appropriate colors. Some color blending was possible, but a well-made tapestry needed a range of shades for many colors: Matching flesh tones was especially demanding. Furthermore, it was essential that the colors did not change their tone and that they faded as little as possible. It was an added advantage if a color could be replicated months or years later; tapestries were created in sets that could require years to complete and several copies might be commissioned from one set of cartoons.

The irregular results from the dyers employed by the Gobelins manufacture played a part in its declining reputation among employees and associates, if not the general public. At some point, the reputation for slow payment may have overtaken the honor of supplying to a royal manufacture making it difficult to commission the colored silks or wools required. Other reasons for the decline at Gobelins were only indirectly related to skills of the workers and to the state of the treasury. From the beginning of the eighteenth century, tapestries began to be used in more intimate spaces than state rooms, and these smaller spaces brought the viewer closer physically to the hanging. This created a corresponding need for more detail in the woven image and even more subtle use of color. A stylistic shift in composition contributed further to this problem. As designs included more figures and architecture in the foreground, the degree of articulation, and so again the numbers of colors required, and skill in their selection, increased accordingly.

Peut-être que les couleurs de faux teint ne ont ce défaut que parcequ'on ne prépare suffisamment le sujet. . . Si l'on trouvoit le moyen de donner aux parties colorantes des bois de teinture l'astiction qui leur manque, & qui en même temps on préparât la laine à les recevoir. . . Je suis déjà assuré par une trentaine des expériences, qu'on parviendroit à rendre ces bois aussi utiles aux Teinturiers du bon teint qu'ils l'ont été jusqu'à présent, aux Teinturiers du petit teint.

Jean Hellot, *L'art de teinture des laines* (Paris, 1750), 44–45.

Second, after the reorganization of the dye industry in the 1730s, some *petit teint* colors were introduced into the Gobelins palette. Jean Hellot's treatise on dyeing suggests a reason why this might have been acceptable: Having worked out a theory of coloration, these colors could be made as good as *bon teint* colors.¹⁰ While some new coloring processes probably did improve lightfastness, this was not always the case. The indigo sulfonate (Saxon blue) vat, for example, made colors that were less stable than those produced by the traditional indigo dye process. Over time, Gobelins tapestries proved that stability remained a problem for *petit teint* colors.

Color stability and adequate supplies were problems addressed time and again on behalf of the Gobelins manufacture and the French dye industry more generally. Charles-François Dufay's investigations, Hellot's continuation of that work and his treatise, Pierre-Joseph Macquer's publication on silk—all were part of an ongoing effort to improve products at the Gobelins as well as to realign the dye industry in the face of new materials and new markets.¹¹ Yet the need for better control over processes seemed to increase and every effort at improvement backfired. Ultimately the comte d'Angeviller, director of the royal household, appointed a committee to oversee production and suggest the means for improvement. Initially the group consisted of the chemist Macquer, the architect Jacques-Germain Soufflot, and Jean-Étienne Montucla, a mathematician. Their collective role was similar to that of Le Brun at the founding of the manufacture, but Macquer's presence augmented the role of chemistry, as the problematic state of the dyehouse would seem to have dictated.

Chemistry and Dyeing at Gobelins

Although there were discussions about bringing a chemist to work in the dyehouse as early as 1757, none arrived for almost fifteen years.¹² Late in 1773, a man known only as Quemiset (sometimes spelled Quemizet or Quemisset) was hired for the manufacture.¹³ He was brought in as a journeyman dyer, to work under Jacques Neilson, the *entrepreneur* who oversaw the dyehouse most closely. Among Quemiset's assignments were the introduction of new dyeing techniques and the development of a palette of some 30,000 tones for wool dyeing. According to Lucien Reverd, the color palette for wool yarns at Gobelins in the 1660s was about 112 colors, including mixtures, based on the basic set of red-yellow-blue-fauve (his list does not mention black or undyed yarns).¹⁴ The projected expansion of the palette was ambitious in its numbers alone; how much that expectation depended on reorganized and improved technique is unclear.

C'est à la Physique & à la Chymie que les Arts doivent leur naissance & leur éclat; mais abandonnés par la suite entre les mains d'Ouvriers dépourvus des connoissances propres à les perfectionner, & même à les conserver, il s'y est introduit des abus & des erreurs à l'infini, qui ne

font que de multiplier avec les tems.

Quemiset, *L'Art d'apprêter et teindre toutes sortes de peaus* (Paris, 1775), [vii].

Somewhat mysteriously, in that little discussion about it exists in French archives, a book by Quemiset on a related subject appeared about two years after his appointment at Gobelins.¹⁵ We don't know if Quemiset's interest in dyeing leather predated his appointment at Gobelins. A claim to the secret of dyeing skins had been made to the French Council of Commerce by another Gobelins dyer; perhaps there was some connection.¹⁶ It may be that the expertise Quemiset claimed, the expertise that resulted in his writing the book, influenced his being hired at Gobelins. That position also served his book as on the title page he notes his connection to the national tapestry manufacture. *L'Art d'apprêter et teindre toutes sortes de peaus* is a collection of recipes to color skins, plus some miscellaneous information. The book includes many references to Joseph-Jerôme Lalande's *L'Art de faire le maroquin* and Quemiset promises to improve on that work.¹⁷ The preface also connects this book to publications on dyeing cloth, suggesting that Quemiset will organize the subject of dyeing leathers and establish its rules as Hellot's, Macquer's, and Le Pilleur d'Apligny's books had done for wool, silk, and cotton, respectively.

Je me bornerai à dire ici que sur un grand nombre de ses laines teintées, les trois quarts au moins parurent avoir un avantage sur les anciens procédés en ce qu'il a souffroient moins au débouillis, et que la plupart des autres au moins ne changeoient pas de tons, et ne faisoient que s'affaiblir.

"Observations sur l'état actuel de la manufacture des Gobelins," 1776, AN O/1/2048 p. 17.

Quemiset's book on leather dyeing practices does not seem to have had a great effect on that industry. Nor did Quemiset's presence have an immediate effect on the dye processes or their products at Gobelins: Tapestry personnel continued to complain about the poor quality of the colored yarns they received. An investigative committee in 1778 confirmed the need for a chemist and recommended the creation of a register of all operations and processes at the dyehouse.¹⁸ As Quemiset was already working at the manufacture, it may be that these recommendations were endorsements of some changes already established. The recommendation to create a master register of techniques returns us to several basic questions about the activities at the Gobelins manufacture, about its organization and the degree of control its administrators possessed. If the main portion of Quemiset's duties was to test and reinvent recipes, then it is logical within both common eighteenth-century experimental and workshop practices to assume that a register of the best would be maintained. It is somewhat surprising that, despite the high degree of accountability required at the Gobelins manufacture, no such document existed before. It is also interesting in light of Jean Hellot's assignment to reorganize the Vincennes ceramic manufacture in the 1750s, and his earlier involvement with dye theories and techniques. A part of Hellot's assignment at Vincennes was to examine the recipe books of the workers and to create a book, of master recipes for ceramic bodies and glazes, that would

be kept under lock and key and as the property of the manufacture. Was the lack of a similar document at Gobelins a result of the absence of a master dyer, or does it reflect different traditions in those two disciplines? What is the relationship between these documents and the presentations about dye processes, and about dye processes at Gobelins, included in the *Encyclopédie*?

Quemiset's work was good enough and indicated sufficient improvement to practices that the commissioners of the manufacture agreed it was worthwhile to tolerate his difficult personality, frequent bouts of drunkenness, disappearances, and threats to expatriate himself if he weren't paid.¹⁹ Quemiset's work at Gobelins ended with his death "à la suite des debauches," in 1779. Nicolas Charles Homassel, who had been hired as an assistant about two years earlier, succeeded him.²⁰

Both Homassel's account and archive records make clear the disorder at the Gobelins tapestry manufacture between 1779 and 1784, a period during which Neilson retired and Quemiset, Soufflot, and Macquer died.²¹ Intrigues surrounded succession to all positions, and discontent with incumbents continued. The choice of the chemist Claude-Louis Berthollet and Jean-Baptiste-Marie Pierre, painter to the king and head of the Paris Academy of Painting and Sculpture, as the principals responsible for activities at Gobelins confirmed the direction of the manufacture in the final years of the eighteenth century. The path to recovery of lost artisanship and to all future progress would come through an ever-closer alliance between the royal manufacture and the royal academies.²²

Je n'ai point employé dans cet ouvrage la nouvelle nomenclature chimique, 1° parce qu'à soixant ans on ne renonce pas volontiers à la langue de ses pères; 2° parce que je fus toujours plus jaloux d'apprendre des choses que des mots; 3° parce que l'entretien d'une nombreuse famille me met dans la nécessité de préférer l'util à l'agréable.

Homassel, *Cours théorique et pratique sur l'art de la teinture* (Paris, an VII [1798-99]), xv.

The oversight of Berthollet and Pierre did not calm controversies in the dyehouse. Homassel's dislike of Berthollet may have been a factor in the former's dismissal; Homassel in his book is explicitly hostile toward the new chemical nomenclature advocated by Berthollet and its systems, which he tried to instill at Gobelins.²³ Berthollet instituted some changes to practices, but his greater interest in philosophical chemistry did not yield notable improvements at the manufacture.²⁴ Chemistry at the Gobelins was not secured for several more decades.

A Project to Improve Manufactures

Malgré l'ordre établi pour le bon teint, il étoit encore susceptible de réforme. Et c'est à la faveur des connoissances multipliés de notre siècle qu'un sçavant de l'Academie a trouvé le moyen de nous le presenter sous un autre forme sous la quelle il en a affermi les principes et a sçu varier les couleurs pour des mélanges d'une maniere aussi sage qu'ingénieuse.

[Quemiset] "Cours général pour la teinture en laines," 22 May 1775, AN O/1/2047, p. 4.

In late May 1775, Jacques Nielson submitted to the Council of Commerce a prospectus for a book on dyeing.²⁵ The prospectus consisted of an introduction, in which the contents of a book (to be written by Quemiset) were outlined, and a letter by Neilson about Gobelins, the project, and the author. The treatise would include both theoretical and practical information, as each was necessary to understand dyeing. The book would present instructions to replicate the samples included in an accompanying color catalog. Together, these documents would support the goals recognized as essential to the improvement and progress of dyeing and tapestry manufacture at Gobelins. The prospectus may also have served to justify the large sums of money that went into the project, including more than 1,400 livres for designing and coloring the tables.²⁶

In the introduction to his proposed treatise, Quemiset exuded the same confidence that shows through in the writing of others about him. He hinted that his two books, one on dyeing skins and the other on dyeing wools, would have a relationship to each other that resembled the relationships between publications that were part of the *Déscriptions des arts et métiers*. Quemiset's *Cours général pour la teinture en laines* would align techniques used at Gobelins with those outlined in other publications about arts and practices, proving the improvements at the manufacture.

Quemiset's treatise on dyeing wool was never completed. Twelve years after leaving Gobelins, and almost twenty-five years after Neilson presented the prospectus to the Council of Commerce, however, Homassel published a book about dye techniques.²⁷ Lucien Reverd has suggested that the first portion, about fifteen chapters, was, or was based on, Quemiset's treatise.²⁸ Insofar as a comparison is possible, this appears to be true. If Homassel is a reliable witness, then his book, including his comments in the introduction, add depth to the image of chemistry in the manufacture during the final quarter of the eighteenth century, and not only to the contentiousness that occasionally threatened to overwhelm production at the tapestry manufacture. This is further supported by an album in the print collection of the Bibliothèque Nationale, dated to the mid-eighteenth century, that matches the description, in Quemiset's introduction, of the catalog of colors.²⁹ According to Homassel, it contains 25,000 colors, fewer than the 30,000 promised, and still perhaps an exaggeration. Nevertheless it is a catalog that exhibits a degree of articulation unmatched by any other compendium of color.

The Contents of Quemiset's Book

Après avoir examiné les productions que la terre renferme dans son sein, nous parcourrons la surface du globe, pour y considerer les differentes productions vegetalles, tant pour nous instruire de la nature des ingredients colorants, de leur partie constituante raport aux climats, et du sel qui les produit, qu'a cause du suc nourcier principal auteur de sa vegetation, afin

d'analyser les differents produits que nous obtenons de l'art, comme tartre, sel de nitre, sel commun, et sels alkalis, ensuite nous passerons aux esprits tirés du règne minéral, et du regne vegetal sortant du laboratoire chimique nous traiterons de leur affinité.

[Quemiset] "Cours général pour la teinture en laines," 22 May 1775, AN O/1/2047, p.8.

In the prospectus for his book, Quemiset outlined his approach to rationalizing color production at Gobelins. He planned a three-part treatise. In the first part he would present color in physics, locating sources of colors in the reflection of light and presenting a kind of "anatomical physics" that would dissect color in those objects receptive to coloration. In the second part, he would consider chemical composition, describing the results of the different mixtures that make colors. In the third part he would offer observations on methods, explaining the composition of the dyebaths and other operations that yield colored wool yarns.³⁰ Quemiset promised to incorporate chemical grounding into each step so that dyers could identify the shortcomings of the dye process and proceed in an analytical style. He also promised to reveal the little tricks of the dyehouse, things that might improve solidity or correct poor results. The proposal recommended a series of lessons that would begin with a description of light as it related to the five basic colors of the dyehouse, move to look at mixtures and at the composition and characteristics of materials, and finally consider the dye processes.³¹ Chemistry would explain operational phenomena and aid in the creation or instillation of good procedures. Knowledge of physics would guide the choice of materials used in creating specific colors. The result would be good, solid colors, with the many gradations of shade needed to give painterly qualities to tapestry weaving. Knowledge of science was essential to good practice and to improved practices.

The whole project—creation of the catalog, creation of the treatise, improvement at Gobelins—was served further by Quemiset's classification and descriptive system. His goals for this were similar to those stated for other systems—to simplify the choice of colors, to identify relationships among different shades, and to suggest the selection of appropriate materials to create compound colors. Quemiset promised a different work, one that would include images as well as instructions, each enhancing the other. Furthermore, if a dyer replicated the hanks of wool depicted on the sheets and ensured that the colors matched exactly, he could use the album as a testing device, comparing the dyed goods with the color underneath. (Quemiset says nothing about the stability of the coloring materials used to create the catalog, however.) This is a more practical approach than many, and a more ambitious one to complete.

Quemiset's Chemical Operations

Suivant notre système le tartre vitriolé n'ouvreroit pas les pores, et n'écarteroit pas les fibres de la laine, ce ne seroit donc pas a sa dureté qu nous devons attribuer la solidité des couleurs; en effet quelque dur que soit le tartre vitriolé il devient soluble et le soleil le reduit en poussiere. Consequemment si la solidité des couleurs n'est dont qu'au tartre vitriolé, elles se detruiront a mesure que le sel se dissipera.

[Quemiset] "Cours général pour la teinture en laines," 22 May 1775, AN O/1/2047, p. 5.

In many respects, Quemiset's program builds on one articulated by Hellot in *L'Art de teinture en laines*, adjusting some assumptions, adding new ideas to others. Homassel corroborates the impression that work at Gobelins combined ideas found there with those of Macquer and Louis-Guillaume de la Follie. Quemiset did not fully reject Hellot's theory of coloration but elaborates it, taking, for example, the role assigned to alum by Hellot and supplementing that with a discussion of the use of vitriolated tartar to dilate the pores of the wool more thoroughly. Quemiset ultimately rejected that change, having reasoned that, because the tartar had a sharp taste, it would close, rather than open, the pores. In its place, Quemiset recommended a combination of salt and oil, into which the coloring material dissolves and becomes finely divided. Agitation of the vat (via boiling or stirring) introduces air, which opens the pores of the wool as the liquid carries the color across dilated fibers. Once this has happened, Quemiset continued, it becomes appropriate to introduce the vitriolated tartar. This will cause the fibers to close, securing the color in the fiber. He explains this action further, using terms and concepts that call on Macquer's theories of coloration: The vitriolated tartar converts the oil into a resinous substance, one better able to adhere to the fiber and to do so with that sparkle all beautiful colors have.

Quemiset referred frequently to his own role in the presentation of these theories of coloration. The workman knows the mechanisms and the philosopher the principles, but neither alone has sufficient information to improve processes. Quemiset implied that he is the one of the talented few who might achieve this goal. Proofs will come from understanding operations and from related experiment, he acknowledged, but they will call on other resources as well. For example, Quemiset suggests that his explanation of the five primitive colors of the dyehouse can be understood best by considering not only the dye vat, the prism, and the nature of compound colors but also theories of the earth, or the production of the materials that in turn produce colors. It is important to know the nature of all materials used, and his treatise will consider the sources of colors, and the affinities of substances. Then, having used both practical traditions, chemistry and mineralogy, to establish that there must be five primitive colors in the dyehouse, and having demonstrated how they combine to create an infinity of colors, Quemiset would show their connection to the three primitives (red, yellow, and blue) that were more standard in painting practice and more closely related to prismatic colors than to typical dyers' practices of the time.

In this determination to refine the practical details of trichromacy, Quemiset's work is again typical. Compare it, for example, to Pfannenschmid's dissection of primitive colors. It is different, however, in that Quemiset does not simply offer conjectures about the numbers of primitive colors but that he connects those

conjectures to other sources and attempts a unified theory. In this way, Quemiset indicated his awareness of some ongoing controversies in philosophical and theoretical chemistry.³²

Quemiset's Catalog

Finally, the prospectus describes Quemiset's system of color, the catalog for which preparation was so expensive. Here, Quemiset outlined a visual system based in all the chemical and physical characteristics included above. The display would be both an aid and a proof, allowing the reader-user to choose a desired color and then turn to the sections about technique to learn how to recreate it. Finally, the creation of colored-in areas within the book would make the treatise a most practical manual for the dyehouse. The reader-user can create colored hanks of wool to match each painted sample according to the instructions, thus developing the skills to make this infinite variety of colors. A poor dyeing will become obvious in time, as the color of wool sample and the color in the catalog diverge.

Quemiset's system called for an unspecified but large number of pages, with different numbers of colors on each, fifteen shades of every color. The first page, for example, would have the five primitive colors, in fifteen shades from lightest to darkest. As several different coloring materials may produce each primitive color, a separate page would record, for example, the shades of yellow obtained from yellow wood and yellows made with turmeric, fauve colors from nut husks, reds made from lac, cochineal, and madder; and so on.

Pages displaying compound colors would include graded hanks of the uncombined component colors and their shades, plus shades created using equal and unequal proportions of those colors. This, Quemiset noted, would simplify comparison across the charts; the position of the color in each column would be dictated by the proportion of each color. When completed, the color catalog would allow *entrepreneurs* at the manufacture to select shades precisely and to know the range of shades or tones for each coloring material or combination. This knowledge would contribute to the beauty of the tapestries by making faithfulness to the cartoon more certain and more stable.

The Problems of Color at the Gobelins Manufacture

The projects and plans for the dyehouse operations at Gobelins exhibit many of the common concerns about color production and many of the hopes for its general improvement. They suggest, for example, that the difficulties encountered in the development and introduction of improvements depended as much on an assortment of social and economic relationships as they did on a breadth of practical or scientific understanding. In this sense, we can compare Quemiset's work, and his system, with François Gonin's slightly earlier

restructuring of dye practices in Normandy. Gonin's work confirms much of what is found in Quemiset's introduction: support for changes or resistance to changes in operations was neither confined to any one group involved nor necessarily consistent. Quemiset may have been unusual in his ability to articulate connections between the sciences and his work, but his choices of the places to find those connections were completely typical. The perceived need to balance different terminologies, as a way to bring varied philosophical and practical customs together, and to reconcile all with simplicity was a characteristic of most other projects. Gonin's system, like Quemiset's, broke colors into their constituents and focused attention on these components in ways that mirrored the separation of light. Whereas traditional production focused on the result—one made black-colored fabrics, or blue-colored fabrics—and certain results could be obtained only from specific combinations of materials (e.g., Venetian scarlet could only be made from kermes) these organizational presentations assumed some degree of congruence among the results.

But then, we lack explanations as well as a color catalog for Gonin's work; either or both would better demonstrate the scope of his work. Was his demonstration only for improvements in efficiency, for the project of creating a large number of colors in a few days with simplified preparations? Were these new-looking colors created by a new production method, or was the latter the only goal? Thanks to Homassel, we can see some of the answers to those questions for Quemiset. Quemiset's contribution lacks a single neat format—no bar, circle, or triangle. Compared to Lambert's triangle or Harris's circle, the expression of Quemiset's work is inelegant, but perhaps the assumption that well-ordered color would fit into a concise form was as much a downfall for those systems as were the problems of what might be the appropriate medium and materials for creation. Quemiset suggested, and Homassel produced, a greater range of color, illustrated as a series of charts, than did Schäffer or Schiffermüller, Werner or Lambert. Quemiset's order, as Homassel expressed it, highlights connections between colors and their shades as well as between colors and their mixtures, and it does so across a broader range of compounds than any of those men imagined. These changes may have had a basis in experience, not only of Quemiset and, later, Homassel as dyers but also of Neilson. As an artist and a weaver, Neilson may have recognized the need for explicit articulation of all colors at the expense of simple form, rather than leaving so much to the imagination.

We can see in the project instigated by Neilson, planned and executed by Quemiset, and completed by Homassel successful answers to a collection of perplexing problems. And we are fortunate here to know not only what they did, and how but also, unusually, what they believed they were doing.

Notes:

Note 1: Notice de la mort du Jacques Kerquaure [*sic*], 10 January 1750, AN F/12/639A.

Note 2: A. La Tour, "Colbert's Reorganization of the French Wool Industry," *Ciba Review* 67 (1948): 2446–53.

Note 3: *Edit d'établissement de la Manufacture royale des Gobelins*, 21 December 1668, AN O/1/2040A. See also Jules Guiffrey, *Les manufactures parisiennes de tapisseries au XVIIe siècle* (Paris, 1892), 33–40, 131–32.

Note 4: Jean-François Belhoste, "Les Manufactures de Drap Fin en France aux XVIIe et XVIIIe Siècles," *Revue de l'art*, no.65 (1984): 26–38; Jean Coural, "Les Manufactures Royales," *Les monuments historiques de la France* 21, no.4 (1975): 57–78; Jules Guiffrey, *Les manufactures nationales de tapisseries: les Gobelins et Beauvais* (Paris, 1908); Gustave Geffroy, *Les musées d'Europe: Les Gobelins* (Paris, 1923).

Note 5: Maurice Fenaille and Jules Guiffrey, *État général des tapisseries de la manufacture des Gobelins depuis son origine jusqu'à nos jours 1600–1900*, 5 vols. (Paris, 1903–23).

Note 6: Lucien Reverd, "La Manufacture des Gobelins et les Colorants Naturels," *Hyphé* 1, no. 2 (March–April 1946): 91–104; Lucien Reverd, "La Manufacture des Gobelins et les Colorants Naturels (*suite*)," *Hyphé* 1, no. 3 (May–June 1946): 141–47; and Lucien Reverd, "La Manufacture des Gobelins et les Colorants Naturels (*fin*)," *Hyphé* 1, no. 4 (July–August 1946): 185–93.

Note 7: "Manufacture des Gobelins Inventaire—1746," 31 December 1746, AN O/1/2041; Meriel, marchand teinturier, "Mémoire," 6 September 1747, AN O/1/2036, pp. 104–5; "Manufacture des Gobelins, Inventaire—1748," 31 December 1748, AN O/1/2041; D'Isle to Tournehem, 29 December 1750, AN O/1/2036, pp. 22–23.

Note 8: Petition of Roby, 18 February 1746, AN O/1/2056.

Note 9: Neilson and Audran to D'Angivillier, 29 December 1773, AN F/12/639B.

Note 10: Jean Hellot, *L'Art de teinture des laines et des étoffes de laine, en grand et petit teint. Avec une instruction sur les débouillis* (Paris, 1750).

Note 11: Charles-François Dufay, "Observations Physiques sur le Meslange de Quelques Couleurs dans la Teinture," *Histoire de l'Académie royale des Sciences. Année 1737 . . .* (Paris, 1740): 253–68; Minutes of the Conseil de Commerce, 15 October 1733, AN F/12/80, pp.787–97; Minutes of the Conseil de Commerce, 17 December 1733, AN F/12/80 pp. 1004–6; Hellot, *L'Art de teinture des laines*; Pierre-Joseph Macquer, *L'art du teinturier en soie* (Paris, 1763).

Note 12: Pierre Phillpei Cavalier to the Marquis de Marigny, 1 August 1757, AN O/1/2036, pp. 66–71; Jacques-Germain Soufflot to the Marquis de Marigny, 16 October 1757, O/1/2036, pp. 64–65; "Petition de le Sr. de Julienne. Arrêt rendu en conséquence," 7 September 1746, F/12/93, p. 572.

Note 13: An (untitled) annual report on dyeing at the manufacture, dated 23 December 1774 notes Quemiset began work 1 November 1774, AN O/1/2047. Documents concerning Quemiset, from which I gathered this story, are found among miscellaneous materials relating to Gobelins in the cartons of the *Bâtiment du Roi* AN O/1/2047, O/1/2048, O/1/2051, and also in AN F/12/2259 and F/12/639B. See also citoyen Homassel, *Cours théorique et pratique sur l'art de la teinture en laine, soie, fil, coton, fabrique d'indiennes en graine et petit teint. Suivi de l'art du teinturier dégraisseur et du blanchisseur, avec les expériences faites sur les végétaux colorans*. (Paris, an VII (1798-9); Alfred Curmer, *Notice sur Jacques Neilson entrepreneur et directeur des peintures de la manufacture royale des tapisseries des Gobelins au XVIIIe siècle*. (Paris, 1878); and Reverd, "La Manufacture Des Gobelins et les Colorants Naturels," pt. 1 and pt. 2.

Note 14: Reverd, "La Manufacture Des Gobelins et les Colorants Naturels," pt. 1, 92–93.

Note 15: Quemiset, *L'Art d'apprêter et teindre toutes sortes de peaus. contenant plusieurs découvertes & réflexions, tant sur les opérations qui précèdent que sur celles que concernent et suivent la teinture des marroquins, vaches tannés, peaux chamoises, passèmes en mégie etc.* (Paris, 1775).

Note 16: "Privilège exclusif demandé par le sr. Bedel, de Paris, pour vendre et débiter tous sortes de peaux blanches, unies et maroquinées, qu'il prétend avoir le secret de chamoiser et teindre a fond en toutes couleurs. Décision négative," 1 February 1774, AN F/12/94, p. 71.

Note 17: Joseph Jérôme Lefrançais de Lalande, *L'Art de faire le maroquin*, ([Paris, 1766]). de Lalande also published earlier work on a similar subject *L'Art du tanneur* ([Paris], 1764).

Note 18: Reverd, "La Manufacture des Gobelins et les Colorants Naturels," pt. 2, 144.

Note 19: Belle to Soufflot, 29 September 1776, AN F/12/639B.

Note 20: "Observations sur l'état actuel de la Manufacture des Gobelins," 1776, AN O/1/2048; "Certificat de vertu de la part de Nicolas Charles Homassel," 6 February 1785 in dossier, "Gobelins, misc." AN O/1/2051; "État des gratifications annuaire aux employées de la teinturerie," 1786, AN O/1/2051.

Note 21: Curmer, *Notice sur Jacques Neilson*, 48–49.

Note 22: d'Isle to Tournehem, 8 February 1751, AN O/1/2036 pp. 42–44; Pierre Phillippei Cavalier to the Marquis de Marigny, 1 August 1757, AN O/1/2036 pp. 65–67; Jacques Germain Soufflot to the Marquis de Marigny, 27 October, 1757, O/1/2036; Mémoires sur la teinture au Gobelins, June, July & August 1768, AN F/12/639A; "Observations sur l'Etat de la Manufacture Royale des Gobelins," 31 December 1776, AN O/1/2048; Procès-verbal de D'Anvilliers à Soufflot, 3 November 1777, AN O/1/2047.

Note 23: Homassel, *Cours théorique et pratique sur l'art de la teinture*, xiv–xv.

Note 24: Barbara Whitney Keyser, "Between Science and Craft: The Case of Berthollet and Dyeing," *Annals of Science* 47 (1990): 213–60. Claude-Louis Berthollet, *Elemens de l'art de teinture* (Paris, 1791); Claude-Louis Berthollet, "Observations sur la partie colorante des bois de fernambuco, campêche, bois jaune, garance, combiné avec les oxides métallique," 10–14 March 1789; AdS *Dossier Biographique du Berthollet*; Claude-Louis Berthollet, "Experiences sur la teinture avec la cochenille et quelques dissolutions d'étains," n.d., AdS *Dossier biographique du Berthollet*.

Note 25: Jacques Neilson, letter accompanying [Quemiset], "Cours Général pour la Teinture en Laines," [22 May 1775], AN O/1/ 2047. A copy of the latter is also at the BNF (*Ms. Fr.* 14114).

Note 26: Glockner, designer et coloriste, "Mémoire," 17 December 1776, AN O/1/2047.

Note 27: Homassel, *Cours théorique et pratique sur l'art de la teinture*.

Note 28: Reverd, "La Manufacture des Gobelins et les Colorants Naturels," pt. 2, 144.

Note 29: Album manuscrit provenant de l'atelier de teinture des Gobelins, milieu du XVIIIe siècle. Paris, BNF Cabinet des Estampes, Lh-31-Ft 4., Inv. 7309, fol.

Note 30: [Quemiset], "Cours Général pour la Teinture en Laines," 22 May 1775, O/1/ 2047, pp. 4–6.

Note 31: [Quemiset], "Cours Général pour la Teinture en Laines," 1–2.

Note 32: [Quemiset], "Cours Général pour la Teinture en Laines," 8.