

Information and Inspiration

Printed Sources

In 1738, John Hoofnail arranged for the printing of a book that described a venture he had undertaken; both the venture and the book are interesting for several reasons. Treating Robert Boyle's *Experiments and Considerations Touching Colours* (1664) as a flawed but essentially practical work, Hoofnail attempted to improve upon its usefulness through his own series of investigations. *New Practical Improvements, and Observations on Some of the Experiments and Considerations Touching Colours . . .* was the result.¹

When first I took these Essays into my Hands, I indeed expected (not knowing the Nature and Design of them 'till I read them) to find nothing but Recipes ready for me to apply directly to the Purposes I wanted them for; but I had not gone over some few of them without being soon convinced of my Mistake, and easily discovered that the Honourable and generous Author had designed these Elaborate Peices [*sic*] only, as Foundations for others to improve and build upon.

[Hoofnail], *New Practical Improvements* (London, 1738), iv.

The basis of Hoofnail's book was seven of the fifty experiments included in the section Boyle called "Concerning Promiscuous Experiments about Colors," a section in which Boyle discussed the generation of colors, light refraction, laws of contrast, and the creation of painters' and dyers' color.² Hoofnail transformed the information Boyle presented; it was no longer an adaptation of artistic practice to benefit chemical understanding but a practical manual founded in experimental philosophy. In undertaking his task, Hoofnail assumed a compatibility between natural-philosophical pursuits and activities in the colorhouse. His project, as he saw it, strengthened Boyle's approach to the practical value of scientific understanding; it offered Boyle's work to others for their use and perhaps for further improvement. The principal concern of Hoofnail's book is production of good colors. It is clear that he expected that his instructions would be followed to their practical end—their use as painting materials—but he expressed an expectation that his reader would also undertake independent experiment. The purpose of those experiments might be further improvement of Boyle-Hoofnail for the public, and certainly would be greater personal understanding.

Hoofnail's presentation is a lively and explicit interaction between sciences and technologies, one that embodies certain kinds of exchanges between them—exactly the kinds that were at the heart of eighteenth-century ideals about the relationship between the sciences and technologies. They are exchanges characterized by a respect for all facets of a topic, and for the progress and improvement that will result from their combination. Hoofnail clearly describes the value of his scientific experiments to chemistry and to other sciences as well as to artisan practice. Yet questions remain. Many details of this endeavor are

unanswerable; we know too little about Hoofnail himself or about contemporary uses of his book. If Hoofnail was an artisan, perhaps a colorman, *New Practical Improvements* may have served to supplement public or private lessons as books by Peter Shaw, Constant de Massoul, Louis-August Pfannenschmid did. Hoofnail's book may have constituted another example of efforts to ensure authority and longevity through publication, efforts as common among art teachers and colormen as it was among other savants.³ The revision of Hoofnail's title (to *The Painter's Companion . . .*) in a later edition suggests whom Hoofnail hoped to benefit and how Hoofnail focused, or refocused, Boyle's experiments.⁴ We can address other questions, however—questions about why or how Hoofnail's book might have been issued and about where it fits within the panoply of printed sources of information and inspiration for color.

Eighteenth-Century Publication

Historians assign many meanings to publication, and to print culture more generally, in the eighteenth century. We know it as a common technique to make public a personal engagement with culture or with polite society. Writing, or arranging for publication, also extended an author's expertise to many communities when access through personal contact alone was difficult. We understand the many ways that books and reading fed the hunger for information at all levels of society in the eighteenth century. We know also that practical descriptions permitted consumers to better understand and judge the quality of potential purchases. Knowledge of the mechanical aspects of painting, of the techniques employed by textile, pottery, or glass industries, and similar information contributed to improved taste and more-intelligent consumerism. Implicit in these reasons too was an interest in economic advantages gained through improved trade, which in turn could reduce foreign imports or competition from foreign markets.

Corroboration that all these expectations were held for color practices and color theories in the eighteenth century is easily found among the common genres of publication. They appear in works compiled from several sources or written by several authors—encyclopedias, dictionaries, and other compendia—both general and specific to arts, trades, or sciences. Ideas about color in all its manifestations appeared as pamphlets, self-published or issued under the aegis of an institution; these might be comprised of excerpts from other works, comments on the work of others, or new presentations. Periodicals dedicated to sciences, the arts, or general knowledge looked to foreign as well as local institutions and incorporated or abstracted their papers, including studies of color-related subjects. Broadsheets and notices in periodicals advertised manufacturers and their special products. Suppliers' trade cards might highlight special coloring materials offered. Printed information about color contributed to the ongoing effort to understand and improve it. The availability of information in different formats afforded a

broad education in color and colormaking, teaching readers to recognize their problems in trade, in production, and in the sciences. These publications, in turn, form a valuable part of the material culture of color in the eighteenth century.

In this section, I will begin my discussion of the forms of printed works as inspiration and information in the eighteenth century with a necessary acknowledgment of one result of their prolific quantity. Even when forgeries and pirated works are set aside, the bibliography of printed information about artists' materials and artisan practices is convoluted. The problems associated with the names of publications parallel the nomenclature problems for all colors, and it is little comfort that they were equally confusing to eighteenth-century readers and consumers. The bibliographic history of Hoofnail's treatise, like that of Jean-Félix Watin's, emphasizes one aspect of this problem. Changed titles only sometimes indicate new or reedited information. Significantly different collections might have similar names. There were at least six editions of Godfrey Smith's *The Laboratory, or The School of the Arts* published between 1738 and 1799.⁵ It competed with other books called, or subtitled, *Laboratory of the Arts*, the *School of the Arts* and the *Handmaid to the Arts*, and the separation was not made simpler by the naming of a more old-fashioned and largely pirated compendium, published first in Dublin in the 1770s *The Golden Cabinet, Being The Laboratory, or The Handmaid to the Arts*.

Sources for Sources of Inspiration

Where did publishable information about color come from? Literature about color was not new in the eighteenth century but it took on new meanings, acquiring links to ideas about the place of knowledge in public and social life while retaining alliances to earlier publishing traditions.⁶ The diffusion of information through print and the way these and other sources for information about color sparked interest and provided inspiration must be considered in terms of its harbingers as well as of what it presaged. Colors and colormaking were alchemical and technical secrets as well as components of optics or vision. Color was a subject of manuscript works—as records of workshop practices and as part of philosophical canon. The former were among the first secrets to be "told" in print, in the *kunstabüchlein* that became incorporated into ever-larger works of general knowledge and translated into many different languages.

Books published during the eighteenth century differed from older books about color theories or practices in their purpose—implicit in the older books, but explicit in later ones. We know of, or can guess at, an author's intentions through the prefatory remarks of eighteenth-century publications and through the occasional comments or assessments within those texts. Often using a common rhetoric, the authors of these remarks emphasized a concern for access for rational explanation and for the creation of opportunities to learn to judge quality.

Their claims extended not only to the factors, merchants, and philosophers but also to individuals, the ultimate consumers of objects and ideas.

As soon as we had cast our eyes on the title of this performance, we were struck with the mass of curious and (as we think) instructive information, which the laborious erudition of a German professor might contrive to extract from the subject; and our expectations have not been disappointed by a perusal of the volumes before us.

[Hamilton], "[Review of] Johnston's Translation of Beckmann's History of Inventions," *Monthly Review*, 2d series 26 (June 1798), 128–9

By the eighteenth century, the event of publication had changed in ways that reflect the uses of print as a source of information and inspiration. In keeping with new ideas about the nature of experiment and experience, many authors added to their remarks claims to special knowledge about their subject. Some acquired this knowledge through their occupation. For others, expertise derived from the combination of observation and experience of good science extended to other realms. Not infrequently, there are claims of expertise grounded in both the practical and the theoretical. Jacques-Fabien Gautier d'Agoty was as careful to attribute to scientific observation and experiences the grand ideas he presented in *Chroa-génésié* as he was to insist that practical observation and experiences were the source of his three-color printing technique. The connections could be tenuous: as André-François Deslandes warned, some authors made unfounded claims to experience, reported facts they could not explain clearly or used mysteriousness to prevent verification of experiments.⁷

The Habit of Citation

Publication encouraged the idea of a highly personal enlightenment that was based on expertise, but the expertise on display was not always only personal. When nonspecialists entered specialized territory, acknowledgment of recognized experts often featured prominently, reassuring those more knowledgeable about the subject, or about portions of it, that this person did have at least a basic understanding. Thus, throughout the eighteenth century, the rhetoric of presentation for color included a reference to Newton, no matter the focus and no matter the conclusion about his ideas. It could incorporate knowledge of the classics, philosophy, art criticism, antiquities, and of other experts. Other chemists and physicists, and occasionally classical authors, might preside over the subject matter. Local experts, mentioned by publication or by name, were often present. The anonymous author of *The Art of Drawing and Painting in Water-Colours*, published in Dublin, refers to a Mrs. Mariana as if she were the only producer of litmus blue in the English-speaking world.⁸ The same author describes two methods to cure saffron: one "owned" by a Mr. Douglass—another local merchant—the other credited to Mr. Bradley, probably Richard Bradley.⁹ In a typically eighteenth-century publication, a catalog of sources will include a combination of authorities—practical and academic, famous and obscure. In an early-nineteenth-century book—attributed to Mayer Oppenheim—about

English-style pottery, prominent references are made to Torbern Bergman, Jean-Henri Hassenfratz, René Réaumur, Johann Heinrich Pott, and Louis-Nicolas Vauquelin, all authors of publications about ceramics manufacture or about some aspect of that subject.¹⁰ Oppenheim mentions the potters Josiah Wedgwood and Bernard Palissy, names a connoisseur would recognize although neither was then alive.

The writer published nothing but what was already well known. The composition of the Jasper and black basalt ware of Wedgwood, however was never completely mastered, and we see that Mr. O*** knew absolutely nothing about their composition. His information about the process of transferring prints on the ware was also very incomplete. . . . [T]he practical handbooks of that period are generally due to retired manufacturers who, if they did not care any more about keeping professional secrets, are very careful, at the same time, not to divulge the personal discoveries they may have made in the course of their experience.

M. L. Solon, *Ceramic Literature* (London, 1910), 313–14.

His expertise in other fields is credited to what must have been personal acquaintances, a pharmacist in Rouen and a "Mr. Hickling" of Birmingham, two cities where Oppenheim had worked. An early-twentieth-century assessment of Oppenheim's publication suggested a limit to his experience, implying a dependence on citations of contemporary and ancient authorities, as a means to enhance their own.¹¹ It may simply have been a convention Oppenheim retained from his own reading.

We do know, however, that consulting others—in print or in person—was a regular part of investigations. When Jean Hellot undertook reorganization of the Vincennes porcelain manufacture in the 1750s, his mandate included consideration of all possible sources. He collected notebooks and discussed techniques and materials with specialists affiliated with the manufacture. His notes indicate he consulted an unnamed German manuscript and publications by Johannes Kunckel, Georg Stahl, Johann Juncker, and Antonio Neri. Hellot wrote down instructions from the doctor of Prince Stanislas, a man identified only as "Pierre" who was sent to the Bastille in 1753, and an extremely venal monk from the Abbey of St. Martin. From the information given to him by all these informants, Hellot constructed a research program, ultimately creating another special notebook of recipes for the manufacture.¹²

Also common in manuals of practice was a strategy of carving out authority by citing the inadequacies of existing works, as this implied that the work at hand superseded rather than supplemented all others. This strategy was not limited to purely practical treatises, however. John Harris complained, in the preface to his *Lexicon Technicum*, of Chauvin's *Lexicon rationale* (1672), Furetiere's *Dictionary* (1702), the *Grand dictionnaire des arts et sciences* (1695), the *Universal English Dictionary* (1696); none was as good as the (unnamed) dictionaries of chemistry or physics he consulted, but each was inadequate in its own way.¹³

The habit of citation existed alongside a parallel tradition of excerpting

information from different publications and publishing "the best" on one or several topics, verbatim or nearly so. This transfer technique, common to periodicals, encyclopedias (including the *Encyclopédie méthodique*), and individual books have links to older traditions of compilation. Eighteenth-century examples are rarely the repetitive and disorganized collections of information in the tradition of *The Secrets of the Reverende Maister Alexis of Piemont* or similar works, even when information is obviously derived from those collections.¹⁴ The creation of order in presentation was a technique in development throughout the eighteenth century.

Translation

Translation was another common citation and dissemination strategy that meshed easily with all kinds of scientific and technical information in the eighteenth century. Announcement that a publication included translations of foreign authors, or that the contents of a book was rooted in expertise drawn from foreign countries could suggest an importance for the publication that exceeded its real significance. Translations were also, occasionally an opportunity for the creation of a very different edition from the original. *Instruction sur l'art de la teinture*, the 1791 translation of Karl Wilhelm Pörner's *Chymische Versuche und Bemerkungen zum Nutzen der Färbekunst* (1772) was undertaken with oversight from a committee organized by Claude-Louis Berthollet. The French translation altered the presentation, and aligned the contents more closely with the forms of chemistry that had grown to prominence in Paris since Pörner's original, German, publication.¹⁵

Information in Printed Works

Encyclopedias, and Dictionaries and Compilations

Farbe, eine gewisse Eigenschaft der Körper, wodurch sie die Lichtstrahlen dergestalt zurückwerfen, daß in unserm Auge eine gewisse Empfindung entsteht. Man zählt fünf Hauptfarben, woraus wieder verschiedene untergeordnete Farben und Schattirungen entstehen. So betrachtet der Naturforscher die Farben. Nach dem gegenwärtigen Zweck versteht man aber unter Farbe vorzüglich die jenigen Körper, wodurch man einer Sache eine veränderte und gefälligere Farbe mittheilen kann.

Johann Karl Gottfried Jacobssons Technologisches Wörterbuch (Berlin, 1781), 2: 658.

Encyclopedias, dictionaries, and other works compiled from several existing publications or written by several authors were a wide-ranging and straightforward-seeming source for ideas and attitudes. Alphabetization and cross-referencing of entries meant that readers could easily locate information describing, for example the different meanings of the word *color*—including the relationship between light and prismatic colors, color vision and notions of primary colors as well as importance of color to arts and commerce. One entry might explain how to repeat Newton's experiments with prisms; others might describe materials and techniques needed to produce certain colors, such as ultramarine, verdet, or carmine.¹⁶ Descriptions of such processes as painting or

enameling might also include ingredient lists and production details. Within this range of information, encyclopedias, dictionaries, or similar compendia claimed to expose secrets and to offer what seemed to be information useful in the creation of color. Reading about operations was as important as reading about underlying philosophies. Portions hinted at the possibilities of experiment, supplying information to improve personal understanding.

Carmin ordinaire

5 gros de cochenille, demi gros de graines de chouan; 18 grains d'écorce d'autour; 18 grains d'alun de Rome; eau distillée, deux pintes et chopines. Faites bouillir. Filtrés chaud, et laissés refroidir pour précipiter le carmin.

Rapport de Tillet et Macquer sur le carmin du Sieur Viquesnel, 15 May 1765, AdS *pochette*.

Considered together, eighteenth century encyclopedic works are remarkably consistent, suggesting a similar consistency to ways that they served as sources of information for further reference or for action. The information was rarely current and, even when articles were written specifically for one publication, often relied on existing publications for content and language. "General Observations on Dyeing," an article that appeared in the *New and Complete Dictionary* (1754), is repeated in the *Dictionary of Arts, Trades, and Commerce* (1771), and it formed the basis of a similar entry in the *New Royal Encyclopedia Londinensis* (1790). François-Xavier d'Entrecolles's description of porcelain, Pierre d'Incarville's essay on varnish, originating in the early eighteenth century, appear again and again in French, English, and German compilations.¹⁷ As late as the nineteenth century, instructions to make carmine lakes often called for *autour* and *chouan*—materials that Pierre Pomet was unable to identify with certainty in the previous century—continued to be a feature of new issues.¹⁸ Such repetition reinforced some common ideas and debates—the central position of Isaac Newton, the difference between real and apparent colors, that glass painting was a lost art, the need for violet dyes or lakes that would not fade. For other subjects, such as the variable number of colors in the world, the lack of consensus within an article or within a volume might offer no guidance but suggest a problem to be conquered.

Within encyclopedic works, discussions of scientific topics were more likely to have been based on more recent studies than technological ones were. This may have been owing to the effectiveness of dissemination techniques among the sciences, or it may have been owing to the availability of writers with more-detailed knowledge, but conventions of writing about practical matters may have been factors as well. It is interesting that new techniques developed by scientists—that combination of science and practice that might have been best served through encyclopedic works—did not fare better than those developed by others. Pierre-Joseph Macquer adapted Prussian blue pigment to textile uses by 1749 and his technique was published by the Paris Academy of Sciences three

years later.¹⁹ But it does not appear in any eighteenth-century dictionary or encyclopedia as dyestuff even when detailed descriptions of the painters' color are featured in entries on "blue." Even the inventor's brother neglected to include it in his *Dictionnaire portatif des arts et métiers* (1766).²⁰ Yet other sources tell us that Prussian blue was used and remained a continued subject of experiment with textile colors throughout the latter part of the eighteenth century.

[I]t is surprising how shamefully silent [Encyclopedias and dictionaries], which profess to comprehend every thing relating to subjects of this kind, are with respect to most of the essential articles; even those where the writings of others, had they been industriously consulted, would have furnished what was required. Nor is the French Dictionary now published in the least an exception to this; for, on examining it, in order to have informed myself of the methods practised by the French, with respect to certain particulars in which they excel, I was surprised to find, that, in some cases, every thing concerning them was entirely omitted, and in others, recipes, or other passages, taken from some of the old books with the most injudicious choice, supplied the place of the just account of the improved methods obtained from the ablest practitioners of the several arts, which, in the proposals or this work, were promised to have been given.

Robert Dossie, *The Handmaid to the Arts* (London, 1764), 1: xxiv-xxv.

Dictionaries, encyclopedia, and similar compilations were very conservative sources for information about color. The data were rarely innovative, and the details provided could be far removed from local or current technical practices and beliefs, subject to the author's idiosyncratic interests as much as to the quantity and quality of information available.²¹ The repetition of information among publications reinforced ideas about the nature of colors, but exclusive reliance on these publications as sources of inspiration in colormaking could work to the disadvantage of an eager inventor. As the constant rediscovery of the lost art of glass painting suggests, "new" information might describe discontinued practices or suggest needs and opportunities that no longer existed.

Periodical Publications

Academic and Scientific Journals

Exhortations to make knowledge useful and to investigate the natural and artificial worlds generated a considerable quantity of information appropriate to the immediacy of the periodical press. Information in academy-sponsored publications extended the reach these institutions. Periodicals with informal or secondary affiliations—including *Observations physique* and Crell's Journal in their several incarnations, the *Journal des sçavans*, *Annales de chimie et physique*—reproduced information from publications sponsored by scientific societies and occasionally published articles declined or ignored by those societies. The periodical press offered more-current sources of information than encyclopedias and, often utilizing as many definitions of *color*, included more-specialized writing. Scientific periodicals throughout Europe published and republished accounts that, tying color to classic roles as a chemical indicator and mineralogical descriptor, linked colored substances to their use as coloring

materials.²² The influences could be subtle; an article about pyrites and vitriols might suggest new pigments and reformulated inks and dyes, if one were familiar with the role they played in those processes.²³

The presentation formats of eighteenth-century journals supported their use as a source of ideas about color, through their emphasis on detail in description of materials and techniques, and their dependable order of information. The format also served as a blueprint for the reporting of investigations, including those of nonmembers, both amateurs and artisans.

Color in the Popular Press

NOUVELLE DECOUVERTE

Le beau Rouge sur la Porcelaine.

Le beau Rouge propre à être employé sur la Porcelaine, avoit toujours été regardé comme un de ces Secrets, pour la découverte desquels on ne pouvoit faire que des efforts impuissans, lorsqu'un Particulier inventa en Saxe le Rouge, tel qu'on l'employe aujourd'hui à la manufacture de Dresde. Cette Découverte réveilla les espérances des Artistes, & on mit la main à l'œuvre pour tâcher de découvrir quelque chose de mieux. Après bien des recherches, on a enfin trouvé le moyen de perfectionner cette Couleur tant désirée; on est en état à présent d'employer sur la Porcelaine le plus beau Rouge dans toutes les nuances dont il est susceptible; outre les avantages qu'il a sur celui de Dresde, par raport au coloris, il a encore celui d'être inalterable; aucun frottement ne peut l'enlever lorsqu'il est une fois employé, c'est ce qui a été démontré par nombre d'Expériences réitérées. On est redevable de cette Découverte aux recherches laborieuses du Sr. *Taunay*, Marchand Orfèvre-Jouaillier, Quai de Conty, au Petit Suisse.

Mercur de France, no. 885 (November 1740): 2517–8.

Popular periodicals also important to the transmission of information about color, presenting as they did a wider range of information than was found in more the focused academic journals. Weekly or monthly publications intended for a general audience might include a notice about the opening of a shop, reminders that this or that merchant could supply colors or materials to be colored, remarks about products, or color-related discussions taken from other sources—whole, abstracted, or simply mentioned. Debates and disputes about color, coloring, and related technologies also found their way into these journals, along with their poetry and their gossip, making familiar to many readers arguments about subjects as complex and philosophical as the nature of light and shadow or as petty and vitriolic as the true origins of three-color printing. A reader of the *Schwaebisches Magazin von gelehrten Sachen* between 1775 and 1780, for example, could read essays about prismatic colors, the effect of light on shadow in painting, the histories of painting, dyeing, manufacturing, and trades, and read about local as well as foreign sources for particular colors, assistants, and other goods.²⁴ Whatever the impetus for these exchanges—politics, religious beliefs, improved sales or something else—they sustained all manifestations of the idea of color in public consciousness. Here, too, repetition of information reinforced ideas about the ubiquity of color and its potential for improvement.

Review Journals

As subset of the general periodical press, review journals such as *France littéraire* or the *Critical Review* made a particular contribution to the transmission of information about color production, sciences, and technologies. They provided access to content without requiring readers to purchase, borrow, or even read the volume. Making no claims to impartiality, those or similar periodicals showed readers how to understand (or find incomprehensible) ideas presented in the publications under review, as they explained the content of those works. Review publications could include announcement of a publication and a précis of contents, as well as detailed critiques of books. Science and manufacturing topics, articles that highlighted industry or ideas in foreign countries or trade practices in a context of improvement were regularly presented in these publications.²⁵

Single-Subject Works

[As] the mere practitioner cannot understand the language of theory, till by gradual information his doubts and prejudices are removed, it is an oversight in scientific writers (with trepidation it is said) to publish researches only as theoretical; greater, if announced applicable to practice with no practical matter incorporated with them; but greatest of all, openly to avow a total ignorance of the practice of what they are offered to improve; as that at once precludes further notices from the merely practical man, who looks for practical information.

Charles O'Brien, "General Reflections, &c" *The Callico Printer's Assistant* (London, 1789), n.p.

Books discussing a single or a few related subjects—manuals of practice, treatises of all kinds, books on physics, mechanics, or chemistry—further disseminated scientific and technical knowledge and provided critical sources of information and inspiration in the eighteenth century. Content might be directed to general and amateur readers, to those more conversant with technical subjects, or to those more knowledgeable about the sciences.

Publications about the sciences intended for general audiences were obvious sources of information, often inspiring the reader to an engagement with experiment, perhaps not always to the degree that Boyle inspired Hoofnail. Although few books were about color per se, many more included its basic tenets, and Newton's *experimentum crucis* was often called on to explain color, science, and light, and, by extension, the juncture of science and arts. Some adapted the dialogue or story format, in an effort to simplify information or make it seem more appealing.²⁶

Publications Specifically about Color

Shorter Works on Color

Ideas about color also appeared as pamphlets. More than a broadsheet but smaller than a book, these were single subject discussions, occasionally issued as a series, that could be bound or disbound as required. A pamphlet might announce a discovery or the proposed publication of a book. Charles O'Brien noted that his book *The Callico Printers' Assistant* could be broken into

parts—essentially made into pamphlets—to simplify distribution to the appropriate student or apprentice within a manufacture. Jean-Félix Watin, for very different reasons, collected his correspondence regarding white lead and painter's colic and published it as a pamphlet both before and after he incorporated it into *L'Art du peintre, doreur, vernisseur*. Official publications in France, where pamphlet-writing was exploited by the government as well as individuals, included reports on the restoration of paintings and on chemical investigations of the properties of ochers as well as instructions to prepare Turkey red, Saxon green, and several varieties of black.²⁷ These pamphlets made their way far beyond the borders of France, becoming subjects of discussion—sources of information and inspiration—in committee rooms and salons in London, Manchester, Göttingen, Berlin, and elsewhere.

Practical Manuals

There is no way to establish a comparison among all single-subject or narrowly focused publications on art, on artisan activities, on manufacturing or on related subjects about color. The existence of these books—as discrete publications—their range of subject matter, the consistency of their appearance and re-printing throughout the century all suggest that practical manuals were extremely valuable sources of information and inspiration for any person interested in their subject. They are difficult to describe succinctly, however. Some books seemed to include near-random collections of recipes with no pretense at a philosophical grounding: Not all eighteenth-century manuals about practice were organized according to the simplified or scientificized forms of presentation I have described elsewhere. Some single-subject practical manuals adopted an encyclopedic structure, alphabetizing to integrate the different aspects of their subject; others, like Hoofnail, held to a method of presentation that mimicked scientific works. There is no single standard, but there are some typical examples.

Other Published and Unpublished Works Based on the Written Word

Lecture-based Publications

Publications connected to public lectures or demonstrations form an important subgenre of publication about technology and about the sciences.²⁸ Print versions of lectures extended the rudiments of scientific or technical knowledge to readers at all levels of sophistication, forming links to polite society. Their form varied from the seemingly verbatim to the barest outlines, useful as souvenirs or as a source of inspiration—and information—for a self-study program. Color was a popular demonstration topic and a common part of public or semipublic lectures about chemistry, physics, and "useful arts;" I discuss their content and their use as an aspect of verbal transmissions.

Conclusions

Throughout the eighteenth century, color was a simple subject to research in print. Ideas about color, examples and descriptions of its production and improvement were available in many forms and formats. Curiosity about color was piqued and supported by easy access to information published in an extensive variety of places. Color—as an aspect of light, as a part of textile- or ceramics-making processes, as a component of painting—was found out in manuals and treatises on practice and in more-general works.

Discriminating among the vast quantities of information was a more difficult task. Faced with a great number of techniques, a mind-boggling quantity of materials, and confusing variations in result, how could anyone judge from published information alone what was both novel and good? Access to encyclopedic works gave a reader with no scientific or technical grounding a broad if inchoate knowledge about methods and theories. These sources of information articulated a mainstream position and often had greater significance as a source of inspiration than as a valuable repository of information about innovative practice. Ideas about color that were more current were available through the periodicals, or via pamphlets and broadsheets. Technical manuals offered a closer focus on one or a few related (or seemingly related) subjects.

Transfer of information from one source to another—we might call it plagiarism, but it was rarely seen as such in the eighteenth century—reinforced the significance of certain ideas as it established a pan-national basis of familiarity with color and suggested to individuals opportunities for further personal undertakings. Ongoing efforts to bring sciences into practices encouraged reading, observation, experiment, and proofs. The range of information suggested connections between different definitions of color and between different materials. The juxtaposition of theoretical and practical reinforced the dual position of color as something essential to all objects as well as a subject linked to optical experiments in light and vision.

But how can we separate publications that were used from those that were merely useful or decorative? There is no sure way. Archival references are too scarce to suggest consistency. The inclusion of publications as a reference within a book or books may indicate knowledge about that publication rather than personal familiarity and so can be misleading. What we can know about publication as sources of inspiration and information is not much different from what we can know about the effects of verbal exchanges or about objects as media of transmission. For some publications, such as Constant de Massoul's *Treatise on the Art of Painting, and the Composition of Colours* and Godfrey Smith's *Laboratory of the Arts*, we have suggestions of a significance through contemporary comments. We can consider the effect of publications as sources of information and information, but we must recognize that their information may be based on publication or re-publication traditions, and not on contemporary artisan

practices. For most print publications about color that were available in the eighteenth century, we know far less. In this case, you cannot depend on books.

I am sorry when I differ in Opinion from Mr. *Delaval*, whose Writings I much Esteem; but I hope, I may with due Deference to him, give my Sentiments as a *practical Dyer*.

John Wilson, *An Essay on Light and Colours* (Manchester, 1786), 7.

How did publications serve as inspiration? We assume that familiarity—a familiarity that came from the repetition of ideas published in different formats, in different places, or at different times—served many purposes. What can we determine about the ways information was transformed? Hoofnail's endeavor, especially its explicit relationship to Boyle's publication, becomes more unusual as we realize that, for the most part, we can only guess at the changes to information that were the result of such inspiration. The questions we choose to answer—to ask, even—about improvement to colormaking, and about the success of any effort to improve, depended on the sources available to the investigator. If the information at hand was *The Secrets of the Reverende Maister Alexis*, some book of chemical lectures, and a deeply felt interest in mineralogy, information and inspiration leading to discovery of a new color would be different from those of someone who combed articles from the contemporary popular press with encyclopedic works and undertook a close inspection of merchandise. Both approaches would be distinct from that of someone whose principal experience was grinding pigments or finishing cloth. And that person's approach would differ from the outlook of an inventor who turned first to philosophical writing or works "of the ancients" or an inventor who knew only the work of colormaker colleagues. Indeed, the whole rationale behind each attempt might be different. We often think of print as the most basic system of dissemination, but it may only be that of all ephemeral sources it is the least ephemeral, the easiest to trace.

Notes:

Note 1: Robert Boyle, *Experiments and Considerations Touching Colours. First Occasionally Written, among Some Other Essays, to a Friend; And Now Suffer'd to Come Abroad as the Beginning of an Experimental History of Colours* (1664; reprint, New York, 1964); [John Hoofnail], *New Practical Improvements, and Observations on Some of the Experiments and Considerations Touching Colours, of the Honorable and Judicious Robert Boyle, Esq., So Far as They Relate to Tinctures and Pigments, etc.: Intended for the Use of Gentlemen and Ladies that Amuse Themselves with Painting in Water Colours, as well as Designers and Limners, etc.* (London, 1738).

Note 2: See also William Eamon, "New Light on Robert Boyle and the Discovery of Colour Indicators," *Ambix* 27 (1980): 198–202.

Note 3: William Williams, *An Essay on the Mechanic of Oil Colours* (Bath, 1787).

Note 4: Later editions (there were about six) were renamed *The Painter's Companion; or, A Treatise on Colours. Shewing How to Make the Several Sorts from Their Proper Ingredients; Together with the Best Method of Colouring Maps, Prints, Views, &c. the Whole Being Practical Improvements on the Experiments of the Honourable Robert Boyle,*

Very Useful for Gentlemen and Ladies That Amuse Themselves with Painting in Water Colours, as well as Designers, Limners, &c.

Note 5: Godfrey Smith, *The Laboratory, or, School of Arts: In Which Are Faithfully Exhibited And Fully Explain'd, I. A Variety of Curious and Valuable Experiments in Refining, Calcining, Melting, Assaying, Casting, Alaying, and Toughening Of Gold; with Several Other Curiosities Relating to Gold and Silver; II. Choice Secrets for Jewellers in the Management of Gold; in Enamelling, and the Preparation of Enamel Colours, with the Art of Copying Precious Stones, of Preparing Colours for Doublets, of Colouring Foyles for Jewels, Together with Other Rare Secrets; III. Several Uncommon Experiments for Casting in Silver, Copper, Brass, Tin, Steel, and Other Metals; Likewise in Wax, Plaister of Paris, Wood, Horn, &c., with the Management of the Respective Moulds; IV. The Art Of Making Glass: Exhibiting Withal the Art of Painting an Making Impressions Upon Glass, and of Laying Thereon Gold or Silver; Together with the Method of Preparing the Colours for Potters-Work or Delft-Ware.; V. A Collection of Very Valuable Secrets for the Use of Cutlers, Pewterers, Brasiers, Joiners, Turners, Japanners, Book-Binders, Distillers, Lapidaries, Limners, &c.; VI. A Dissertation on the Nature and Growth Of Saltpeter; also, Several Other Choice and Uncommon Experiments* (London, 1738).

Note 6: William Eamon, *Science and the Secrets of Nature* (Princeton, NJ, 1994); William Eamon, "From the Secrets of Nature to Public Knowledge," in *Reappraisals of the Scientific Revolution*, eds. David C. Lindberg and Robert S. Westman (Cambridge, 1990), 33–65; Pamela O. Long, "The Openness of Knowledge: An Ideal and Its Context in Sixteenth-Century Writings on Mining and Metallurgy," *Technology and Culture* 32 (1991): 318–555. This very convoluted history was analyzed by John Ferguson in the late nineteenth century, they are collected as *Bibliographical Notes on Histories of Inventions and Books of Secrets* (1959; reprint, London, 1981).

Note 7: André-François Deslandes, "Advertissement, ou Discours sur la Meilleure Manière de Faire des Experiences," *Recueil de differens traitez [sic] de physique et d'histoires naturelles propres à perfectionner ces deux sciences* (Brussels, 1736).

Note 8: "The Doctrine of Water Colours for Illuminating Prints etc. in the Best Manner," *Art of Drawing and Painting in Water-Colours: Wherein the Principles of the Drawing are Laid Down, after a Natural and Easy Manner; . . . To Which are Annexed, Familiar Directions, Whereby a Stranger in the Art of Drawing may be Readily Taught. . . With Intructions for Preparing, Mixing, and Managing All Sorts of Water-Colours Used in Painting; . . .* pt. 2 (Dublin, 1768).

Note 9: Richard Bradley, *A General Treatise of Husbandry and Gardening; Containing a New System of Vegetation: Illustrated with Many Observations and Experiments. . . .* (London, 1726): 1:213–14.

Note 10: O*** [M. Oppenheim], *L'Art de fabriquer la poterie, façon anglaise. Contenant les procédés et nouvelles découvertes, la fabrication du minium, celle d'une nouvelle substance pour la couverte, celle des couleurs vitrifiables, l'art d'imprimer sur faïence et porcelaine, et un vocabulaire de termes techniques et chimiques: avec gravures . . .*, ed. Edmé Bouillon-Lagrange (Paris, 1807); Antoine Alexandre Barbier, *Dictionnaire des ouvrages anonymes*. (Paris, 1872–79), s.v. "O***."

Note 11: M. L. Solon, *Ceramic Literature: An Analytical Index to the Works Published in All Languages on the History and the Technology of the Ceramic Art* (London, 1910).

Note 12: [Jean Hellot], *Recueil de tous les procédés de la porcelaine de la Manufacture royale de Vincennes, décrits pour le roi: Sa majesté, s'en etant réservé le secret, par arrest du 19 Aoust 1753, [1753–54], BMNS, Y.51bis.; Antoine d'Albis, *Traité de la porcelaine de Sèvres* (Dijon, 2003).*

Note 13: John Harris, "Preface" *Lexicon Technicum: or, an Universal English Dictionary of Arts and Sciences . . .* (London, 1704).

Note 14: Alessio Piemontese et. al., *The Secretes of the Reverende Maister Alexis of Piemount Containyng Excellente Remedies Against Divers Diseases, Woundes And Other Accidents, with the Manner to Make Distillations, Parfumes, Confitures, Diyngs, Colours, Fusions and Meltynges; A Worke Well Approved, Verye Profytable and Necessary for Every Man* (London, 1558). See Ferguson, *Bibliographical Notes*, 33–39.

Note 15: Karl Wilhelm Pörner's *Chymische Versuche und Bemerkungen zum Nutzen der Färbekunst*, 3 vols. (Leipzig, 1772); *Instruction sur l'art de la teinture: Et particulièrement sur la teinture des laines . . .* trans. C**** [Crottin]; ed. Desmarests and Berthollet (Paris, 1791); "M. Berthollet, de l'Académie des Sciences, propose: 1° de faire traduire un ouvrage publiée en Allemagne sur la teinture; 2° de publier tous le deux ans, un recueil des découvertes faites dur la même matière, tant en France qu' . . . l'étranger," 6 March 1788, AN F/12/107, p. 56; "Examination de nouveau de le plan de imprimer le manuscrit du M. Poerner sur la teinture," 7 March 1790, AN F/12/108, p. 29.

Note 16: Jacques Lacombe, *Dictionnaire encyclopédique des amusemens des sciences mathématiques et physiques: des procédés curieux des arts, des tours récréatifs & subtils de la magie blanche, & des découvertes ingénieuses & variées de l'industrie: avec l'explication de quatre-vingt-six planches, & d'un nombre infini de figures qui y sont relatives . . .* (Paris, 1792).

Note 17: On the value of the 1712 and 1722 letters of d'Entrecolles regarding Chinese porcelain manufacture see W. David Kingery and Pamela B. Vandiver, *Ceramic Masterpieces: Art, Structure, and Technology* (New York, 1986), 17. Pierre d'Incarville "Mémoire sur le Vernis de la Chine," *Mémoires de mathématique et de physique, présentés à l'Académie royale des Sciences, par divers sçavans, & lus dans ses assemblées [Savants étrangers]* 3 (1760): 117–420 and "A Letter from Father d'Incarville, of the Society of Jesus, at Peking in China, . . ." *Philosophical Transactions* 48 (1755): 253–60.

Note 18: Pierre Pomet, *Histoire generale des drogues* (Paris, 1694); Philippe Macquer, *Dictionnaire portatif des arts et métiers: contenant en abrégé l'histoire, la description and la police des arts et métiers, des fabriques et manufactures de France and des pays étrangers* (Paris, 1766) s.v. "Carmine"; Jacques-Christophe Valmont de Bomare, *Dictionnaire raisonné universel d'histoire naturelle* (Paris, 1775).

Note 19: Meeting Minutes for 16 April 1749, *Procès-verbaux de l'Académie Royale des Sciences* 68 (1749).

Note 20: Philippe Macquer, *Dictionnaire portatif des arts et métiers: contenant en abrégé l'histoire, la description and la police des arts et métiers, des fabriques et manufactures de France and des pays étrangers*, 2 vols. (Paris, 1766).

Note 21: Frank A. Kafker, *The Encyclopedists as a Group: A Collective Biography of the Authors of the "Encyclopédie,"* (Oxford, 1996); Frank A. Kafker, *The Encyclopedists as Individuals: A Biographical Dictionary of the Authors of the "Encyclopédie,"* (Oxford, 1988); Frank A. Kafker, *Notable Encyclopedias of the Late Eighteenth Century: Eleven Successors of the "Encyclopédie,"* (Oxford, 1994); Frank A. Kafker, *Notable Encyclopedias of the Seventeenth and Eighteenth Centuries: Nine Predecessors of the "Encyclopédie,"* (Oxford, 1981); Arthur Hughes, "Science in English Encyclopædias, 1704–1875," *Annals of Science* 7 (1951): 340–70; Jean-Claude Perrot, "Les Dictionnaires de Commerce au XVIIIe Siècle," *Revue d'histoire moderne et contemporaine*, 28 (1981): 36–67.

Note 22: Donald S. Schier, *Louis Bertrand Castel, anti-Newtonian Scientist* (Cedar Rapids, Iowa, 1941), 88.

Note 23: For example: Jacques-Christophe Valmont de Bomare, "Mémoire sur Pyrites et Vitriols," *Savants étrangers* 5 (1768): 617–30.

Note 24: The list includes articles as diverse as Thomas Cooper, "Observations on the Art of Painting; Among the Ancients"; and Thomas Henry "Considerations Relative to the Nature of Wool, Silk and Cotton, as Objects of The Art of Dying; . . .," both appeared in volume three of the *Memoirs of the Literary and Philosophical Society of Manchester* (1790). The range of ideas about color offered in one popular periodical might be: "Manufacture des Couleurs Fines Établi au Hôtel de Guise au Temple" *Mercur de France* No. 1081 (September 1754): 174–77; "Effet de la Lumière dans les Ombres, Relativement à la Peinture" *Mercur de France*, no. 1142 (August 1758): 131–55; Juvenal, "Dissertation Historique sur les Manufactures," *Mercur de France*, no. 847 (March 1738): 466–82.

Note 25: See, for example: *Ackermann's Repository*, *Annals of Philosophy*, *Bremisches Magazin*, *Critical Review*, *Gazette des arts et métiers*, *Gentleman's Magazine*, *Göttingisches Magazin der Wissenschaften und Litteratur*, *Magazin für das Neuste aus der*

Physik und Naturgeschichte, Mercure de France, Monthly Review, Observations périodique, Schwäbisches Magazin von gelehrten Sachsen.

Note 26: See, for example: Francesco Algarotti, *Sir Isaac Newton's Theory of Light and Colours and his Principle of Attraction*. . . (London, 1742); Other examples of scientific dialogues include Monsieur D.L.F. [Louis-Guillaume de la Follie], *Le philosophe sans prétention ou l'homme rare. Ouvrage physique, chymique politique et moral, dédié aux savans* . . . (Paris, 1775); Jane Marcet, *Conversations on Chemistry, in Which the Elements of that Science are Familiarly Explained and Illustrated by Experiments*, 2 vols, 2d ed. (London, 1807); George Palmer, *Theory of Colours and Vision* (London, 1777).

Note 27: Cromwell Mortimer, *An Account of Mr. James-Christopher Le Blon's Principles of Printing, in Imitation of Painting, and of Weaving Tapestry, in the Same Manner as Brocades* (London, 1731); *Manière de teindre un drap blanc en verd, nommé verd de Saxe* (Paris, 1750); Edward Hussey Delaval, *A Letter the Right Honourable The Earl of Morton, President of the Royal Society Containing Experiments and Observations on the Agreement between the Specific Gravities of the Several Metals, and Their Colours* . . . Read at the Royal Society Jan 24 1765 (London, 1765); Jean-Antoine Chaptal, *Observations sur quelques avantages qu'on peut retirer des terres ocreuses* (Paris, 1787); *Rapport sur la restauration de le tableau du Raphael connu comme la Vierge du Foligno, adopté par la classe du science mathematics et physics literature et beaux arts 1&3 nivose an 10 par Guyton, Vincent, Taunay & Berthollet* (Paris, [1801]); See also *Rapport de la commission nommée dans l'Assemblée du 11 nivose de l'an 6* (Paris, 1798).

Note 28: George Adams, *Lectures on Natural and Experimental Philosophy, Considered in its Present State of Improvement Describing, in a Familiar and Easy Manner, The Principal Phenomena of Nature, and Showing That They All Co-operate in Displaying Goodness, Wisdom, and Power of God*. 4 vols. (London, 1794); Pierre Philippe Alyon, *Cours élémentaire de chimie théorique et pratique* . . . (Paris, 1787); I. Atkinson, *A Compendium of a Course of Lectures on Natural and Experimental Philosophy*. . . . (Kendal, England, 1784); "Plan d'un course de la chimie, experimental, rationnée et appliquée aux arts par M. Dhervillez, docteur en medicin, et Lapostolle, maître apotecaire," 12 February 1777, ADSM 5/E/108. John Banks, *An Epitome of a Course of Lectures on Natural and Experimental Philosophy* (Kendal, England, 1794); Jean-Antoine Chaptal, *Cours de tableau analytique du cours de chymie* (Montpellier, 1783); William Farish, *A Plan of a Course of Lectures on Arts and Manufactures More Particularly Such as Relate to Chemistry* . . . (Cambridge, 1796); James Ferguson, *Lectures on Select Subjects in Mechanics, Hydrostatics, Pneumatics and Optics* . . . (London, 1760); Thomas Garnett, *Outlines of a Course of Lectures on Chemistry* (Liverpool, 1797); John Hadley, *Plan of a Course of Chemical Lectures* (Cambridge, 1758); "Un cours de chemie et de l'histoire naturelle à Rouen, proposée par Hardy et Descroizilles," October 1778, ADSM 5/E/108; citoyen Homassel, *Cours théorique et pratique sur l'art e la teinture en laine, soie, fil coton, fabrique d'indienne en grand et petit teint*; . . . 2d ed. (Paris, 1807); *Leçons de chymie de l'université de Montpellier où l'on explique les préparations avec la meilleure physique, et l'usage de chaque remède fondé sur la meilleure pratique médecine* (Paris, 1750); Pierre-Joseph Macquer and Antoine Baumé, *Plan d'un cours de chymie expérimentale et raisonnée avec un discours historique sur la chymie* (Paris, 1757); Benjamin Martin, *A Course of Lectures in Natural and Experimental Philosophy*, . . . (Reading, 1743); "Plan d'une cours de chemie proposée par Mesaire Apothecaire Majeur de la Santé et de l'hôtel de dieu du Rouen, demonstreur en chemie, membre de l'Académie royale des Sciences, Belles Letters et Arts de cette Ville," March 1781, AN F/12/ 2259; Pierre-François Nicolas, *Precis des leçons publiques de chimie et d'histoires naturelle* (Nancy, 1787); "J B Pont, de Saintes (Carcassonne), sur 1) l'emploi de cochinelle et 2) l'établissement d'un cours libre public sur la chemie de teinture dans les villes principaux du royaume," 7–29 September 1782, AN F/12/2259. George Smith Gibbes, *Syllabus of a Course of Chemical Lectures* (Bath, 1799); Peter Shaw, *Chemical Lectures Publickly Read at London, in the Years 1731, and 1732, and Since at Scarborough, in 1733: For the Improvement of Arts, Trades, and Natural Philosophy* (London, [1734]); Adam Walker, *Analysis of a Course of Lectures on Natural and Experimental Philosophy*. . . . (Kendal, England, 1766); Martin Wall, M.D., *A Syllabus of a Course of Lectures in Chemistry, Read at the Museum, Oxford, February 1782* (Oxford, 1782); Richard Watson, *Chemical Essays*, 5 vols. (London, 1785–87).