Transmission of Alchemical and Artistic Knowledge in German Mediaeval and Premodern Recipe Books

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Abstract In the Middle Ages and premodern period, artisanal knowledge was transmitted via collections of recipes often grouped concomitantly with alchemical texts and instructions. Except for some very well-known artistic treatises, e.g. works by Eraclius or the *Schedula diversarum artium*, attributed to Theophilus, detection and delimitation of alchemical content within recipe books has been rare and fraught with difficulty. Alchemy can be defined as the 'art of transmutation', referring to the perfection of base or impure matter (often metal or stone) into perfect substances. Alchemical procedures thus rely on artisanal/craft practices. Any overlap between alchemy and art-technological procedures can be explained by the use of identical materials and substances. Both are concerned with the description of colours—especially in processes of change, the making of pigments, the production of artificial gemstones, the imitation of gold and silver and the transmutation of materials. Both require procedures involving precise and specifically defined actions, prescriptions and ingredients. So both ultimately use identical rhetorical formulations that reflect a 'step by step' procedure. Assuming that alchemical and artistic texts have the same textual format, raises the question: did they also have the same types of production and dissemination? Using a corpus of about 40 manuscripts produced in Northern Europe between the fourteenth and the sixteenth centuries, this paper investigates the context behind these writings, and the various ways alchemical and artisanal recipes were embedded within recipe books. It also proposes some clues to assist in locating, identifying and demarcating alchemical writings within the literature of recipes.

In the Middle Ages and premodern period, alchemical knowledge and practice was frequently transmitted via collections of recipes grouped concomitantly with artistic instructions. Presented in the form of a succession of more or less short notes, these

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writings describe processes for the manufacture, preparation and application of various types of materials and substances. The majority are anonymous compilations of texts, which may originate from older or undetermined authorities. Hundreds of such collections of recipes dealing both with alchemical and art-technological procedures were produced and disseminated in Northern Europe from the fourteenth century on, especially in German-speaking countries.

Drawing on a delimited corpus of about 40 representative German manuscripts dated from the fourteenth to the sixteenth century, this paper investigates the connections and similarities between these two fields and examines the various ways alchemical and artistic instructions were embedded within recipe books.[1] It argues that textual form and lexical proximities within recipes from these different disciplines may lead to association, contamination and confusion within this textual genre. It finally suggests some clues to help locate, distinguish and demarcate alchemical content within the literature of recipes.

Art and Alchemy Within Recipe Books

At first sight, any overlap between alchemy and art-technology within recipe books can be broadly explained by the mutual use of various materials and substances such as "common stones, gems, and types of marble, gold and other metals, sulfurs, salts, and inks, azures, minium, and other colors, oils and burning pitches, and countless other things."[2] More precisely, the field of art-technology encompasses a large range of craft practices involved in the production of pieces of art (including those which incorporate such substances). This 'hand' knowledge, is related to the mechanical arts and is divorced from the philosophical or speculative dimension. Yet, alchemy could be described as the practical, philosophical and medical search for the perfecting of base material substances and also for the extending of life.[3] The theoretical and practical aspects of alchemy involve both the study of all inanimate or animate things made from the elements and the observation and imitation of natural processes within the laboratory.[4] In this context, alchemy could be seen as a mechanical art, in the sense that it works on matter but is also a liberal art, as it attempts to explain matter in its composition and its transformation.[5] In the practical sense, one of the main goals of alchemy is the transmutation

[1] The main data and characteristics of these manuscripts are given in Appendix.

[2] Brewer, *Fr. Rogeri Bacon*, 39–40.

[3] Perception and definition of alchemy is not chronologically constant and has been the subject of several (re)interpretations since the eighteenth century, see Principe & Newman, "Historiography of Alchemy."

[4] Halleux, "Alchimie," 336–7; Newman, "Technology and Alchemical Debate," 432–3; Pereira, "Use of Vernacular Languages," 336; and Kahn, *Alchimie et paracelsisme*, 7–8.

[5] Halleux, *Savoir de la main*, 134.

of base or impure matter (often metal or stone) into a noble or perfect one.[6] To do so, alchemists used to perform chemical processes and manipulations which resembled those practiced by contemporary artists and artisans.

Thus, in both fields particular importance is placed on craft practices. Both alchemical and artistic recipe books describe various processes for purifying and transforming materials, either for improving their properties or in order to use them for specific purposes. In this context, from a technological point of view, the term 'transmutation' could refer to the colouring of glass, the melting and tinting of metals, the dyeing of stones or gems, or the manufacture of synthetic pigments. A huge number of recipes are dedicated to procedures for obtaining gold or silver or gold-silver like substances from base metals (copper, tin, lead, iron, mercury).

The tradition of recipe books has roots deep in Antiquity. Treatises dealing both with art-technological and alchemical procedures notably survived in the Alexandrian Greek papyri preserved in Leyden and Stockholm.[7] These date from the third century but were probably based on previous texts.[8] These papyri contain information on the imitation of precious materials such as gold, gems and Tyrian purple. They also have recipes dedicated to the art of dyeing, to chrysography, and to the making of artificial precious stones.

An echo of these recipes can be found in the Codex Lucensis 490 (Lucca, Biblioteca Capitolare Feliniàna), also known as the *Compositiones ad tingenda musiva* or *Compositiones variae*. This manuscript, dated from the end of the eighth or the very beginning of the ninth century, is based on previous Greek sources compiled around the beginning of the seventh century.[9] This recipe book deals with various artistic techniques, notably the dyeing of skins, the manufacture of pigments, colorants, varnishes and glues, chrysography and the gilding of metals.

The *Lucca Manuscript* shares content with the *Mappae clavicula*, compiled around 800. Parts of this text have far earlier origins and present parallels not only with the Leyden and Stockholm papyri but also with Syriac translation of Zosimus and with ps.–Democritus's writings.[10] The nucleus of this text was probably a Greek alchemical treatise written and translated between the fourth and the fifth centuries, with additions in the eleventh and twelfth centuries.[11] The two main manuscripts are the Corning, Corning Glass Museum, Ms. 5 and Sélestat, Bibliothèque Humaniste, Ms. 17, but this tradition was also (partly) disseminated through dozens of manuscripts. The *Mappae clavicula* contains about 300 recipes

[6] Singer, *Catalogue of Latin*, 38; Principe & DeWitt, *Transmutations*, 2–3; and Principe, *Secrets of Alchemy*, 13.

[7] On Leyden, see Rijksmuseum van Oudheden, Papyrus P. LEID.X.; On Uppsala, Victoria Museum, P. HOLM.

[8] Halleux, *Papyrus de Leyde*.

[9] Hedfors, *Compositiones ad tingenda musiva*; and Johnson, *Compositiones variae*.

[10] Berthelot & Ruelle, *Anciens alchimistes grecs*. See also Martelli, *Pseudo–Democrito*.

[11] Halleux & Meyvaert, "Mappae clavicula"; and Berthelot & Duval, *Chimie au Moyen-Âge*, vol. I.

and descriptions of miscellaneous chemical operations, including instructions for the manufacture of dyes and pigments, for the gilding and painting on glass, as well as, among others, metalwork, chrysography, distilling alcohol, making candy, and creating military devices.[12]

Mediaeval and Premodern Recipe Books

In mediaeval and premodern times, artistic and alchemical procedures were often described within compilations of texts that may concurrently address various fields such as medicine, cooking, botany or pharmacology. They also include magical recipes, dietetical instructions or advice on home-economics. All these various disciplines are embedded within the genre of the *Fachliteratur*.[13] This kind of literature regroups all texts of a utilitarian and informative nature whose content does not principally concern aesthetic or religious issues, or matters relating to emotional purpose.[14] A great number of these writings share the same format and are quite similar in terms of their external and internal characteristics. Within these compilations, the recipe frequently appears as the "shortest element in which the text could ultimately be divided."[15] This observation, although initially relating to the field of alchemy, can also be applied to recipe books in general during the Middle Ages and the premodern period. Robert Halleux underlined the similarity in format between the mediaeval treatises of alchemy and the so-called technical recipe books. He states that, whatever subject the recipe books are dedicated to, they all present a similar structure, from the earliest Mesopotamian examples to the pharmacopoeia texts of the sixteenth century. We could refine this definition by adding that the recipe is the smallest 'independent' element into which these texts could be divided. In fact, a recipe could be seen as an independent text in itself and could thus be dissociated from its original recipe book and be introduced into the pages of another manuscript. For this reason, it may be argued that the recipe, as a type text, could be considered as a structural unit common to several disciplines embedded within the manuscripts belonging to the *Fachliteratur* and serve to define a genre in itself. As Bruno Laurioux noted "[the recipe] gives the tone and standardizes, by its repetitive structure, the corpus of this literary genre."[16]

[12] Smith & Hawthorne, "Mappae Clavicula."

[13] The *Fachliteratur* has been the subject of various studies. Concerning the German production, see notably Eis, *Mittelalterliche Fachliteratur*, and more recently Haage & Wegner, *Fachliteratur der Artes*.

[14] Jansen–Sieben, *Repertorium*, XII.

[15] Halleux, *Textes alchimiques*, 74.

[16] "C'est elle qui donne le ton et uniformise, par sa structure répétitive, l'ensemble de ce genre littéraire." (Laurioux, *Livres de cuisine médiévaux*, 13).

Craft practices, alchemical treatises and artists' recipe books thus share parts of the same specific syntax, the frequent use of the imperative form but also some particular verbs (such as 'grind', 'mix', 'purify') and vocabulary. For example, the first alchemists used the word *tinctura* to refer to the tinting or the dyeing of metals, stones or clothes.[17] These methods notably explained how to dye metals yellow or white—so (apparently) how to transmute them into gold or silver. They also described various ways to counterfeit precious stones.[18] In this context, the term *tinctura* does not relate to the artisanal practice of dyeing, but instead describes the procedure for executing the transition from one colour to another, through the steps of the alchemical process. Another example is provided by the terms 'mercury' and 'sulfur'. According to the context, these may alternatively designate the common substances used for making vermilion or the two principles of which all metals were thought to be composed in different proportions.[19]

Thus, both artistic practices and alchemy required procedures involving precise and specifically defined actions, prescriptions and ingredients. So both used an identical rhetorical recipe formulation that reflects a 'step by step' procedure.

Assuming that alchemical and artistic texts have the same format and were assembled within the same sort of compilation raises the question: were they produced, diffused and read by the same people? Previous research has demonstrated that investigating questions related to the authorship and the context of production behind these texts, as well as their compilation and dissemination, elucidates information about the former nature and the previous and current function of these writings.[20] Answering these questions would: first, help to better estimate the relevance of these books when using them as a historical source for reconstructing part of mediaeval and premodern alchemical and artistic knowledge. And second, examining the various connections and similarities between these two fields, as described within recipe books, would serve to (re)situate them in their historical and cultural contexts.

The Sources and the Context of Production

First of all, the wide diversity of subjects and fields embedded within the corpus begs the question: were they written by several authors? *A priori*, palaeographical examination tends to confirm this: as with a large number of recipe books produced during mediaeval and premodern times, the manuscripts examined were written by several

[17] Principe, *Secrets of Alchemy*, 17; and Clarke, *Art of All Colours*, 37.

[18] See in this volume Matteo Martelli.

[19] Bucklow, "Paradigms and Pigment Recipes"; and Principe, *Secrets of Alchemy*, 35–6.

[20] Neven, *Recettes artistiques*.

hands, and these hands are predominately anonymous. These works thus appear to be the result of collaboration, or at least intervention, by several distinct persons. However, each person's contribution cannot necessarily be allocated according to the different subjects in the book. The same hand might be responsible for both a medical treatise and a collection of alchemical or art technological recipes.

The manuscripts under consideration were, in fact, the result of copying and compiling of various sources and contributors. More precisely, these recipe books were compiled from three different types of source:

1. content produced by copying and compiling of other written sources;
2. practical information obtained from personalities (practitioner or not) cited by the scribes;
3. content possibly derived from personal contributions made by the scribes.

In some instances, most of the content came from the copying and compilation of other written sources. This process can be followed by tracing the repeated appearances of certain popular texts found in the manuscripts of that period. Taking a wider view, these books have a great number of texts in common—dedicated to medicine, pharmacology, herbal, cosmetic, etc.—which were widely copied and disseminated in mediaeval and premodern times. These texts are quite often associated with the name of older or quoted authorities. Within our corpus several alchemical treatises and recipes are attributed to (pseudo) Albertus Magnus (c.1190–1280), Arnaldus de Villa Nova (c.1240–1311) or Roger Bacon (1214–1294). Previous studies have established that, quite often, such writings correspond to apocryphal or pseudepigraphical works.[21] As most recipe books are compilations, it is possible that some anonymous texts were (sometimes involuntarily) assembled together under the name of an authority cited in another part of the manuscript and subsequently disseminated under that name. Generally, these citations acted as a testimony of authority; they legitimised the alchemical knowledge recorded in these books. No doubt, the typical attraction and reverence for ancient authorities on the one hand, and the opportunity to record a (presumably) non anonymous text on the other hand, favoured the dissemination of these writings.[22] The association with the name of an authority gave rise to a tradition of works which, due to the processes of copying and compilation, circulated under various titles and were sometimes attributed to diverse authorities.[23]

At this stage, it should be noted that there are also a significant number of texts dedicated to religious content bound together with the recipe books under scrutiny. These are theological works, liturgies, extracts from the bible and hagiographies. In fact, a great number of recipe books appear to have been written or compiled within

[21] Minnis, *Theory of Authorship*. Concerning the alchemical works attributed to Albertus Magnus see notably Kibre, "Alchemical Writings." See also Newman, "Alchemy of Roger Bacon." For Arnaldus de Villa Nova, see notably Calvet, "Tradition alchimique latine."

[22] Minnis, *Theory of Authorship*, 9.

[23] Calvet, "Tradition alchimique latine," 42.

religious institutions, as attested by the citations of ownership. Signatures or monograms within these compilations indicate that these books were copied by scribes and members of this community. Obviously, the religious institutions—and their libraries—were privileged places, offering scribes the opportunity to copy and compile this kind of collection. The Munich Bayerische Staatsbibliothek Cgm 821, Cgm 822 and Clm 20174, formerly preserved in the Tegernsee monastery library, are good examples: they present not only similarities in terms of the different writings they contain but also, thanks to palaeographical analysis undertaken in the present study, it has been confirmed that several parts of their respective texts were recorded by the same scribe. This would imply that these manuscripts were (at least partially) copied in the same scriptorium, from similar written sources and by the same 'hand'.

Religious institutions may also appear as a contextual factor explaining the rapprochement of the various disciplines embedded within the manuscripts. Indeed, in general, medical and pharmaceutical recipes had an important place within religious communities. In this regard, art–technological recipes also found their place and could be linked with the art of writing and illuminating involved in scriptorial activity. The tables of contents of recipe books can be quite edifying on this point. For example, the table of contents in Munich Bayerische Staatsbibliothek Clm 20174 informs us that the artistic instructions were intended for the use of the scribes and illuminators of the scriptorium (*Et alia multa utilia per scriptoribus et illuministarum*, Clm 20174, fol. 1). In this context, scribe and illuminator, when not represented by the same person, worked side by side to produce manuscripts.[24] This collaboration led to enhanced communication and the development of a mutual interest in artistic practices among the monastic community.[25]

Practical or concrete interest and use of alchemical recipes in religious institutions is less obvious. It has been stated that writers of religious literature sometimes drew parallels with alchemical theories and processes.[26] Such writings, which obviously borrow alchemical vocabulary and imagery, are not included within our corpus. None of the alchemical texts under scrutiny were found to contain obvious religious connotations. But religious scribes' personal interest in alchemical craft procedures and practical alchemy in general can be attested by the large number of manuscripts produced that comprise both alchemical treatises and recipes. The presence of such instructions is more probably related to a certain attraction of alchemy for some monks or friars. Previous studies indeed have established that, even if the practice of alchemy was forbidden by several monastic orders, many of their members were at the root of alchemical (compilations of) texts and *Practica*.[27] Inventories of their library also inform us that they possessed alchemical treatises

[24] Cézard, "Alchimie et les recettes techniques," 6.

[25] Eamon, *Secrets of Nature*, 36.

[26] Principe & Newman, "Historiography of Alchemy," 398–400.

[27] Theisen, "Attraction of Alchemy." See also Barthélemy, *Alchimie de Guillaume Sedacer*, 26–8.

and recipe books.[28] Within our corpus, a relevant example is that of Wolfgang Seidel (1491–1562), prior but also copyist at Tegernsee monastery, who notably wrote two *Kunstbücher* (Munich Bayerische Staatsbibliothek, Cgm 4117 and Cgm 4118) between 1540 and 1550.[29] Cgm 4117 and 4118 reflect Seidel's interests in mathematics, astronomy, natural sciences and alchemy—disciplines in which he acquired theoretical but also practical knowledge. To do so, Seidel is known to have notably collected data from the libraries of Tegernsee but also from the neighbouring cloisters. During his stay at St. Ulrich's and St. Afra's Abbey (Augsburg), he made use of the abbey's vast collection of books, as attested in his commentaries recorded in Cgm 4118: "So many presents I have let copy from the library of the Cloister St Ulrich in Augsbourg, by a young boy whose name is Walthasar Gech von Fiessen in the year 1550."[30]

Seidel also seems to have relied on exchanges that are known to have taken place with contemporaries. In fact, in his *Kunstbücher*, he cites the authorities from whom he obtained practical information. These were either practitioners—artists—or contemporary scholars. For example, Seidel specifies several times that he is indebted to Bishop Philipp von Freising (1480–1541) for some recipes that he subsequently included in Cgm 4117. These prescriptions are notably dedicated to the melting of gold, silver and lead (Cgm 4117, fol. 2v, 37r–38v). Seidel also mentions Bartholome Schobinger (1500–1585), a jurist from St. Gallen.[31] The instructions recorded after Schobinger's name delineated a number of alchemical methods that notably serve to modify the properties of gold, to obtain a golden colour, and to work with gold, silver, iron and copper. Others concern the gilding on glass, the melting of ivory, metals and glass, the preparation of *aqua fortis* and the manufacture of a blue pigment called *azure* (Cgm 4117, fol. 62r–130r?).

These persons were learned persons or scholars, who were interested in natural philosophy and alchemy and who perhaps conducted their own experiments, as suggested by formulae which follow some of the recipes, such as *probatum vom Bischoff von Freising* (Cgm 4117, fol. 2v). Schobinger is notably at the root of a large compilation of alchemical texts.[32] He is also renewed for having personally known Paracelsus, who referred to Schobinger's writings.[33] The value of such an authority may appear visually in the recipe book. In the Cgm 4117, Seidel dedicates a whole page to recording Schobinger's name.[34] Moreover, the simple invocation

[28] See, for example, Barthélemy, "Alchimie et médecine," 110–3.

[29] Paulus, "Wolfgang Seidel"; and Pöhlein, *Wolfgang Seidel*.

[30] "So vill vom geschenckh hab ich auss der liberej des closters zw sant vlrich zw Augspurg lassen abschreiben durch ain knaben des namen ist Walthasar Gech von Fiessen im 1550 Jahr." (Munich, Bayerische Staatsbibliothek, Cgm 4118, fol. 128r).

[31] Schobinger, *Schowinger von St. Gallen*.

[32] *Allgemeine Deutsche Biographie*, 209; and Hertenstein, *Joachim von Watt*, 91–2.

[33] Meier, *Paracelsus*, 33–46.

[34] "Von bartholome Schobinger burger zu sanndt Gallen in Schweitz. Hab ich dise nachuolgende kunstel. etc./Empfangen den Sibenvnndzwaintzigisten tag. des Monats Februarii/Anno etc. 40." (Munich, Bayerische Staatsbibliothek, Cgm 4117, fol. 62r).

of the name of the Bishop of Freising would have served to confirm the efficacy of some of the technical instructions. Thus, the same way the scribes used to relate old treatises or data with the name of previous and quoted authorities, such as (pseudo) Albertus Magnus or Arnaldus de Villa Nova, they also mention those of their contemporaries to lend authority to validate the practicability or the reproducibility of the instructions they consign.[35]

In some cases, the information recorded in recipe books is documented as having been provided by an artist or practitioner. Augsbourg Staats- und Stadtbibliothek 2° Cod. 207 was produced in St. Ulrich and St. Afra's Cloister. It contains miscellaneous alchemical treatises and collections of recipes contributed by several scribes, including the monk Bild Vitus (1481–1529) and Johannes Gossolt (1421–1506), identified as *vicarius augustensis*.[36] In this work, Gossolt combined alchemical treatises attributed to (pseudo) Albertus Magnus with Latin and German alchemical recipes. For the latter he sometimes specifies his local sources. For example, at folio 171v, he mentions the "Magistri Jodoci Aurifabri de Haidelberga." Other citations of goldsmiths' names are found in our corpus of texts. In the St. Gallen Cod. Vadiana 395, several alchemical instructions are associated with the name of "Nicolaus Aurifaber." In many respects, metalworkers seem to have shared interest and knowledge in alchemical practices and materials.[37]

The scribes did not indicate how these data were actually provided and disseminated. At this stage, it is difficult to determine if these recipes were transmitted orally or only in written form. Oral transmission is usually favoured in specific contexts and environments in which people 'physically' converse.[38] In this regard, the workshop or laboratory probably offered the required closeness and the opportunity for oral exchanges and teaching. In the framework of this study, in only a few cases has it been possible to establish that a scribe *personally* met the authority he cited, meaning he might have obtained orally the practical information he recorded within his recipe book. This is notably the case for Seidel and two of the persons he cites, von Freising and Schobinger.[39] Nevertheless, it is quite unlikely that oral data circulated under the rhetoric of the recipe. This standardized and conventional textual format goes hand in hand with the copying process, and, thus, with a written transmission of knowledge. In other cases, exchanges in the form of correspondence are documented. For example, Seidel is also known to have exchanged letters with the monk Vitus, previously quoted, and (partially) responsible for Augsbourg Staats- und Stadtbibliothek 2° Cod. 207.[40] Both shared the same interest in natural philosophy, astronomy and alchemy—the same fields addressed within their writings.

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[35] See notably Halleux, "Pratique de laboratoire."

[36] This hand is identified within the Augsbourg, Staats– und Stadtbibliothek, 2° Cod. 183, fol. 1r.

[37] Smith, *Body of the Artisan*, 140–51.

[38] Fox & Woolf, *Spoken Word*, 259–61.

[39] Pfaff, *Codex Vadiana*, 43.

[40] *Neue Deutsche Biographie*, vol. II, 235.

Finally, some recipes recorded within the corpus are a scribe's personal contribution. The acquisition of theoretical but also practical knowledge in natural science and alchemy may have lead Seidel to conduct his own experiments, which he then recorded in the form of recipes in his books. This possibility is confirmed in the first folio of Cgm 4118, where Seidel explains that he as well as both written (and older) sources and information collected from contemporaries, he had also drawn on his own practical experience.[41] The St. Gallen Ms. Vadiana 429 is an alchemical collection compiled between 1464/65 by Ulrich Ellenbog (1435–1499), a city physician in Ravensburg. A small part of its content also includes art technological recipes. Ellenbog's interest and practical knowledge in (al)chemy could notably be put in relation with his 1473 pamphlet *Von den giftigen besen Temppfen Reuchen der Metal* (On the poisonous and noxious vapours and fumes of metals). In this writing, the physician gives advices to goldsmiths and other metalworkers on how to protect themselves from the noxious effects of vapours of silver, mercury and lead.[42]

The Modalities of Composition

The diversity of sources and persons who contributed to these collections of recipes is evidenced by their varying modalities of composition. Codicological examination undertaken during this study has uncovered the (sometimes) very complex processes involved in the creation of recipe books.

A small number of these writings are produced in the form of carefully presented and independent collections: they are written in metallogallic ink and are quite often embellished with titles in red, and rubrics. These examples may be relatively homogeneous: usually, only one or two scribes (who are contemporaneous) can be identified and the presentation of their texts is almost identical. Moreover, no additional material modifies the original volume.

Others (though not the majority) are quite heterogeneous, both in their content (medical, theological, astronomical, technical, household) and in their physical appearance (diversity of format, dialect and handwriting). They are informally written, with no decoration, and are characterized by apparently random presentation and inconsistent structure.

The recipe titles, which do not always correspond to the procedure that follows them, do not imply a coherent organization. This second type of manuscript was compiled from several contributions and additions from various scribes and

[41] "De arte fusoria Rhapsodia partim ex uetusta quadam Biblioteca, partim uero bonorum amicorum colatione cum sumata, opera autem et labore fratris Wolffgangi Sedelij in vnum collecta in solacium et commodum fusorie artis studiosorum." (Munich, Bayerische Staatsbibliothek, Cgm 4118, fol. 1r).

[42] Teleky, *History of Factory*, 7; and Koelsch, *Geschichte des Arbeitsmedezin*, 101.

compilers, but also from the accumulation of physically distinct materials—quires and folios. Moreover, the diverse sections that make up these books often come from different geographical locations.

Frequently, additions and marginal notes attributed to the same scribe or to a later owner punctuate the distinct recipes within the manuscripts. In fact, these additions mostly appear under the form of titles or details given as a counterpart to the instructions. In the Ms. Vadiana 429 from St. Gallen, a great number of additional notes consist of technical commentaries and supplementary notes added to those of the compiler of the manuscript. In the Nuremberg Hs. 33733, a later owner added several titles and remarks within the margins. Some of these marginal additions also mention the name of the person from whom the scribe may have obtained the data he is adding. For example, in the Vienna Ms. 5224, fol. 74, the scribe indicated the name of a physician, "Doctor Jorg erffordie," before the title of a recipe dedicated to the production of sal ammoniac. On folio 105 of the same manuscript, the scribe associated an alchemical procedure with the name "Marggrauff von Rötell" by mentioning him in the upper margin. This observation provides a possible explanation for the considerable number of *unica* (isolated recipes) that appear only in one recipe book, and are thus likely to constitute data transmitted personally (and orally?) to the scribe.

The method of composition in this kind of recipe book indicates that they were compiled over a more or less long period, during or after peregrinations undertaken by their scribes. This is evidenced by notations mentioning different chronological periods and geographical provenances throughout the manuscripts. For example, Ms. 9715 from Nuremberg contains diverse collections of alchemical recipes. This manuscript was written by several scribes, who give names of persons or *magistri* underneath the practices they described. They also cite the different places where they collected their data and specify the dates of these events, which span several years. Notably there are several mentions of the "magistri Johannis Bog" and places such as "Erffordie" (Erfurt), and "Köln" (Cologne).[43]

Moreover, later additions or annotations found within the manuscripts tend to suggest that these books have been handled, manipulated and passed from one owner to another, sometimes over a long period. The *Prager Malerbuch* had several owners and circulated through several localities before entering the monastery of Zlatá Koruna. According to a note written by Federl Mir, the main scribe of the *Prager Malerbuch*, this manuscript was written c.1452, in Tittmoning in the district of Traunstein (Bavaria). This place probably corresponds to the original provenance of the recipe book. Moreover, the scribe tells us that he has gathered data from Michel Schril, a professor in Vienna, who passed away in 1472. We also know that from 1529 to at least 1599, this recipe book belonged to the Preisinger family. This family lived in Zettwing, in the present-day Czech Republic, between Munich and

[43] On Johannis Bog, see fol. 42v, 72v, 157v; on Erfurt, see fol. 49r; and on Cologne, see fol. 50v.

Vienna. Later, the manuscript is recorded within the inventory of the Zlatá Koruna convent, as indicated in folio 1r, where we find the date 1649.

Thus, the recording and disseminating of these instructions could go hand in hand with the circulation and penetration of alchemical and artistic knowledge outside the workshop or the laboratory.[44] It could be linked with a (partially oral?) transmission of knowledge that seems to have taken place between (learned) scribes, artists or artisans and scholars. Allusions to such exchanges are notably to be found in Seidel's *Kunstbücher*. For example, in Cgm 4117, fol. 1v, a recipe is stated as coming from a certain Thomas, caster in Munich, and transmitted via Freising to Seidel.[45] This instruction was placed in an available blank space, situated between the title of one of the book's sections and the table of contents (Fig. 1). It is credited to Seidel, but the handwriting is slightly different from the rest of the manuscript text. These observations suggest that this recipe, coming from a contemporary—perhaps oral—source is an isolated and later addition. Moreover, scribes sometimes even relate how contemporaneous authorities delivered their 'secret(s)' and even divulge the price they had to pay to obtain it. In other cases, recipes are recorded as being offered as a gift *pro memoria*.[46]

Contextualising the production and reception of these recipe books thus serves to highlight a large range of individual's personal's interest in alchemical and artisanal, as well as other types of knowledge. In this regard, a number of the recipe books produced in a religious institution are documented as having been later kept in a religious context. For example, Berlin Staatsbibliothek Theol. Lat. Quart. 152, written by "Frater Nicolaus lector" between 1408 and 1412, was owned by "Frater Polonus lector principalis" (Johannes Polonus), lector in the Thorn cloister during the fifteenth century. These manuscripts were usually moved to libraries at the beginning of the nineteenth century, during the period of secularisation that followed the French Revolution. In parallel, several examples of our corpus are documented as being part of private collections and were probably executed for or commissioned by a patron. This is notably the case for the *Kodex Berleburg* (Bad Berleburg, Schlossbibliothek Sayn–Wittgenstein, RT 2/6) which is recorded as being compiled for Bernhard of Breidenbach (c.1440–1497), who worked for the chapter of the cathedral of Mayence. Cod. Helm. 627 from Wolfenbüttel is a collection of alchemical treatises and instructions—including colour recipes—written around 1441–1444 by several hands. A note on the binding informs us that this volume probably belonged to the Bavarian physician Johannes Hartlieb (1410–1468), who wrote several compendia notably the *Puch aller verpoten kunst, ungelaubens und der zaubrey* (1456).[47]

[44] Halleux, "Alchimie," 342.

[45] "Vom Jungen thoman giesser zw munchen durch den bischoff von freising." (Munich, Bayerische Staatsbibliothek, Cgm 4117, fol. 1v).

[46] See Corbett, "Alchimiste Léonard de Mauperg."

[47] "Sum magistri Iohannis Hartliep, alias Walsporn, Vangionensis"; on Hartlieb, see Fürbeth, *Johannes Hartlieb*; for the edition of the text, see Eisermann & Graf, *Johannes Hartlieb*.

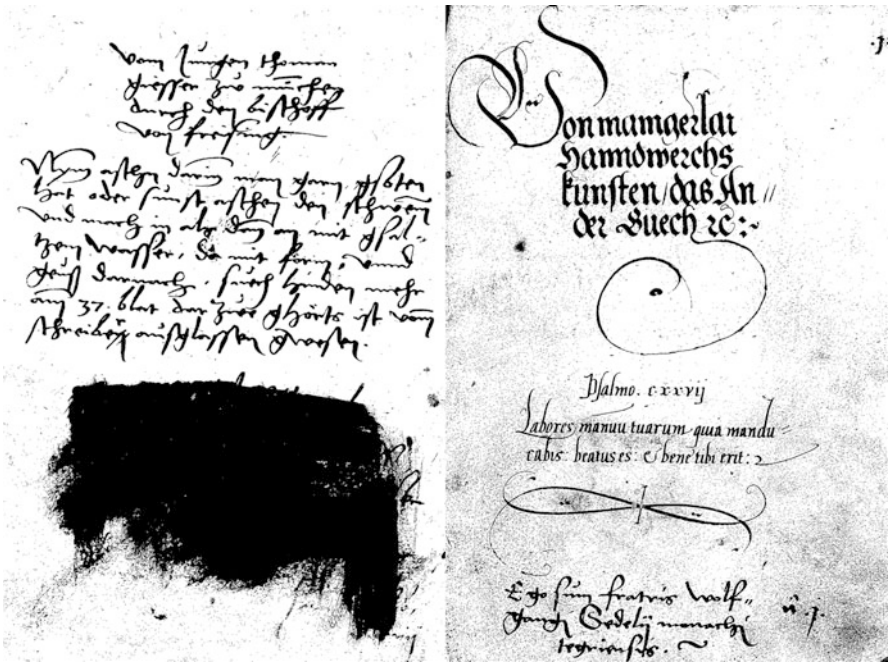

Fig. 1 Additional instruction due to Seidel, Munchen, Cgm 4117, fol. 1rv (Courtesy of Münchener Digitalierungszentrum)

The Function(s) of Recipe Books

The complex modalities of composition and diffusion of these texts raises some questions regarding their nature and their original function. At this stage, two different hypotheses have been put forward regarding the aim of this type of literature. On the one hand, these texts have been seen as manuals that may have been used by practitioners. On the other hand, the recipes often seem to have been transmitted for the purposes of literary preservation, not directly connected with contemporary workshop or laboratory practices.[48]

First of all, the textual environment and the diversity of the subjects bound together with the artistic and alchemical recipes in a same book, lead to the conclusion that these compilations were mainly read by scholars primarily interested in natural philosophy and were not intended for contemporary practical use. Moreover, it has been frequently stated that craft practices were transmitted orally,

[48] Clarke, "Codicological Indicators"; and Neven, *Recettes artistiques*, 16–23.

from the master to the apprentice.[49] A large number of the manuscripts of this study result from copying and compilation processes undertaken by scribes. As they were copied in a context outside the workshop or the laboratory, these recipes were not revised and, consequently, conveyed an anachronistic technical tradition that became more and more outdated.

Such observations seem to argue against the view that sees these books as manuals written for the practitioner. But neither were these compendium written purely for scholarly purposes, deprived of any practical function. In parallel to the data that could be considered part of the technical heritage of a earlier period, these recipe books also contain more recent practical instructions—coming from contemporary artists and practicing scholars or from the scribe's own experiments, as the examples of Seidel, Freising and Schobinger discussed above illustrate. Even when the writing of these instructions, verbalized in the rhetoric of the recipes, was carried out by scribes, data were not blindly copied. Scribes organised, assembled, completed or corrected when they felt it necessary. Thus, even if they were not the author *per se*, in the sense that they were not the origin or the source of the technical or chemical procedures they wrote down, they accomplished a set of activities linked to 'authorship'.[50] Scribes also made attempts to ensure that the recipes could be consulted at need: they composed tables of contents or indexes, they introduced titles within the margins and many other details which attest to a real desire to deliver usable information. In this context the marginal notes and additions made by the scribes/authors of the recipe book are of interest as most of them are technical comments testifying practical interest in both alchemical and artistic instructions. Several marginal annotations due to Seidel's hand punctuate the Cgm 4117 and consist in personal commentaries regarding the technical procedures he records. For example, on folio 53r, Seidel compares two ways for the melting of crystal. Concerning the first process he states in the margin that this 'art' was not of use to him as a better (method) is delivered on 219.[51] Then on folio 219, he indicates another method for the same technical procedure, giving as title "How one should masterfully melt crystal."[52]

In this sense, the scribes at the root of these recipe books created not simply a copy but a unique work, which reflected their own interests, their cultural and life context and sometimes their intention, which was to deliver practical and useful instruction.

[49] Halleux, *Entre technologie et alchimie*, 7.

[50] For this definition of authorship, see notably Love, *Attributing Authorship*, 32–40.

[51] "Dise kunst prauchet ich nit hinden amm 219 hastu vil pessere." (Munich, Bayerische Staatsbibliothek, Cgm 4117, fol. 53r)

[52] "Wie man christallen maisterlich giessen soll." (Munich, Bayerische Staatsbibliothek, Cgm 4117, fol. 219)

Reliability of Recipe Books

The modalities of composition and diffusion of these recipe books have an impact on their current (practical) use. During the compiling and disseminating processes, both alchemical and art-technological collections of recipes were subject to mutations, in the form of interpolation, reduction, contamination or assimilation with other texts. As the recipe books evolved and were modified by adding new texts and procedures, the recipes themselves could be modified in their technical formulations during their transmission from one manuscript to another. Assimilation with other texts occurs quite frequently, as the ingredients (and the actions) specified in these texts appear in the artistic recipe books but also in medical treatises, cookery books, and in alchemical or magical texts. Frequently, the copyist was free to add, to remove or to omit some words or even some parts of the text. These modifications or omissions sometimes concern primary data, such as the name of the ingredients or materials, or may be related to some of the steps of the procedure. At each stage of the copying process, variations or errors can occur. This phenomenon can be explained in several ways: it could be an attempt to improve or to diversify a previous formula; it could be a *quid pro quo*, in which an unknown or expensive ingredient is substituted with a more well known or less expensive one; it may have been a voluntary reduction of the recipe text.

If we suppose that the function of a recipe book was practical or instructive, this function could be the motivation behind changes to the recipes. An author or a scribe may, voluntarily, have corrected the text, or added information to it. However, changes to the recipe may also be due to a misunderstanding of the procedure. Such miscomprehension may be due to palaeographical problems that resulted in a word being misread or misunderstood and thus replaced by another. This was a likely occurrence if the copyist was not a practitioner or if he was not able to translate or to decipher an unreadable formula. For example, in Heidelberg Cod. Pal. Germ. 183, fol. 286, at the beginning of a recipe dedicated to the production of minium, the scribe mentions the use of "*Lautterm sapienticum*" instead of *Lutum sapientium.* In Munich Bayerische Staatsbibliothek Cgm 824, the scribe describes the preparation of a white (fol. 13r), a yellow (fol. 13r), a blue (fol. 14v) and a grey pigment (fol. 14v), and each time suggests taking "cretam *rosam.*"[53] The same instructions are recorded in the Cgm 822 (fol. 64v) where the scribe correctly indicates the use of *cretam rasam* (scraped chalk).

Such phenomena—reduction, amplification, variation—may result in a procedure whose description can seem vague or unclear and thus thwart the current use and relevance of recipe books in the study and the reconstruction of historical artistic practices.

[53] My italics.

Alchemical and Art-Technological Recipes Within a Manuscript: Location, Relationship and Distinction

Similarities of format and modalities of composition and diffusion may have had an impact on the recording and assembling of alchemical and art-technological recipes within the same manuscript. This could notably result in the mixing and grouping of different types of unrelated instructions.

More precisely, in the corpus under scrutiny, alchemical instructions appear either as independent pieces of work, or as isolated (groups of) recipe(s) embedded with artistic or other types of instructions. In the first case, alchemical content may appear concurrently with an artist's recipe book within the same manuscript but in a separate section. When this occurs, the texts mostly consist of quite theoretical alchemical treatises, often associated with the name of a former or contemporary authority. Most of them are attributed to the (pseudo) Albertus Magnus, Roger Bacon and Arnaldus de Villa Nova whose writings date from an earlier period. These works could also be 'physically' distinct works, delimited to a quire or a booklet—or even a folio—and assembled with the rest of the manuscript at a contemporary or later period. Vienna Ms. 5224 contains various alchemical collections of recipes and *practica,* all of which are delineated and separated by blank spaces or folios. These texts were written by several hands, on paper from different origins dated from the fifteenth and the sixteenth centuries. The main contribution comes from an anonymous scribe who is responsible for a number of independent collections of recipes but also for some additions throughout other parts of the volume.[54] Perhaps this contributor was at the root of both the (partial) writing and the collecting and assembling of these data into one single volume. This theory is supported by the fact that his hand dates from the sixteenth century, which coincides with the estimated date of the binding and the titles written on the cover. Once all the diverse parts were bound together, the manuscript was subject to later additions by the main scribe, who wrote these on previously blank space (fol. 143v–144r and fol. 158r, 163v), both at the beginning and the end of two distinct treatises.

Alchemical texts are also sometimes situated alongside an artists' recipe book, either before or after. If this is the case, they will be found next to technical instructions dedicated to procedures similar to those described in an alchemical context, such as the imitation of gold or silver, the gilding of stones or glass, the manufacture of vermilion, the purification of ultramarine, the melting of stones or metals, or several dyeing procedures. The alchemical content may be delimited within the title(s), chapter(s) or table of contents or 'physically' circumscribed by a folio or a quire. But, in most cases, there is no obvious delimitation between the two distinct collections of recipes. For example, in Nuremberg Germanisches

[54] Identified as 'hand' 4 in the catalogue notes, he is responsible for fol. 31v, 38r–120v, 123r–143r, 153r–157v, 160r–163r.

Nationalmuseum Ms. 5078b (fol. 2r–41r), the scribe moves from one subject to another with no indication that the subject has changed. Moreover, this set of alchemical and art-technological recipes is followed with no clear distinction (no title, nor blank space) by a series of medical prescriptions due to the same hand.

In another case—isolated (groups of) alchemical recipes found in the middle of prescriptions of another type—detection of alchemical content and distinction from artistic instructions within recipe books can be fraught with difficulty. Similarities in terms of their textual format probably lead scribes to group them with other sort of prescriptions. When found as isolated elements, alchemical and art technological recipes usually appear within a large broad of various (and unrelated) writings. For example, part of Nuremberg Hs. 3227 (fol. 74v–81v, 90v–164v) is a miscellanea of cooking, alchemical, household and artistic recipes, written by the same hand. Heidelberg Cod. Pal. Germ 678 notably includes a collection of medical recipes interrupted by one single alchemical recipe, dedicated to the manufacture of vermilion. In Berlin Theol. Lat. Quart. 152, some isolated alchemical recipes are placed in the middle of several cooking recipes and within religious texts.

Finally, some recipes were never granted their own place within a collection of recipes. An isolated recipe is sometimes jotted down on any available space on a page or squeezed into an even less appropriate place. For example, in Nuremberg Ms. 27773, recipes dedicated to the colouring of glass and the hardening of steel appear under the form of later additions in the upper and lower margin of a school book, and probably also on the binding board.

Thus reading these collections and attempting to categorise the recipes as alchemical or art-technological can be less than straightforward. After examining the corpus in question the following suggestions are proposed to help identify the different recipes.

As stated above, whether alchemical or art-technological, the recipes contained in these manuscripts are presented in the form of a *formula* which, in most cases, enumerates the ingredients and the actions necessary to produce a particular preparation. In addition artistic recipes sometimes indicate the recommended geographical provenance or grade of quality of the ingredients. Suggestions for possible substitutions might also appear. This sort of information is rare in alchemical recipes.

The length of a recipe depends not only on the number of ingredients involved but also on its complexity, the number of steps necessary to obtain the final product. A recipe can be anything from one sentence to several pages within a manuscript. Alternatively, a recipe may appear merely as a brief list of ingredients, without any other additional information. In fact, two categories of recipe can be distinguished: the *Vollrezepte* (detailed recipes) and the *Kurzrezepte* (abbreviated recipes).[55] In the first, the quantities and the various steps are indicated. In the second, only the

[55] Halleux, "Alchimie," 343.

ingredients are cited: the procedure is sketched out or omitted altogether and the rest is left to the ingenuity of the user. This second category is more common in the case of artistic recipes; a great many of the recipes dedicated to the manufacture of ink are written in the form of a very short list of ingredients. It is less common for the alchemical recipes to be presented this way.

The title of a recipe may also give an indication of the final product to be obtained and, in some cases, specify the use of the product. Again, this is particularly true for artistic instructions and is less observable for alchemical ones.

For both types of instructions (alchemical or artistic), some steps could be omitted or were left to the interpretation of the reader. Specified quantities may be missing in both fields. When quantities are given, artistic recipes are far more likely to use local measurements, whereas in alchemical instructions, the quantities—if mentioned at all—are more often expressed in terms of ratio or proportions. In some cases, these proportions are not 'practically' correct. A very well-known example is the proportion of mercury and sulphur proposed by mediaeval recipes for the production of vermilion which is invariably incorrect.[56] Very rarely are the correct chemical proportions cited.

In parallel, alchemical writings may involve the use of symbols or metaphors to designate substances and practices. In consequence, the way an alchemical recipe was received would depend on the degree of experience of the reader-practitioner reading it. On the one hand, the (sometimes) metaphorical or codified language as well as the approximations stressed the arcane nature of these recipes and contributed to their secrecy. On the other hand, the omitted information may have been complemented by data only known to some readers and not recorded by the copyist who conserves only the essential part of the recipe. If so then this kind of recipe was only meant to be accessible and useable by those practitioners who could easily fill in the lacuna that punctuated the text of the recipe.

As previously observed, citations of authority were frequently used by the scribes of the manuscripts. However, the tendency for an older authority to be cited in the recipe books is particularly characteristic of the alchemical writings and less typical of the art-technological recipes. As stated above, such citations primarily served to legitimate the technical and chemical procedures. In addition, most alchemical recipes describe processes and practical results to validate previously enounced theoretical principles. Thus, more than artistic recipes, alchemical instructions emphasize the efficacy of the procedure which is frequently confirmed through expressions such as *expertum es* or *probatum est* which are placed at the beginning or end of the instructions. The notion of *experimenta* (testing) implies the acquisition or confirmation of theoretical knowledge through direct observation and experimentation rather than through analysis based on rational arguments.[57] In such a case, when one of these reassuring expressions appears at the end (or the beginning) of a recipe, it does not signify that the recipe has actually been tested by the scribe.

[56] Bucklow, "Paradigms and Pigment Recipes," 144.

[57] Halleux, "Pratique de laboratoire."

Rather it implies that the recipe constitutes a plausible set of instructions, and has been successfully performed at least once and/or confirmed by a previous authority.

Particular interest in the empirical aspects of the technical procedures is also more perceptible within alchemical instructions, in comparison to artistic recipes. The former pay greater attention to the chemical aspects of the craft process they detail and describe more precisely each stage of the transformation of matter, from original to final (and more perfect) form. Whereas artists such as painters were interested in the physical appearance of their materials, alchemists were more interested in the fundamental changes that might occur within the matter. This could perhaps be related to Paul of Taranto's description in the *Theorica et practica* of primary and secondary qualities and the distinct ways artists and alchemists worked on substances. He considered artists capable of producing only 'extrinsic' or external changes as they operate on secondary or 'artificial' qualities such as colors. In contrast, alchemical attempts to manipulate primary qualities transmute substances intrinsically and operate fundamental change.[58]

Accordingly, alchemical recipes also dedicate a large part of their text to the description of chemical apparatus, tools and containers. These writings pay particular attention to the use of a variety of containers and receptacles and their specific purposes. Moreover, in several manuscripts, such as Seidel, Vienna Ms. 5224 or Cod. Helm. 627 from Wolfenbüttel (to cite but a few), the text is punctuated by illustrations of these (Fig. 2). This is rare, if not non-existent in artistic instructions.

These last distinguishing features of alchemical, as opposed to art-technological texts, go hand in hand with the fact that practical alchemy relies on theoretical (or speculative) principles. Quite often, these recipes should be seen and understood as *experientia* which are meant to serve as a rational demonstration of a preceding *theorica*.[59]

Conclusion

Examination of the processes of making, compiling and disseminating this corpus of mediaeval and premodern recipe books provides us with information concerning their nature and former function. One the one hand, it has been established that these manuscripts were mostly written in religious centres and that they are largely the result of the copying process undertaken by scribes. Moreover, within these books, alchemical and artistic recipes were frequently recorded alongside a wide range of various—and *a priori* unrelated—subjects which may have been written by the same person. Both the context of their production and the similarities in

[58] Newman, "Technology and Alchemical Debate," 434, 442–5. The author largely relies on Paul of Taranto, *Theorica et practica*, Paris, BN, Lat. 7159, fol. 1r–55r for which he delivers a partial edition and translation.

[59] Halleux, "Pratique de laboratoire," 118–22.

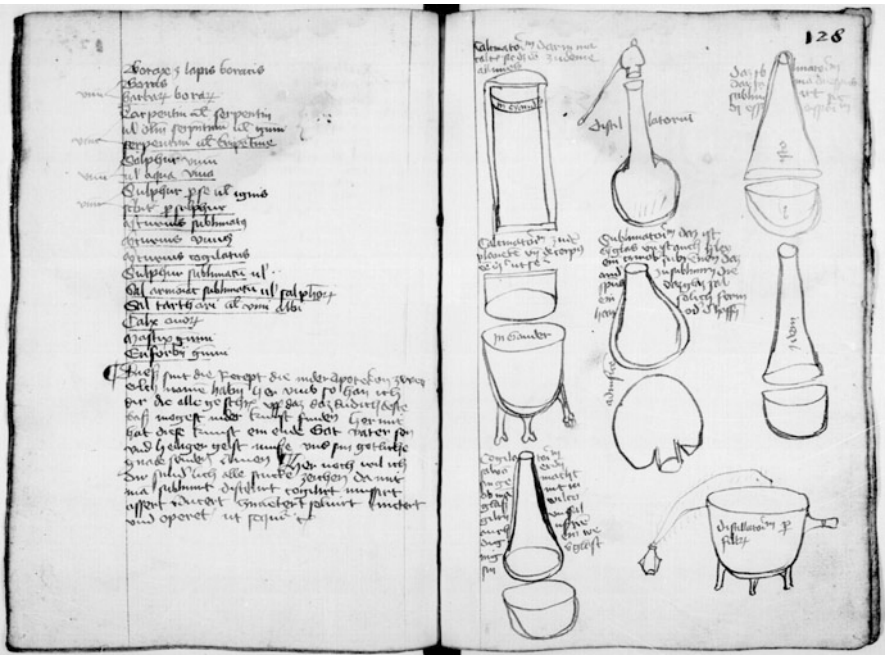

Fig. 2 Illustration of containers within an alchemical text, Wolfenbuttel, Cod. 627, fol. 127v–128r © Photographer (Courtesy of Wolfenbuttel Library)

terms of their textual format could serve to explain their propinquity. These first observations tend to suggest that these recipe books were produced for literary purposes and to preserve existing knowledge. And, indeed, these compilations were mainly read by a scholarly public primarily interested in natural philosophy, astrology, and alchemy and were probably not intended for practical use within the workshop or the laboratory.

Moreover, as these books are the result of compilation and additions of data, the finding and the delimitation of alchemical content can be complicated, especially when isolated (groups of) recipe(s) were recorded in the middle of unrelated (collection(s) of) text(s). By displaying the various ways alchemical and artistic recipes are embedded within the same manuscript, this study has highlighted the potential difficulties in localizing and distinguishing them.

On the other hand, it has been demonstrated that recipe books partly derived from the recording and transmission of (more or less) contemporaneous practices. Thus, recipe books also reflect alchemical and artistic knowledge and interests of both scribes and contemporary scholars, both of whom could be involved as readers or authorities. Recipe books also serve to define a more precise network in which these types of knowledge circulated, delivering information about the 'actors'—whether artisans, scholars, natural philosophers, (theoretical) alchemists or lay scribes—and their interconnections, as well as the media (copy, oral source, experiment) they used to exchange, share and communicate art and alchemy.

Appendix: List of Manuscripts

Augsbourg, Staatsbibliothek

– *2° Cod 207*, c.1514
Scribe: Johannes Gossolt and Bild Vitus (1481–1529), monk at St Ulrich in Augsburg
Language: Latin and German

– *2° Cod 572*, before 1446 (part 2)–1446 (part 1)
Language: partly written in Swabian (part 1) and Bavarian (part 2) dialects

– *4° Cod 131*, 15th–16th century (the recipes)
Language: German

– *4° Cod 149*, c.1501–1519
Scribe: Leonhard Wagner
owner:
Language: Schwabian
Origin: written in Augsbourg (St Ulrich and Afra), Irsee, St Gallen, Lorsch

Bad Berleburg, Schlossbibliothek Sayn-Wittgenstein

– *RT 2/6 Kodex Berleburg*, c.1475–1478
Language: Franconian and Latin
Origin: Rhine Main
Previous owner: Bernhard of Breidenbach, (who worked for the chapter of the Cathedral of Mayence)

Bamberg, Staatsbibliothek

– *L III 33*, 16th century
Language: Middle German

Berlin, Staatsbibliothek

– *Germ. Fol. 8*, c.1430–1440
Language: Swabian, Latin and Italian. The text is written in different hands including that of Johannes Seiler.
Origin: South of Germany, Switzerland or Bohemia

– *Germ. Quart. 15*, 1496 (fol. 156)
Language: Latin and German
Origin: South of Germany

– *Theol. Lat. 152*, 1408 and 1412
Origin: Torgau and Dresden (main text)
Scribe: 'Frater Nicolaus lector' (fol. 121r, 132r, 140v) in 1408 in Torgau and 1412 in Dresden.
After that, the ms. is documented as being in Thorn, the 5 of March 1427.
Previous owner: Johannes Polonus ('Frater Polonus lector principalis'), Lector in the Thorn cloister (15th century)

Budapest, Nationalbibliothek

– *Cod. Germ. 36*, 1487–1492
Language: Alemanic and Latin

Erfurt, Bibliothek der Stadt

– *Amplonius Quart. 189* ('Notae de coloribus Liber de coloribus et virtutibus lapidum, Pseudo-Albertus Magnus Lapidarium, De coloribus, naturalia exscripta et collecta'), 13th–14th century
Origin: Mainz (?) according to a mention associated with the date of 'December 1407'

Heidelberg, Universitätsbibliothek

– *Cod. Pal. Germ. 183*, 1560–1570/71
Scribe: Michel (?)
Language: High German including Bavarian features
Provenance: Amberg, preserved in the Amberger library of Ludwig VI, Count Palatine, according to inscription on the binding board: 'H[erzog] L [udwig VI.] P[falzgraf] 1570'

– *Cod. Pal. Germ. 678,* 15th century
Origin: South West Germany

– *Cod. Pal. Germ. 696,* ('Die kunst glaß zu schmeltzen und gießen von haugen von wildpürg simmerischer Amptmann'), 16th century

Karlsruhe, Badische Landesbibliothek

– *Cod. R 49*, 15th century, mention of 1465
Language: Swabian dialect

Munchen, Bayerische Staatsbibliothek

– *Cgm 821*, ('Liber illuministarius, pro fundamentis auri et coloribus ac consimilibus'), c.1500–1512 (for the second part)
Scribe: Konrad Sartori (scribe at Tegernsee Monastery)
Language: Latin and Bavarian
Origin: Tegernsee Monastery

– *Cgm* 822, 14th–with additions from 15th century
Language: Latin, Bohemian, Bavarian, middle German and Swabian dialects
Origin: mention of several Augsburger painters. Exlibris of the Tegernsee library 1485 (fol. 1v)

– *Clm 405*, c.1390 (addition in 15th century)
Language: Latin and Alemanic
Previous owner: Bishop Guido de Valencia (from Tripoli) according to fol. 1r. The manuscript was in Osthoven in 1461 (fol. 25 'Subscriptio filii Heinrici Aysinger in Osterhoven a. 1461')

– *Clm. 444*, ('Tractatus de coloribus faciendis. De cerusa componenda. . .Accipe laminas plumbeas vel stagneas'), 14th–15th century
Language: Latin

– *Clm. 7623*, 14th century (beginning)
Language: Latin and German

– *Clm. 20174*, 1464–1473
Language: Latin and German
Origin: Ex-libris of Tegernsee Monastery, 1482

Nuremberg, Germanische Nationalmuseum

– *3227a*, c.1389 (additions from 15th century)
Scribe/ author: partly written by 'Hanko pfaffen Doebringers' (according to a mention on fol. 43r)
Language: Latin, Bavarian and Middle German dialects
Provenance: Cologne/ mention of 'Nicolaus Pol doctor 1494'

– *5078b*, 15th century
Language: Middle Bavarian
Origin: Bavaria

– *9715*, 15th century
Origin: Bavaria

– *27773*, c.1260 (addition in mid-14th century)
Origin: Marbach—the manuscript was bound before 1354 in the canon order of St Augustin in Marbach

– *33733,* c.1455–1457
Language: Bavarian
Previous owner: fol. 1r '15R74 Siluester Schafman von Hamerberg I-B-G (?)'

– *141871*, 16th century (beginning)
Language: Middle German

– *147699*, c.1488–1490
Language: Swabian and Bavarian dialects

Prague, Narodni Knihovna

– *Cod. XI D 10*, c.1452–1477
Scribe: Federl Mir (1452)
Language: Bavarian and Latin
Origin: Tittmoning
Previous owner: Preisinger Family (1529–1599) from Zettwing, Sancta Corona monastery (1649)

St Gallen, Kantonsbibliothek

– *Vad. 395*, 15th and 16th century
Language: German and Latin

– *Vad. 407*, c.1522
The main scribe signed at fol. 155: 'Michel Cochemus 1522' and fol. 253v : 'Michael Cochemus 1522'.
Language: German

– *Vad. 429*, c.1465
Origin: South of Germany
Previous owner: Ulrich Ellenbog

Trier, Stadtbibliothek

– *1024/1936*, ('De coloribus et mixtionibus-Incipit libellus Mappe clauicula dictus'), 15th century, mention of 1437
Origin: Trier (?)

Vaticano, Biblioteca Apostolica Vaticana

– *Pal. Lat. 1330*, 1463–64
Scribe: Walpod, Heinrich (active for Nikolaus of Kues)
Language: Latin
Previous owner: Johannes of Bavaria, canon in Augsburg (1477)

Vienna, Österreichische Nationalbibliothek

– *5224*, 1481 with 16th century additions (fol. 31v, 38r-120v, 123r-143r, 153r-157v)
Language: Latin and German

– *5489*, 14th–15th century, mention of 1462 (fol. 180v), 1463 (fol. 146r) and 1464 (fol. 218v)
Language: Latin and Bavarian

– *5509*, 15th century, mention of 1459 and 1464
Language: Bavarian

Winterthur, Stadtbibliothek

– *Cod. 4° 47*, ('Hie vachet an ein bewerte edle kunst und nützliche wie man sol ferwen lini tuoch wullin tuoch faden garn mitt allen farwen die da gerecht sind und wie man sÿ zuo venedig ferbt'), 15th–16th century, mention of 1575 and 1579
Scribe: Haymhofer Thomas, from Basel
Language: German

Wolfenbuttel, Herzog- August Bibliothek

– *Helmst. 627*, 15th century, c.1444
Origin: mention of Heidelberg, 1444
Previous owner: belonged to the Bavarian physician Johannes Hartlieb (1410–1468) 'Sum magistri Iohannis Hartliep, alias Walsporn, Vangionensis'

Zürich, Stadtbibliothek

– *B 245*, 15th century
Language: Middle German

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