Abstract

Recipe collections are the major literary genre for the transmission of technical knowledge from Antiquity through the early modern period. Their flexibility allowed for the adaptation to a number of different uses in various contexts, from specialized workshop notebooks to encyclopedic compendia. This essay compares the author-practitioner of BnF Ms. Fr. 640 with a slightly older South German counterpart, Wolfgang Sedelius (1491/92–1562). As a monk and court preacher, Sedelius comes from a different social and intellectual milieu than the anonymous French author-practitioner. Although first and foremost a theologian, he was also broadly interested in mathematics, mechanics, artisanal techniques, chemistry, and medicine. His three surviving recipe collections, compiled over a period of about thirty years, document the personal approach of a scholar interested in a variety of technical and scientific fields. In his later manuscripts Sedelius interviewed and observed expert practitioners and personally experimented himself—approaches similar to that of the author-practitioner of Ms. Fr. 640, although their individual interests and expertises differ.

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Introduction

Recipe collections are the major literary genre for the transmission of technical knowledge from Antiquity up to the early modern period. Their openness and flexibility allowed for the adaptation to a number of different purposes, from specialized workshop notebooks to more comprehensive compendia of knowledge addressed to and used by diverse communities. Thus, the purpose and audience of each recipe collection needs to be determined individually.

The Making and Knowing Project has linked the author-practitioner of BnF Ms. Fr. 640 with the Royal Arsenal and with artisans and merchants working in late sixteenth-century Toulouse.[1] It is possible that he intended his manuscript to be published, however, the role of practical experience and reflection in it differs significantly from printed books of secrets and household books which aimed to comply with the interests of a broader audience on a growing market for all kinds of practical literature.[2] Erma Hermens has drawn attention to the courts as further places for the collection and use of art technological recipes in the Renaissance.[3] In addition, the monastic tradition of compiling technical recipes had not yet disappeared in the early modern period.

A comparison of the author-practitioner with a slightly older German counterpart coming from this monastic background gives insights into distinct ways of individual appropriation and use of technical knowledge and the role of recipe manuscripts as epistemic tools in different cultural, intellectual, and social contexts of the sixteenth century.

Wolfgang Sedelius: Life and work

Wolfgang Sedelius (Seidel), born in 1491/2 in Mauerkirchen (Upper Austria) attended the Latin school in Landshut and the University of Ingolstadt for one term.[4] In 1517 he took vows in the Benedictine abbey of Tegernsee. After a short stay in the sister abbey Andechs, he officiated as ducal preacher in Munich from 1532 through 1560. Retired to Tegernsee, he died on June 11, 1562.

In the fifteenth century, Tegernsee had become one of the promoters of the Benedictine reform of Melk which not only aimed at a renewal of monastic life but also of learning.[5] Monks studied at the universities of Vienna or Ingolstadt, both renowned in the field of astronomy and mathematics.[6] But the study of mathematics, astronomy and other *artes* played an important role also in Tegernsee itself.[7] At least six surviving fifteenth- and early sixteenth-century manuscripts document the interest of Tegernsee monks in technical recipes. The most comprehensive of these recipe collections, the *Liber illuministarum*, was compiled between ca. 1500 and 1512 by the scribe, illuminator, and librarian Konrad Sartori (c. 1480–1531).[8] It includes information on pigments, illumination and painting, dyeing, metal work, and medicine. Tegernsee thus offered Sedelius a stimulating environment as well as a rich library to pursue his personal interests in technical knowledge and mathematics. Sedelius exchanged information by letter with other humanist monks, Nikolaus Ellenbog in the monastery of Ottobeuren and Vitus Bild in St. Ulrich and Afra in Augsburg.[9] In his time as ducal preacher, his personal network expanded beyond the monastic sphere and he was in contact with intellectuals and artisans at the court and in the cities of Munich and Augsburg.

The large literary legacy of Sedelius consists—not surprising for a preacher and counter-reformer—mainly of sermons and theological literature.[10] His remaining works document clearly his personal interest in technical and scientific questions, with no less than seven of thirty-seven preserved manuscripts devoted completely or in part to mathematical, astronomical, technical, or medical topics. Art technological recipes are found in three of them: St. Gall, Kantonsbibliothek, Hs. VadSlg. 404; Munich, Bayerische Staatsbibliothek, Cgm 4117, and Cgm 4118.[11] Yet their thematic spectrum and internal structure differs considerably, and they were even classified by Sedelius as different genres.

Wolfgang Sedelius as Collector and Practitioner of Recipes

St. Gall, Kantonsbibliohek, Hs. VadSlg. 404,[12] compiled in 1530–31, is the only surviving volume of four *collectanea* of "flowers of diverse arts." It deals with the production and use of colors, mainly in illumination and dyeing; with mathematics, particularly the calculation of sundials; and with medicine, chemistry, and metallurgy.[13] Despite the seeming variety of topics it is a coherent *collectaneum* of *artes mechanicae* according to the medieval concept which still held sway in the sixteenth century. Sedelius' approach followed well-established methods of appropriation and transmission of knowledge: the medieval tradition of florilegia as reference books for preachers[14] and the early modern technique of excerpting authoritative texts in Classical studies and beyond.[15] Consequently, the title *collectaneum* was used by Sedelius for different collections of excerpts, each concerning a specific field of knowledge, e.g., mathematics (*collectaneum mathematicum*),[16] astronomy (*collectaneum astronomicum*),[17] Greek (*collectaneum graecanicum*),[18] or the Passion of Christ (*Collectaneum dominicae passionis ex dictis quattuor evangelistarum*).[19] In some cases the *collectanea* also included works by Sedelius himself, such as mathematical texts or Greek letters.[20]

In contrast, he classified his manuscript Munich, Bayerische Staatsbibliothek, cgm 4117 as a *buech* ("book").[21] The content of this *buech* is very similar to that of the *collectaneum* Vad. 404; the difference in genre consists in the approach to collecting and systematizing knowledge. Cgm 4117, written about 1540, is also the sole survivor of a larger project. It is the "second book on various artisanal arts" (*Von manigerlai hanndwerchskunsten das Ander Buech*, fol. 1r), which was to be followed by another book on the "alchemical artisanal arts" (fol. 308r).[22] In contrast to the *collectanea*, which reflect personal stages of knowledge acquisition and intellectual preoccupations, Sedelius conceived this "book" on craftsmanship as a systematic compendium clearly arranged according to techniques such as "painting and dyeing," and subdivided into thematically coherent chapters. Alongside the well-known topics of color production, illumination, dyeing, and etching, the portion of chemical recipes was large, and casting techniques are introduced as a new important subject. This well-organized handbook on technical knowledge was, however, not self-contained but a working tool which Sedelius used, corrected, and amended over the years.

Munich, Bayerische Staatsbibliothek, cgm 4118, written between ca. 1550 and 1558, partly by the scribe Balthasar Gech, partly by Sedelius himself, seems to be an extension of cgm 4117 to include new knowledge for which space was lacking in the older book. Concerning working process and concept, it is a hybrid between a "book" and a *collectaneum*; starting as a thematically coherent "rhapsody of the art of casting" (fol. 1r), but expanding in the course of time to glass technology and medicine, topics which were only roughly ordered.

Sedelius' technical writings stand at a turning point between medieval monastic concepts of knowledge and early modern approaches. The *artes* system is the underlying principle of the *collectanea*, and in part still of the "Book on various artisanal arts." The theological conviction that God obliged humans to live by the "labor of the hands"[23] justifies the preacher's estimation of craftsmanship, an estimation which is also rooted in the "Ora et labora" of the rule of St Benedict. However, while he published a number of his sermons and devotional texts in print, Sedelius explicitly excluded this "vulgarization" for his "*collectanea* on diverse arts" and reserved their use to his friends.[24] The personal pursuit of "secular science and religious eagerness"[25] was essential in Sedelius' view of a learned and pious life. The manuscripts are no general program of learning,[26] but tools in an

individual approach of knowledge appropriation which includes collecting written and oral information, its critical evaluation and sometimes even practical experimentation. This links him to the author-practitioner of Ms. Fr. 640. Some comparisons of thematic overlaps between the two may further highlight similarities and differences in their approaches to understanding, reflecting upon, and practicing technical knowledge.

Some Comparisons with Ms Fr. 640

Music Automata

Both authors were interested in musical automata: a "spinet playing by itself" is described in Ms. Fr. 640 (fol. 104v (https://edition640.makingandknowing.org/#/folios/104v/f/104v/tl)),[27] an organ in Vad. 404 (fols. 137v–144v).[28] The difference is significant: spinets were profane instruments, organs were used during holy office. Sedelius even attests that automatic organs were common in contemporary monasteries (Vad. 404, fol. 138r).

Although much more comprehensive than the description of the spinet in Ms. Fr. 640, Sedelius' small treatise on the automatic organ is no systematic instruction on how to build the instrument. Instead, he starts with an explanation of the principles of the mobile wheel and the distribution and size of the keys which will play an organ with four pipes (ut, re, mi, fa). Then he discusses the mathematical principles of how to calculate the size and distribution of the keys in relationship to the tone pitch. Several explanatory drawings accompany the text: geometrical sketches to demonstrate the relationship between size of keys and tone pitch, a table of tone pitches and cursory drawings of the mobile wheel and the organ (*Fig. 1*, *Fig. 2*).

Fig. 1. Wolfgang Sedelius, mobile wheel for an automatic organ, 1530/31. Ink drawing on paper, 15.5 x 10.5 cm (page). Kantonsbibliothek Vadiana, St. Gallen, Vadianische Sammlung der Ortsbürgergemeinde, Ms. 404, fol. 138v. The drawing shows the mechanical wheel and the position of the keys. Photo: Rudolf Gamper, Winterthur; by permission of the Kantonsbibliothek Vadiana St. Gallen. © Rudolf Gamper, Winterthur.

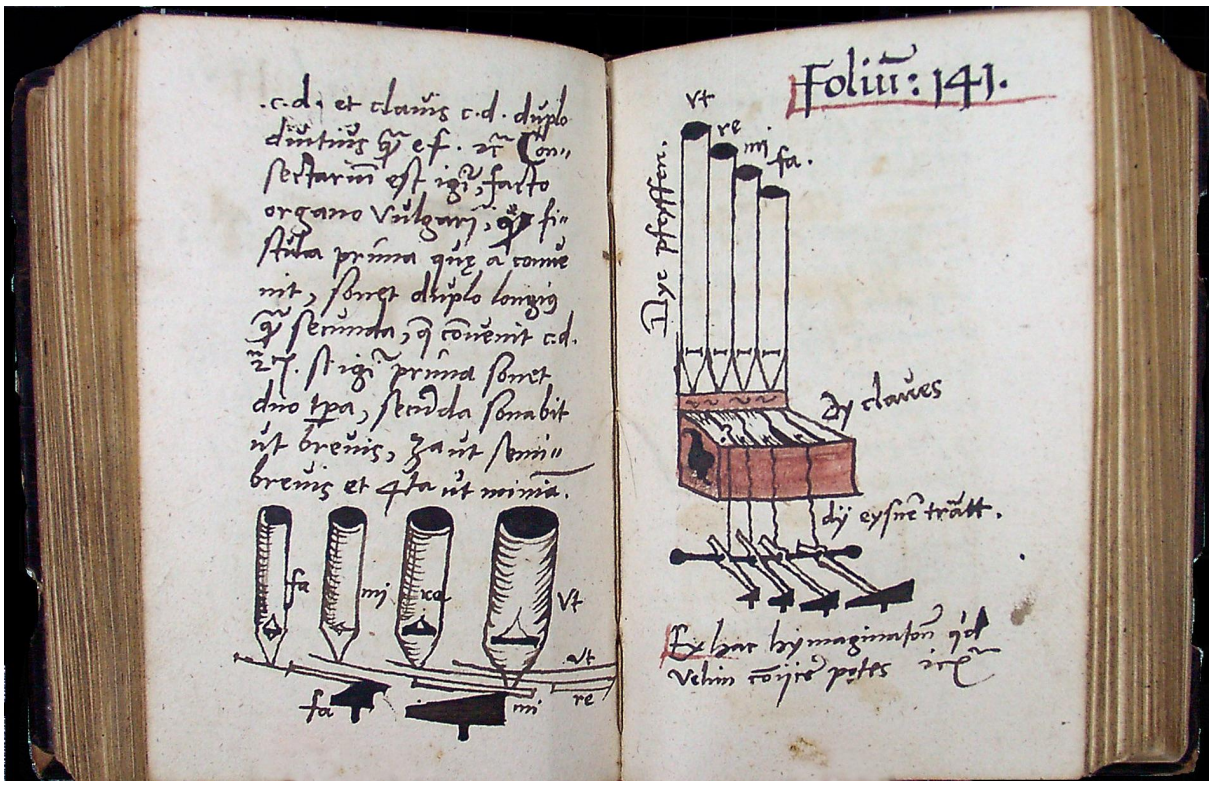

Fig. 2. Wolfgang Sedelius, organ pipes and keys of the automatic organ, 1530/31. Ink drawing on paper, 15.5 x 10.5 cm (page). Kantonsbibliothek Vadiana, St. Gallen, Vadianische Sammlung der Ortsbürgergemeinde, Ms. 404, fol. 140v–141r. The left page (fol. 140v) shows the pipes, keys, and tone pitches. The drawing on the right page (fol. 141r) shows parts of the construction of the automatic organ with pipes, their tone pitch, the case with the keys, and the iron wires (*eysern tratt*), which connect the keys and the hammers on the mobile wheel. Photo: Rudolf Gamper, Winterthur; by permission of the Kantonsbibliothek Vadiana St. Gallen. © Rudolf Gamper, Winterthur.

But there are only two isolated pieces of technical information concerning the construction itself: a drawing shows the form of the keys (fol. 144), and Sedelius writes that the keys and mobile wheel should be connected with iron wires (fol. 141). Different from the author-practitioner's observations on the spinet automaton, Sedelius' focus was not on the mechanical construction but on the proper calculation of the sizes and distances of the keys on the mobile wheel related to tone pitch and musical harmony. He was particularly interested in mathematics, an interest that was probably stimulated during his study in Ingolstadt, a center of mathematics at the time—in fact, he exchanged books and recipes with the Ingolstadt mathematician Peter Apian, who is mentioned in the list of authors and books on Ms. Fr. 640, fol. 1r (https://edition640.makingandknowing.org/#/folios/1r/f/1r/tl).[29] Sedelius had much expertise in this field and most of the calculations in his different *collectanea* were his own work and not compiled from other sources.[30] This matches documentary information on his reputation as a maker of sundials, astronomical instruments, and mechanical clocks.[31] In 1530 he devised a now lost planetary clock for the Andechs monastery. Although it is not clear whether he was responsible only for the theoretical calculations or also for the construction itself, he had at least some hands-on experience in

mechanical work and was able to cooperate with a craftsman to build instruments.[32] His description and drawings of parts of the organ automaton reveal that he also understood the mechanics of this instrument (Fig. 1, Fig. 2). It was clearly a kind of early barrel organ, perhaps an amplification of a *hornwerk*, a mechanical organ common in Austria and Bohemia since the fifteenth century.[33] The mechanical spinet of Ms. Fr. 640, in contrast, would have been a curiosity appreciated in an aristocratic context. Sedelius' "method to apply musical harmony onto the mobile wheel"[34] points to a different meaning than that of the spinet mechanism in Ms. Fr. 640. Music played an important role in the church offices, but above all the harmony of music represented divine cosmic harmony. And Sedelius' precisely-calculated automaton guaranteed the perpetual harmony of earthly music.

Casting and International Knowledge Transfer

The author-practitioner was less interested in mathematics; instead, slightly more than a third of the entries in his manuscript are devoted to casting techniques. Sedelius, too, collected more than two hundred recipes covering this thematic field in cgm 4117 and cgm 4118. The topics are also similar: the production of sands for the sand-casting process, the wax casting process, molding with loam, wax, sulfur, or paper, different materials to be cast or stamped in molds including gold, silver, copper, brass, lead or tin, gypsum, sulfur, and even bread.[35] Many of the recipes in cgm 4117 were provided by the Freising bishop Count Palatine Philipp (1480-1541); those in cgm 4118 were mainly copied from a manuscript in the monastery library of Sts. Ulrich and Afra in Augsburg (fol. 128v).[36]

Count Palatine Philipp was an ambitious patron who employed painters, sculptors, and other artists to embellish his new residence in Freising.[37] A medal caster in his service, Christoph Seselschreiber, is known to have worked previously as one of the founders of the tomb of Emperor Maximilian in Innsbruck.[38] Other medal casters were active in Munich, because at the time portrait medals had become objects of self-representation of princes, noblemen, and even artists and citizens like Sedelius' friends Ludwig Senfl and Bartholomäus Schobinger.[39] Augsburg was, after Nuremberg, one of the leading centers for casting and goldsmiths' work in sixteenth-century Germany.[40] Monks of the Benedictine monastery Sts. Ulrich and Afra were part of an intellectual network inside and beyond the town, and some were also interested in technical knowledge.[41] The most famous is Veit Bild with whom Sedelius shared interests in mathematics and the making of sun dials and with whom he corresponded until his death in 1529.[42]

Augsburg is also mentioned in Ms. Fr. 640; it is described as one of the places in Germany where an excellent *spat* for making a casting sand is found (fol. 108r (https://edition640.makingandknowing.org/#/folios/108r/f/108r/tl)). *Spat* is an ambiguous term which could stand for different minerals, including mica (a variety of gypsum), fluorite, barite, or feldspar.[43] The search for appropriate casting sands for various purposes was a major concern of both the author-practitioner and Sedelius. Interestingly, the Augsburg recipes copied by Sedelius' scribe do not mention the use of *spat* in casting sand. The material is, however, used in some of Bishop Philipp's prescriptions (cgm 4117, fols. 37v–39r). The process is very similar to that described in Ms. Fr. 640 (fol. 119v (https://edition640.makingandknowing.org/#/folios/119v/f/119v/tl)). Sedelius or Philipp do not provide information on provenance or quality of the material—perhaps it was too familiar to them. There are other sand and mold materials where Sedelius thought it necessary to distinguish between different properties according to the

deposits, e.g., gypsum or clay. The preparation and use of several loams and clays for molds which were dug from the surroundings of Augsburg are extensively discussed in cgm 4118. This interest in the knowledge of local professionals and the exploitation of local sources is comparable to Ms. Fr. 640. But since *spat* is not mentioned as one of these locally available materials in cgm 4118, we may conclude that it was perhaps not the actual provenance of *aspalt* from Augsburg to which the author-practitioner referred, but, instead, to the expertise of Augsburg casters.

The author-practitioner knew and esteemed the practice of German casters.[44] A sophisticated technique which he observed from German goldsmiths was the surface treatment of objects cast in silver (fol. 128v (https://edition640.makingandknowing.org/#/folios/128v/f/128v/tl)).[45] Sedelius does not provide a relevant recipe; perhaps the technique was more recent, or he had no information on it. Some of his recipes, however, deal with a recent technology for the treatment of gold surfaces (cgm 4117, fols. 68v–69r). The so-called *glüh wachs* ("glowing wax"), a mixture of wax with copper and iron compounds, was smeared onto the golden object and melted to produce a more reddish golden hue. Recipes for this technique were in circulation in Germany from about 1520,[46] and it is likely that the technology was invented by German goldsmiths.

International knowledge transfer also played a role in sixteenth-century southern Germany. In this area, artisans, artists, intellectuals, and collectors were especially interested in contemporary Italian art and technology. There were close trade connections between south German centers like Augsburg or Nuremberg and northern Italy; artists and craftsmen crossed borders to work for princes and citizens.[47] When Sedelius refers to knowledge transfer and regional peculiarities he contrasts Italian (*welsch*) with (southern) German (*teutsch*) techniques. Thus, he discusses diverse techniques of plaster casting (cgm 4117, fol. 45r–v), depending on the different properties of the local raw materials.

Lifecasting

In comparing different techniques of plaster casting, Sedelius made straightforward comparisons, but in the case of lifecasting, Sedelius becomes almost enthusiastic about the superior quality of the "Italian manner" (cgm 4118, fols. 99v–101v). The rubric, presumably copied from the Augsburg manuscript, warns about making this "very ingenious" (*faßt kunstreich*) knowledge available to everybody, and Sedelius noted in the margin that this recipe is "exceedingly excellent and cannot easily be compared to anything else." He does not express a similar enthusiasm in the margins of the lifecasting recipes for leaves some pages before (cgm 4118, fols. 81v–82v) or for animals in his earlier "Book on various artisanal arts" (cgm 4117, fol. 140r–v). The recipe for casting birds, frogs, and lizards in cgm 4117 enumerates only cursorily the steps of making the form and burning the animal. The description of the "Italian manner" is much more detailed and includes different methods to kill frogs and worms, as well as information on their artificial arrangement before they are carefully encased with loam and burnt to ash. He also gives information on technical details like pouring gates, sprues, and the final silver cast.

Sedelius certainly had seen lifecast animals or plants in the collections of the Bavarian dukes or in the workshops of casters working in Augsburg and Munich. But there is no indication that he experimented with casting himself. It was probably more the philosophical implications of recreated nature that fascinated Sedelius than the experience with the recipe's practicability.[48] The preoccupation of the author-practitioner with

lifecasting goes even farther, in his attempts to imitate natural objects as closely as possible. The author-practitioner certainly aimed to gain more expertise in recreating nature, but he, too, was not just driven by the search for virtuosity but also by a broader concept of nature and regeneration.[49]

Expert knowledge and experiments

Whereas the author-practitioner seems to have practiced casting and other techniques himself, there are only few indications that Sedelius tried recipes personally. Words like "*probirt*" or "*probatum*" ("proven"), which are occasionally mentioned in Sedelius' recipes were also used as topoi in contemporary manuscripts, and they may already have been present in the texts copied by Sedelius or his scribes.

The case of glass technology is different. Sedelius was fascinated by the idea that crystal or glass could be softened, melted, or cast, and he tried to understand these processes through conversations with expert practitioners as well as through his own experiments. A striking example is a series of recipes for melting glass in cgm 4118 (fols. 132r–133r). Sedelius first reports a recipe which he received as personal communication from a potter. Below this entry, he adds a correction based on the information of another potter "who is also an artist," and he notes at the margin of the first recipe that "it is not true" (fol. 132v). He continues that he had tried the method of the "artist" with success, although he was only able to melt and not to cast the glass. He was able to observe this more sophisticated technique, however, in the workshop of two "artists" (*kunstler*).

The author-practitioner of Ms. Fr. 640 likewise seems to have gained his information on glass making from discussions with and observation of professionals.[50] His recipes describe the making of glass canes for beads and lampworking. By contrast, Sedelius' experiments with glass do not aim to produce objects. He is more interested in the process itself and in understanding the properties of glass; as a result he notes that it is "not the same thing to soften glass so that it can be printed like wax and to melt glass so that it can be cast" (fol. 133r). For Sedelius, compiling written information on techniques, seeking expert knowledge from practitioners, judging the expertise of simple artisans and more expert "artists," and his own experiments are steps in an epistemic process to understand not only artisanal techniques but also the nature of materials.

Conclusion: Recipes as Epistemic Tools

Sedelius had some expertise in clockwork making. He illustrated his books with colored drawings (*Fig. 3*), but he was not working as a caster or goldsmith. However, he was interested in recent and approved technologies. He copied and had scribes copy selected manuscript sources, and additionally he interviewed and observed artisans as authorities on technical knowledge. The recipes given to him by Count Palatine Philipp, too, came most probably from the workshop of the bishop's casters. Sedelius studied them carefully for correctness and asked the caster Thomas to add missing information (cgm 4117, fol. 1v). Collecting, reviewing, testing, developing, and transforming technical prescriptions was part of an epistemic process for Sedelius. Where personal practical experience was missing, he relied on observation of and information from practitioners. He discussed recipes with them and learned about mistakes and new developments. In a few cases he even tried

recipes himself. His interest in the verification of recipes by observation or practical experiments links him to the author-practitioner, although he does not go as far as the latter as a practitioner.

Fig. 3. Wolfgang Sedelius, wind oven, 1530/31. Ink drawing on paper, 15.5 x 10.5 cm (page). Kantonsbibliothek Vadiana, St. Gallen, Vadianische Sammlung der Ortsbürgergemeinde, Ms. 404, fol. 164r. Sedelius illustrated his autograph *collectaneum* with several colored drawings, mainly for the construction of sundials but also for some instruments like the wind oven, which he explained was necessary for assaying. Photo: Rudolf Gamper, Winterthur; by permission of the Kantonsbibliothek Vadiana St. Gallen.

His three surviving recipe collections, compiled over a period of about thirty years, document the personal approach of a scholar interested in a variety of technical and scientific fields. His earlier *collectanea* are still influenced by the medieval concept of the *artes mechanicae* and the monastic tradition of encyclopedic accumulation and transmission of knowledge. In the courtly and urban milieu of Munich and Augsburg, he became interested in new sophisticated techniques and materials, like casting, or recent glass technology. And he clearly also took part in the contemporary discourse on the properties of natural materials. This discourse was independent from the confessional disputes of the time. Intellectual networks in mid-sixteenth-century Germany transcended confessional boundaries, and the counter-reformer Sedelius could exchange technical and scientific expertise with the fervent protestant Bartholomäus Schobinger without even touching upon religious questions.[51]

Although he shared fields of interest with the author-practitioner of Ms. Fr. 640, Sedelius belonged to a different community of intellectuals connected by their interest in human abilities and skills. His "pursuit of secular science" and knowledge of the world remained enclosed by the Divine order.

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1. See Colin Debuiche and Sarah Muñoz, "Le Ms. Fr. 640 et le contexte toulousain," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_312_ie_19, (https://edition640.makingandknowing.org/#/essays/ann_312_ie_19) and Sarah Muñoz, "Barthélémy Fraysse and the Author-Practitioner of Ms. Fr. 640," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_317_ie_19 (https://edition640.makingandknowing.org/#/essays/ann_317_ie_19). See also Colin Debuiche, "Adaptation à un contexte de guerre et aux enjeux économiques de la seconde moitié du XVI^{e} siècle: les trajectoires professionnelles de Dominique Bertin et Hélie Bachelier," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, edited by Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_314_ie_19 (https://edition640.makingandknowing.org/#/essays/ann_314_ie_19), and Colin Debuiche, "Raymond Masse: un marchand-orfèvre dans l'environnement de l'auteur-praticien," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_313_ie_19 (https://edition640.makingandknowing.org/#/essays/ann_313_ie_19).↩

2. On the market for *Kunstbüchlein* and "books of secrets," see William Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994), 93–113 and *passim*. For a comparison of printed recipe books with Ms. Fr. 640, see Amanda Faulkner, "Ms. Fr. 640 and *The Jewell House of Art and Nature* (1594)," in *Secrets of Craft and Nature in*

Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_072_fa_18, (https://edition640.makingandknowing.org/#/essays/ann_072_fa_18) and Katie Bergen, "*La Maison Rustique*: Cultivation and the Genre of the Household Manual," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_066_fa_18 (https://edition640.makingandknowing.org/#/essays/ann_066_fa_18).↩

3. See Erma Hermens, "Court Workshops and Statecraft as Sites for Artisanal Knowledge Production and Exchange," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_319_ie_19 (https://edition640.makingandknowing.org/#/essays/ann_319_ie_19).↩

4. For Sedelius' biography, I follow Hubert Pöhlein, *Wolfgang Seidel, 1492–1562, Benediktiner aus Tegernsee, Prediger zu München. Sein Leben und sein Werk* (München: Karl Zink Verlag, 1951), 6–145.↩

5. See Harald Müller, *Habit und Habitus. Mönche und Humanisten im Dialog* (Tübingen: Mohr, 2006), 91–97.↩

6. For Vienna, see Paul Gerhard Beck et al., "Das wissenschaftliche Umfeld der jungen Universität Wien am Beispiel der Ersten Wiener Schule der Astronomie," in *Universität und Kloster. Melk als Hort der Wissenschaftspflege im Bannkreis der Universität Wien*, ed. Gottfried Glaßner, Meta Niederkorn-Bruck (Melk: Stift Melk, 2016), 84–98; for Ingolstadt, see Christoph Schöner, *Mathematik und Astronomie an der Universität Ingolstadt im 15. und 16. Jahrhundert* (Berlin: Duncker & Humblot, 1994).↩

7. See Pöhlein, *Wolfgang Seidel*, 59–52; Winfried Müller, "Die Anfänge der Humanismusrezeption im Kloster Tegernsee," *Studien und Mitteilungen zur Geschichte des Benediktinerordens und seiner Zweige* 92 (1981).↩

8. Anna Bartl et al., *Der 'Liber illuministarum' aus Kloster Tegernsee. Edition, Übersetzung und Kommentar der kunsttechnologischen Rezepte* (Stuttgart: Steiner, 2005).↩

9. See Pöhlein, *Wolfgang Seidel*, 45–49.↩

10. For Sedelius' bibliography see Pöhlein, *Wolfgang Seidel*, 194–200.↩

11. A commented edition of these manuscripts is being prepared in an ongoing project by Anna Bartl, Ursula Haller, Christoph Krekel, Manfred Lautenschlager, and Doris Oltrogge.↩

12. Cited hereafter as Vad. 404. I would like to thank the former librarian of the Vadiana, Rudolf Gamper, for his help and for providing a complete series of photographs of the manuscript.↩

13. The medical recipes are edited by Sylvia Pfaff, *Der Codex Vadiana 404 von Wolfgang Seidel (1492–1562) – Erster Teil seines dreibändigen Kunstbuches?* (PhD thesis, Munich, Technische Universität, 1994).↩

14. For florilegia in general, see Erwin Rauner, "Florilegien," *Lexikon des Mittelalters* (München: Verlag J.B. Metzler, 1987), vol. 4, 605–607. For florilegia as preaching aids see Richard H. and Mary A. Rouse, *Preachers, Florilegia and Sermons* (Toronto: Pontifical Institute of Medieval Studies, 1979).↩

15. On early modern excerpting techniques and uses see Gilbert Heß, "Florilegien. Genese, Wirkungsweisen und Transformationen frühneuzeitlicher Kompilationsliteratur," *Wissensspeicher der Frühen Neuzeit: Formen und Funktionen* (Berlin: de Gruyter, 2015), 100–103; 106–108, and Ann M. Blair, *Too Much to Know: Managing Scholarly Information before the Modern Age* (New Haven: Yale University Press, 2010), 62–116.↩

16. Munich, BSB clm 18862, see Pfaff, *Der Codex Vadiana 404*, 66.↩

17. Munich, BSB clm 18865, fol. 2r, see Pfaf, *Der Codex Vadiana 404*, 65.↩

18. Munich, BSB clm 18862, fols.1r, 164r; see Pfaff, *Der Codex Vadiana 404*, 66 ff.↩

19. Munich, BSB clm 18864, fol. 195r; see Pöhlein, *Wolfgang Seidel*, 230.↩

20. On his authorship of mathematical texts, see his remarks in Munich, BSB clm 18865, fol. 1r (see Pfaff, *Der Codex Vadiana 404*, 68 ff.), for the Greek letters see Munich, BSB clm 18864, fol. 164r (Pfaff, *Der Codex Vadiana 404*, 67).↩

21. Munich, BSB cgm 4117, *passim*, e.g., fols. 1r, 1v, 35r, 35v.↩

22. It is unknown whether this book has disappeared like the first volume on the artisanal arts or whether it was never written.↩

23. Psalm 127 (128): 2, quoted as a motto on the title of cgm 4117, fol. 1r.↩

24. Munich, BSB clm 18695, fol. 1r; cited after Pfaff, *Der Codex Vadiana 404*, 68.↩

25. Clm 18695, fol. 201r; cited after Pöhlein, *Wolfgang Seidel*, 76n.↩

26. Literature on mathematics, astronomy, or technique is completely missing from his catalogue of the ideal library of a preacher described in his printed handbook for the education of priests: Wolfgang Sedelius, *Isagoge studii theologice* (Ingolstadt: Alexander & Samuel Weißenhorn, 1551), fols. 18v–45r.↩

27. See Benjamin Hiebert, "Spinet Playing by Itself," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_047_fa_16 (https://edition640.makingandknowing.org/#/essays/ann_047_fa_16).↩

28. For the debate on the use of organs in the Melk Benedictine reform, see Franz Körndle, "Johannes Keck und die Musikpflege der Melker Reform," in *Reformen vor der Reformation. St. Ulrich und Afra und der monastisch-urbane Umkreis im 15. Jahrhundert,* ed. Gisela Drossbach and Klaus Wolf (Berlin, Boston:De Gruyter, 2018), 315–25.↩

29. See Schöner, *Mathematik und Astronomie an der Universität Ingolstadt*, 233–357.↩

30. For a respective note in clm 18675 see Pfaff, *Der Codex Vadiana 404*, 68 ff.↩

31. Pöhlein, *Wolfgang Seidel*, 48–58.↩

32. Pöhlein, *Wolfgang Seidel*, 146–54.↩

33. See Hartmut Krones, "Hornwerk," in *Oesterreichisches Musiklexikon online* https://www.musiklexikon.ac.at/ml/musik_H/Hornwerk.xml (https://www.musiklexikon.ac.at/ml/musik_H/Hornwerk.xml).↩

34. This is the title of the small treatise in Vad. 404, fol. 137v.↩

35. Sedelius uses bread as a casting, rather than a molding material. He includes two recipes for "red lead" bread casting, using a paste made from the pith of freshly baked bread mixed with red lead. For the author-practitioner's use of bread as a molding material, see Min Lim, "To Shrink an Object: Bread Molding in Ms. Fr. 640," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_076_fa_18 (https://edition640.makingandknowing.org/#/essays/ann_076_fa_18).↩

36. The manuscript has not yet been identified, it is perhaps lost.↩

37. See Sigmund Benker, "Das Schloß des Bischofs Philipp von der Pfalz am Domberg zu Freising," *Amperland* 5 (1971).↩

38. See Robert Sellier, *Die Münzen und Medaillen des Hochstifts Freising* (Grünwald: Geiger, 1966), 32–42.↩

39. On medal making in early sixteenth century Munich, see Walter Cupperi, "München, Landshut und Altbayern," in *Wettstreit in Erz*, ed. Walter Cupperi et al. (Berlin: Deutscher Kunstverlag, 2013).↩

40. See Lorenz Seelig, "Zwischen Handwerk und Bildkünsten in Silber und Gold, *Geschichte der bildenden Kunst in Deutschland, 4: Spätgotik und Renaissance*, ed. Katharina Krause (München: Prestel, 2007).↩

41. See Harald Müller, "Der Beitrag der Mönche zum Humanismus im spätmittelalterlichen Augsburg. Sigismund Meisterlin und Veit Bild im Vergleich," in *Humanismus und Renaissance in Augsburg*, ed. Gernot M. Müller (Berlin: De Gruyter, 2010).↩

42. See Pöhlein, *Wolfgang Seidel*, 48.↩

43. See Elisabeth Kuiper and Ingeborg Kroon, "What is *Spat*?" Student Essay, University of Amsterdam, 2015.↩

44. See Sofia Gans, "Circulation of Knowledge in Europe," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_018_sp_15 (https://edition640.makingandknowing.org/#/essays/ann_018_sp_15).↩

45. See Gans, "Circulation of Knowledge in Europe," https://edition640.makingandknowing.org/#/essays/ann_018_sp_15 (https://edition640.makingandknowing.org/#/essays/ann_018_sp_15).↩

46. See E. Major, "Glühwachsrezepte von Urs Graf," *Anzeiger für schweizerische Altertumskunde* NF 6 (1904/05).↩

47. For the mobility of medal casters, see e.g., Walter Cupperi, *Wettstreit in Erz*, 270–273.↩

48. For the idea of lifecasting as regeneration, see Pamela H. Smith, *The Body of the Artisan* (Chicago: University of Chicago Press), 114–121; for lifecasting as substitution for nature, see Robert Felfe, *Naturform und bildnerische Prozesse* (Berlin, Boston: De Gruyter 2015), 29–40.↩

49. See Pamela H. Smith and Tonny Beentjes, "Nature and Art, Making and Knowing: Reconstructing Sixteenth-Century Life-Casting Techniques," *Renaissance Quarterly* 63 (2010): 128–79.↩

50. For glass technology in Ms. Fr. 640 see Ana Matisse Donefer-Hickie, "Glassworking in Ms. Fr. 640," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_052_fa_16 (https://edition640.makingandknowing.org/#/essays/ann_052_fa_16), and Kathryn Kremnitzer, Siddhartha Shah, and Pamela H. Smith, "Gemstones and Imitation," in *Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640*, ed. Making and Knowing Project, et al. (New York: Making and Knowing Project, 2020), https://edition640.makingandknowing.org/#/essays/ann_029_fa_15 (https://edition640.makingandknowing.org/#/essays/ann_029_fa_15).↩

51. On Schobinger see Rudolf Gamper, "Bartlome Schobinger, der Schreiber des Rosarium Philosophorum," in *Alchemische Vereinigung. Das Rosarium Philosophorum und sein Besitzer Bartlome Schobinger*, ed. Rudolf Gamper and Thomas Hofmeier (Zürich: Chronos Verlag, 2014), 120–76.↩

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