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Technologies for musical drafts, twelfth century and later

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ABSTRACT. *This article investigates the correctable technologies for musical drafts available to composers during the central and later Middle Ages (twelfth–fifteenth centuries). The starting point is a unique passage from the autobiography of Renier, abbot of St Laurence of Liège (c. 1110/20–90), which clearly describes someone sight-reading a new work from the text and* musical notation *entered on wax tablets (an edition and translation of the passage are provided). Additional musical references to wax tablets are discussed, as are references to other correctable technologies (text supports and appropriate styli) potentially available to composers, such as varieties of sleeked pasteboard, slate tablets, lead used directly on paper or parchment, liquid correcting fluid or powder or paste, and composition in the mind. Descriptions from the contemporary technical literature, archaeological and iconographical evidence are briefly presented. An estimate of the relative prevalence of these techniques is ventured with references to aspects of the technologies and their musical application which require further investigation.*

A standard method for recording literary drafts in the medieval West was the ancient and venerable technology of the wax tablet (*tabula, tabella*, table, *cera, pugillaris*, etc.), and stylus (*stylus, stil-, ferrula, graphium, grafi-*, etc.).[1] Tablets were made of wood, bone or ivory, and were usually rectangular or square in form (one variation featured an arched top), the plane with the largest surface area being recessed and surrounded by a border.[2] This recessed field would hold the

* The author wishes to thank Andrea Budgey and Andrew Hughes for discussion of some of the points presented here, and Joseph Dyer for many suggested improvements. All translations are by the author. Any mistakes are attributable to his stylus and tablet alone.

[1] These, and other terms, are presented in Pierre Gasnault, 'Les supports et les instruments de l'écriture à l'époque médiévale', in *Vocabulaire du livre et de l'écriture au moyen âge. Actes de la table ronde Paris 24–26 septembre 1987*, ed. Olga Weijers, CIVICIMA: Etudes sur le vocabulaire intellectuel du moyen âge 2 (Turnhout, 1989) (hereafter *Vocabulaire du livre*), 20–33; Richard H. Rouse and Mary A. Rouse, 'The Vocabulary of Wax Tablets', in *Vocabulaire du livre*, 220–30 (hereafter Rouse and Rouse, 'Vocabulary of Wax Tablets'); Randall A. Rosenfeld, 'Tools for Producing Books and Documents in Roman Antiquity and the Middle Ages: a Summary List of Classes', in *Scriptorium* (forthcoming). The wax tablet and other technologies for drafts discussed below were all easily correctable, like some, but not all, of the technologies used for note-taking in universities of the twelfth and thirteenth centuries; Charles Burnett, 'Give Him the White Cow: Note-taking in the Universities in the Twelfth and Thirteenth Centuries', *History of Universities* 14 (1995–6), 1–30. I wish to thank Joseph Dyer for this reference.

[2] For an excellent survey of medieval remains see Elisabeth Lalou, 'Inventaire des tablettes médiévales et présentation générale', *Les tablettes à écrire de l'antiquité à l'époque moderne*, ed. Elisabeth

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'wax', which was a mixture of beeswax, a dark colouring agent (carbon-based, or verdigris), and other organic or inorganic substances to produce a harder, or softer writing surface as desired.[3] Tablets could be 'bound' by thread or thong into books, or as loose leaves gathered into portable leather cases. Styli were of iron, copper-alloy, silver, bone or hardwood (the last fitted with an inset metal point). The classic form narrows along the stem towards the writing point, and the end opposite the writing point is fashioned into either a spatulate or a τ (tau) shape.

Tablets and styli were familiar companions to the literate, many of whom made incidental mention of them when writing of intellectual work. Eadmer of Canterbury records that when St Anselm finally received the illumination revealing the proof for the existence of God that he would develop in his *Proslogion*, the archbishop 'immediately, and in a beneficent spirit, noted the matter down on wax tablets'.[4] Upon the loss of those tablets, and the breakage of a replacement set containing the same material, St Anselm finally ordered the draft to be transcribed on to parchment, a more permanent text support.[5] A more direct statement of the priority of wax to parchment is provided by Eadmer's account of the physical realization of his *Vita* of St Anselm: 'When, moreover, I had first set my hand to work, and those things which I first composed on the wax I had largely committed to parchment . . .'.[6] Guibert of Nogent, a contemporary of Eadmer's, even boasted that 'in fact, when I composed and wrote this small work [i.e., an hexameral commentary] and other writings of mine, I did not engrave them on wax tablets; rather, drafting the works at the same time they were written, it was my habit to enter them in unaltered state on to parchment'.[7] The identification of this technology with the composition of texts

Lalou, Bibliologia: Elementa ad librorum pertinentia 12 (Turnhout, 1992), 233-85 (hereafter Lalou, 'Tablettes'). The hisperic poem *Haec arborea lectis plasmata* (saec. VII$^{med.}$) is a beautifully evocative description of a wax tablet, and its manufacture; *The Hisperica Famina: I. The A-Text. A New Critical Edition with English Translation and Philological Commentary*, ed. Michael W. Herren, Pontifical Institute of Mediaeval Studies, Studies and Texts 31 (Toronto, 1974), 106–7.

[3] To produce a harder surface some types of resins or calcium salts from waxy acids were used, for a softer surface tallow, soap, linseed oil, clay, or sodium salt from waxy acids were favoured. The best survey of the characterization (chemical and physical characteristics) of the wax in ancient and medieval tablets is Reinhard Büll, Ernst Moser and Hermann Kühn, 'Wachs als Beschreib- und Siegelstoff. Wachsschreibtafeln und ihre Verwendung', in *Vom Wachs: Hoechster Beiträge zur Kenntnis der Wachse*, Bd. 1, Beitrag 9 (Frankfurt am Main, 1968), 785–894, particularly pp. 796–815. Also see Reinhard Büll and Ernst Moser, 'Wachs', in *Paulys Realencyclopädie der classischen Altertumswissenschaft*, ed. Georg Wissowa et al., Supplementband 13 (Munich, 1973), 1347–1416, at cols. 1366–9.

[4] 'livore carens rem ilico scripsit in tabulis . . .'; *The Life of St. Anselm Archbishop of Canterbury by Eadmer*, ed. and trans. Richard W. Southern, Oxford Medieval Texts, ed. Vivian H. Galbraith *et al.* (Oxford, 1972) (hereafter Eadmer, *St. Anselm*), 30.

[5] Eadmer, *St. Anselm*, 30–1.

[6] 'Praeterea cum operi manum primo imposuissem, et quae in cera dictaveram pergamenae magna ex parte tradidiessem . . .'; Eadmer, *St. Anselm*, 150.

[7] 'Opuscula enim mea haec et alia nullis impressa tabulis dictando et scribendo, scribenda etiam pariter commentando immutabiliter paginis inferebam'; Guibert de Nogent, *Autobiographie*, ed. and trans. Edmond-René Labande, Les classiques de l'histoire de France au moyen âge, ed. André

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is readily understandable, for whatever was written on the wax could be easily erased with that tool closest to hand, the stylus, simply by inverting it to present the spatulate eraser to the wax.[8]

Philologists and codicologists would have a ready answer, then, to the question 'How were musical drafts recorded in medieval Europe?' They would not imagine any reason why a draft of notation would have a material form any different from a draft of text. The question would hardly seem worth the asking.[9] Evidence from disciplines such as philology, codicology, and even archaeology proper, can be usefully applied to the question of the technology used for musical drafts, because the analogue of the tools used for textual drafts is more than an analogue. As it is unwise to view notation as something apart from the texts which it embellishes, so the question 'What technology was used for musical drafts?' can be seen to be the same question as 'What technology was used for textual drafts?' This view, though arguable, is not entirely incontrovertible, for it is built on the assumption that a technology common and convenient for text drafts would necessarily have been used for drafts of musical notation. The history of technology is full of cases of the possible, and even the probable, which apparently never happened.[10] Given that fact, some direct evidence for the use of the wax tablet and stylus for musical drafts would not be unwelcome.

Renier of St Laurence of Liège (also Reiner von Lüttich, *c*. 1110/20–90) was, as his name implies, a Benedictine of the monastery of St Laurence of Liège. He seems to have entered that house when he was young, to have received a good education there, and to have spent most if not all of his monastic career within its precincts.[11] Renier was a fairly prolific writer, with secure command of a good style, gained in part through a more than passing acquaintance with

Vernet, vol. 34 (Paris, 1981), 144. The *opuscula* is probably that printed in Patrologia latina, ed. J.-P. Migne (Paris, 1880), 156:19–338.

[8] Hence the classical usage 'stilum vertere' (e.g., Horace, *Satirae* I, 10.72) came to mean 'to erase'. The spatulate end could be warmed in the hand the better to smooth out the wax.

[9] A response I have had from several colleagues, strange as it may seem.

[10] E.g., there is no evidence for the nocturnal from before *c*. 1500, although the instrument involves no concepts or skills which were unavailable to the makers of sundials and astrolabes in the thirteenth and fourteenth centuries; Allan Chapman, 'Nocturnal', in *Instruments of Science: An Historical Encyclopedia*, ed. Robert Bud and Deborah Jean Warner *et al*., Garland Encyclopedias in the History of Science 2, Garland Reference Library of the Social Sciences 936 (London, Washington DC and New York, 1998), 414–16; Gerard L'E Turner, *Scientific Instruments, 1500–1900: An Introduction* (Berkeley, Los Angeles and London, 1998), 17.

[11] On Renier see Hubert Silvestre, 'Notice sommaire sur Renier de Saint-Laurent', *Le moyen âge. Revue d'histoire et de philologie* 71 (4th series, vol. 20) (1965, no. 1), 5–16; Guibert Michiels, 'Renier de Saint-Laurent', in *Dictionnaire de spiritualité, ascétique et mystique, doctrine et histoire*, ed. André Rayez *et al*., 17 vols. in 19 (Paris, 1988), 12:360–3; Pascale Bourgain, 'R. v. St. Lorenz zu Lüttich', in *Lexikon des Mittelalters*, ed. Robert-Henri Bautier *et al*., 9 vols. (Munich, 1995), 7:666. The dates given above are those established by Silvestre; they offer the most generous span for Renier's life. I wish to thank Albert d'Haenens for sending me a copy of his work which alerted me to the potential importance of Renier for the investigation of the technology of musical drafts; *Art et écriture: représenter l'inspiration au moyen âge*, Centre interuniversitaire d'Histoire de l'Écriture, Publication no. 13 (Louvain-la-Neuve, 1984). This contribution also appeared in *Art et fact*, 3 (1984), 83–6.

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various ancient and patristic authors.[12] His works embrace the hagiography and history of his house, mystical commentary on liturgical items, and music – now regrettably lost. Of some interest to the question of musical drafts is a passage in the autobiographical portion of Renier's *Letter to His Friend in Three Books Concerning the Nonsense of a Certain Idiot*:

> Besides, during the time I was instructed in the art of music – an art to which I consigned the fruits of study – I composed a melody [*melodia*] about Saints Sixtus, Felicissimus, and Agapitus.[13] For the engendering of genius lies in the assiduity of its exercise. Likewise, a wonderful power can be seen implanted in this art, so that much affection and compunction arises in pious hearts through music's sweetness. Yet certain people notice music but little, and when I used diligently to practice that art, they deemed it frivolity and licentiousness. One of them, who at that time was propped up by the powers of the second priorate, seizing the tablets on which I had written my meagre ideas, examined them for a time. I, meanwhile, gaped in fear; the face of the man was grim, his eyebrows were raised; these features presaged future trouble for me. O judge, more terrible than Minos, or Radamanthus! Reading, he growled; singing [*cantans*], he turned from this passage to that. When, behold!, with as much effect as if I had been severely boxed, he began to disturb the innocent furrowed wax, he began to erase it with his plough, a jealous talon.[14] What could I do? Was I to struggle, to object out loud, or revile him? I would risk the bundle of rods administered in chapter, and there would be many accusers, like, so it seemed to me, that tumult of Pharisees and Sadducees when Paul was once tried in council. Was I to evoke ruin by murmuring? I held a curse in my teeth, for pronouncing it would avail me nothing. What then? I let my ears droop, as does an indignant young ass when it submits to a more oppressive burden on its back, and, with the patience of the hypocritical, I grew mild at the disaster. Would I again entrust the effaced piece to wax? That talon, more ferocious, threatened. Would I restore the piece, this time to parchment? I considered privately the small altar and live coals of King Joachim, and the knife of the scribe Judus, especially since I was neither Jeremiah, nor was Baruch my notary. I therefore grew cold from the start. Finally, a long time elapsed. At length I began to consider if any remnants of that same song [*cantus*] resided in my memory; I recalled it easily, as if I had had the song written [*annotatum*] in reality before my very eyes; I clearly saw that God does not disdain simple prayers. I then set the song down on a small piece of parchment, because it had been restored to my memory.[15]

Renier's piece could scarcely be improved upon as an explicit statement of the use of a wax tablet for composing music.

It may seem curious that Renier's account has thus far not appeared in dis-

[12] Renier's writings are presented in Michael McCormick, *Index scriptorum operumque Latino-Belgicorum medii aevi / Nouveau répertoire des oeuvres mediolatines belges, 3me partie: XIIe siècle, vol. 2: Oeuvres non hagiographiques*, ed. Leopold Genicot and Paul Tombeur (Brussels, 1979), 208–17; and in Peter Dinzelbacher, 'Reiner von Lüttich', in *Die deutsche Literatur des Mittelalters. Verfasserlexikon*, ed. Kurt Ruh *et al.*, 11 vols. (Berlin and New York, 1987), 7:1165–9.

[13] Sixtus II (Pope 257–8), and the deacons Felicissimus and Agapitus, all dispatched in 258, were among the most prominent of the third-century Roman martyrs; Sandro Carletti, 'Sisto II', in *Bibliotheca sanctorum*, ed. Filippo Caraffa *et al.*, 12 vols. (Rome, 1968), 11:1256–61; Filippo Caraffa, 'Felicissimo, Agapito, Gennaro, Magno, Vicenzo e Stefano', in *ibid.* (Rome, 1964), 5:602–3.

[14] The idea of writing which is conveyed through this agricultural image is a late antique metaphor that became common in various medieval literatures; see Ernst Robert Curtius, *European Literature and the Latin Middle Ages*, trans. Willard R. Trask, Bollingen Series 36 (Princeton, 1973), 313–14.

[15] For the text, see the edition appended to this article.

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cussions of the technologies used for musical drafts in the Middle Ages, but Renier is hardly a familiar author, even to many cultural historians who specialize in the twelfth century. Musicologists' unfamiliarity with the passage from Renier's autobiography is largely the fault of the great Max Manitius. The section on Renier in Manitius' highly influential *Geschichte der lateinischen Literatur des Mittelalters* ought to have been written to guide musicologists to Renier's direct statement that he used wax tablets for musical drafts, but, in Manitius' retelling, Renier's compositional activity is not linked to his use of wax tablets: 'All these writings [i.e., youthful historical, poetical, and exegetical works, and computus], however, were stolen from him by someone who was quite close. And once, later, the second prior of the monastery confiscated his writing tablets, and completely destroyed what he had written on the wax. ¶Then he wrote a song on Saints Sixtus, Felicissimus, and Agapitus'.[16] The brief Latin extract reproduced by Manitius on his next page mentions the composing of the melody, but not the wax tablets.[17] The context of the passage is better presented in the brief discussion and partial transcription in Reusens' palaeography handbook of 1899.[18] A local study contemporary with Manitius dealing with musicians at Liège contains no mention of this key passage in Renier.[19]

It is no cause for surprise that those who used and composed chant, and those who wrote about ornamenting it, should be familiar with styli and wax tablets. Benedictines, for instance, were to be provided by their abbots (or the relevant obedientiary) with the material tools necessary for their spiritual work. Numbered among these tools were books, styli and tablets, but no son or daughter of Benedict was supposed to keep them as private possessions without their superior's express permission.[20]

One of the authors who make passing reference to wax tablet technology is Aurelian of Réôme. It is possible to interpret one of his remarks as an indication that he wrote the *Musica disciplina* using wax tablets: 'It is, nonetheless, pleasing that the mind's eye, together with the point of the stylus, bend to the modulations

[16] 'Alle diese Schriften aber habe ihm ein ihm Nahestehender geraubt. Und später habe ihm einmal der zweite Prior des Klosters seine Schreibtafeln weggenommen und alles zerstört, was er auf das Wachs geschrieben hatte. ¶Sodann habe er einen Gesang auf die Heiligen Sixtus, Felicissimus und Agapitus verfaßt'; Max Manitius, with Paul Lehmann, *Geschichte der lateinischen Literatur des Mittelalters*, 3 vols., Handbuch der Altertumswissenschaft, ed. Walter Otto, ninth section, second part (Munich, 1931), 3:162.

[17] 'melodiam composui de sanctis Syxto, Felicissimo et Agapito'; *ibid*., 163.

[18] Edmond Reusens, *Eléments de Paléographie* (Louvain, 1899; repr. 1963), 210–13.

[19] Antoine Auda, *La musique et les musiciens de l'ancien pays de Liège. Essai bio-bibliographique sur la musique Liégeoise depuis ses origines jusqu'à la fin de la principauté (1800)* (Brussels, Paris and Liège, 1930). This work has not aged well.

[20] 'Dentur ab abbate omnia quae sunt necessaria, id est . . . graphium . . . tabulas . . .', and 'ne quis praesumat aliquid habere proprium, nullam omnino rem . . . neque tabulas, neque graphium . . .'; *RB 1980: The Rule of St. Benedict in Latin and English with Notes*, ed. Timothy Fry *et al.* (Collegeville, 1981), 260–3 (ch. 55, the writing tools are received from the abbot), 230–1 (ch. 33, no one is to keep writing tools as private property). For Carthusians, see Guigues Ier, Prieur de Chartreuse, *Coutumes de Chartreuse*, ed. 'par un chartreux', Sources Chrétiennes 313, Série des textes monastiques d'occident 52 (Paris, 1984), 222.

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of the verses, and search out with brevity what the sound characteristic to every single tone in its letter might be . . .'.[21] While this might be considered little more than a platitude, it could just as well be advice offered to the 'wise singer' to be watchful and to physically enter this information ('the sound characteristic to every single tone in its letter'?) on his music, presumably in the wax (drypoint annotation in parchment is also a possibility, although less likely). Some iconographical support for the use of wax tablets in musical drafts is seen in the image of The Inspiration of St Gregory in Hartker's Antiphoner, where a classic form of stylus (spatulate ended) is clearly being used to note St Gall neumes.[22]

One Bertrand Prudentius, a monk of Charroux,[23] left some verses on the art of music, in which he remarks on the unsuitability of both wax tablets and books for recording music:

That art, however, which is properly called music by all,
We are unable to touch with the hand, nor to understand from the face,
Nor to commit to tablets, or entrust to small books.
Who is there who is able to understand intricate songs, save in the mind?
And who is there who is able to judge melodious sounds with the eyes?[24]

The wax tablet is here considered alongside other media which use visual symbols to transmit music, and is declared no more inadequate to that task than the parchment codex.

Honorius Augustodunensis' *Gemma animae*, a commentary on the Divine Office and Mass, defines the duties and external attributes of the 'actores' in the liturgy within an extended military metaphor of spiritual battle:

The cantor is he who begins the chant; he is the trumpeter who gives the signal to enter battle. The precentors are those who rule the choir on both sides; they are the leaders who marshal the troops to enter battle. The cantors cover their heads with caps, and

[21] 'Libet interea mentis oculum una cum acie stili ad modulationes inflectere versuum, et quae propria unicuique sit sonoritas toni in eius litteratura verbis pauculis indagare . . .'; *Aureliani Reomensis Musica disciplina* 19.1 ed. Lawrence Gushee, Corpus scriptorum de musica 21 (Rome, 1975), 118 (the beginning of ch. 19). In the most widely available translation, *stilus* is unfortunately rendered as 'pen'; *Aurelian of Réôme (ca. 843) The Discipline of Music (Musica Disciplina)*, trans. Joseph Ponte, Colorado College Music Press Translations 3 (Colorado Springs, 1968), 45.

[22] St Gall, Stiftsbibliothek, MS 390–1, Abbey of St Gall, 980X1011, p. 13; *Antiphonaire de Hartker, manuscrits Saint-Gall 390–391*, ed. Jacques Froger, Paléographie musicale, deuxième série (monumentale) (Berne, 1976^{2}), 1:13; Andrea Budgey and Randall A. Rosenfeld, 'The Portrait of the Music Scribe in Hartker's Antiphoner', forthcoming.

[23] François Joseph Fétis, *Biographie universelle des musiciens et bibliographie générale de la musique*, 8 vols. (Paris, 1866^{2}), 1:393; Ulysse Chevalier, *Répertoire des sources historiques du moyen âge. Bio-bibliographie . . .*, 2 vols. (Paris, 1905), 1:591.

[24] 'Hanc tamen a cunctis quae musica rite vocatur / Nec palpare manu quimus, nec cernere vultu, / Tradere nec tabulis sed nec mandare libellis: / Quis, nisi mente, queat preplexos cernere cantus? / Quisve sonos oculis possit spectare melodos?'; Adrien de la Fage, *Essais de dipthéographie musicale* (Paris, 1864), 297. If Bertrand is ninth-century, the hands he finds lacking are, of course, pre-Guidonian, such as that which contains the mnemonic poem 'Indicis a summo capiens exordia primus' (saec. IX–X$^{in.}$) in *Paris, Bibliothèque Nationale, Fonds Latin 7211: Analysis, Inventory and Text*, ed. Alma Colk Santosuosso, Facsimiles of Mediaeval Musical Manuscripts 18 (Ottawa, 1991), fol. 149v (Luxeuil, saec. XI).

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they carry staffs or wax tablets in their hands; because they are fighting, they cover their heads with helmets, and shield themselves with the weaponry of war.[25]

The cantors' wax tablets are less likely to have been used as tools for composing (although still a possibility) and are more likely to have carried particular liturgical texts, possibly set with music, or directions for the conduct of a particular service. This passage does, at least, further associate wax tablet technology with those who performed musical functions.

It seems clear from the preceding passages that, in the central Middle Ages and earlier, wax tablets were a tool as familiar to those involved with musical composition and literate performance as they were to those who wrote literary works, or kept accounts. Were wax tablets used for composing music in the later Middle Ages?

That question cannot be definitively answered at present. There is no reason why wax tablets could not have been used for composing monophony, even after the fifteenth century, for wax tablets were still employed for some administrative and commercial purposes as late as the middle of the nineteenth century.[26] A great many tablets survive from the Middle Ages, and a respectable minority of them still hold their wax, but no musical notation has thus far been identified on these artifacts.[27] A text in wax was a text in a temporary physical state on the way to a more lasting physical existence in parchment; thus its waxen form would not normally be elevated from transience to permanence. Unexpected finds and exceptional survivals fortunately do occur in the archaeological record, which gives some hope that a wax tablet bearing monophony in musical notation may emerge from the debris of the past. What of polyphony?

There are almost no technological grounds to withhold wax tablets from the hands of composers of polyphony anytime from the eleventh to the fifteenth century. The sole exception to this possibility would occur with a need to use colouration to signal rhythmic alteration. I cannot at present conceive how coloured notes could be indicated in colour when writing on wax. Otherwise, it is possible that little adaptation of the 'mise-en-page' for monophony was needed to write polyphony on wax tablets, particularly if one accepts Jessie Ann Owens' recent statement that composers in Italy in the first half of the sixteenth century did not compose in score, a conclusion she bases on her interpretation of passages

[25] 'Cantor qui cantum inchoat, est tubicen qui signum ad pugnam dat. Praecentores qui chorum utrinque regunt, sunt duces qui agmina ad pugnam instruunt. Cantores capita piliolis tegunt, baculos vel tabulas manibus gerunt; quia praeliantes caput galeis tegunt, armis bellicis se protegunt'; *Honorii Augustodunensis operum pars tertia liturgica: Gemma animae, sive De divinis officiis et antiquo ritu missarum . . .*, PL 172:567.

[26] Lalou, 'Tablettes', 247.

[27] Remains are surveyed in Lalou, 'Tablettes', and in the other papers in the volume edited by her. Lalou's able account is not meant to be exhaustive. The consular diptych (521) of the future emperor Justinian I (527–65) in Paris (Louvre, Cabinet des médailles, inv. nr. 25) cannot be attested as proof for the use of wax tablets to record musical drafts, for although the recessed field bears a ninth-century text notated in unheighted neumes, it is written in ink directly on to the ivory; Richard Delbrueck, *Die Consulardiptychen und verwandte Denkmäler* (Berlin and Leipzig, 1929), 142–3, pl. 27 (cat. no. 27).

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in the epistolary exchange between Giovanni Spataro and Pietro Aaron.[28] Mention of Owens' work brings us to the curious problem of slate tablets.

Over the last half-century occasional finds of slate artifacts bearing notation have excited the interest of musicologists.[29] Most of the recorded examples are fragmentary,[30] which is not surprising, given the nature and properties of slate. This low-grade rock, fine grained and relatively fissile, with cleavage planes which cause it to split into parallel-sided slabs, can over time become highly brittle.[31] Two interpretations have been advanced to explain the purpose of these artifacts. According to some, they represent the much sought after *tabulae compositoriae* – tools for drafting compositions, mentioned by some sixteenth-century writers.[32] Others hold that the slates were meant for display in pedagogical contexts.[33] The briefest examination of the physical properties of the notation on the slates reveals the stark improbability of the former interpretation. The notation is engraved into the surface of the stone.[34] Unlike an engraving in wax, a plastic substance capable of easy alteration, an engraving into stone cannot be promptly smoothed out for correction. If a *tabula compositoria* must be an erasable tablet, and made of stone, then drafts will not be engraved on its surface. Therefore none of the slate artifacts bearing notation can be 'erasable tablets' used in composition; unless it was intended that the engraved surface, once no longer required, would be pried off, and a new surface underneath be prepared and provided with staves. This procedure would be possible, but hardly convenient; and the tablet could scarcely be called 'erasable'. Moreover, no evidence has been uncovered for such a practice. This is not to say that some form of usefully

[28] Jessie Ann Owens, *Composers at Work: The Craft of Musical Composition 1450–1650* (New York and Oxford, 1997) (hereafter Owens, *Craft*), 98–100.

[29] Important early papers are Suzanne Clercx, 'D'une ardoise aux partitions du XVIe siècle', *Mélanges d'histoire et d'esthétique musicales offerts à Paul-Marie Masson*, 2 vols. (Paris, 1955), 1:157–70 (hereafter Clercx, 'Ardoise'); and Siegfried Hermelink, 'Die Tabula compositoria. Beiträge zu einer Begriffbestimmung', in *Festschrift Heinrich Besseler zum sechzigsten Geburtstag* (Leipzig, 1961), 221–30 (hereafter Hermelink, 'Tabula'). A summary of previous material is to be found in Owens, *Craft*, 74–107.

[30] The most usefully complete of these is the one Clercx wrote about, which has staves, but no notation. It is from Fosses-la-Ville (Jambes, Direction des Fouilles de la Région Wallonne, inv. no. B:J Fos 52/8, ca. saec. XVI?); an excellent plate is in Eugeen Schreurs, *Anthologie van muziekfragmenten uit de Lage Landen (Middeleeuwen-Renaissance). Polyfonie, monodie en leisteenfragmenten in facsimile / An Anthology of Music Fragments from the Low Countries (Middle Ages–Renaissance). Polyphony, Monophony and Slate Fragments in Facsimile*, trans. Stratton Bull and Barbara Haggh (Louvain and Peer, 1995), no. 48, and p. xxi. I must thank Barbara Haggh-Huglo for enabling me to consult Schreurs' work.

[31] The *Mappae clavicula* (saec. IX–XII), in common with modern scientific descriptions of slate, stresses the mineral's propensity to split; *Mappae clavicula: a Little Key to the World of Medieval Techniques*, ed. and trans. Cyril Stanley Smith and John G. Hawthorne, Transactions of the American Philosophical Society, new series, 64, 4 (Philadelphia, 1974), 47 (ch. 136). The *Mappae clavicula* does not mention the use of slate as an erasable, or monumental medium for writing.

[32] E.g., Clercx, 'Ardoise'; Hermelink, 'Tabula'; Owens, *Craft*.

[33] E.g., Judith Blezzard, 'The Wells Musical Slates', *The Musical Times* 120, no. 1631 (1979), 26–30; Jacques Chailley, 'Tabulae Compositoriae', *Acta musicologia* 51, fasc. 1 (1979), 51–4; Kenneth Elliott, *The Paisley Abbey Fragments*, Musica Scotica: Early Scottish Music Publications 1 (Glasgow, 1996) (hereafter Elliott, *Paisley Fragments*).

[34] This point is clearly made by Elliott, *Paisley Fragments*, pp. 5–6.

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erasable slate tablet did not exist, merely that we have no incontrovertible archaeological witness to such a technology in a musical context. The best candidates are several fragmentary slates which have engraved staves, but no notation.[35] Ironically, the lack of notation means that we cannot be certain of the physical nature of the notation these artifacts were intended to bear; they too may have been meant to be engraved, and thus not correctable. The term 'disposable *tabula compositoria*' may best describe the artifacts we have, provided that they were indeed meant for composition. Some of Owens' evidence does indeed suggest that there may have been some types of correctable stone tablet in use for musical drafts. A serious weakness in all the investigations of the slates is the fact that the nature of the writing tool (not to mention evidence for it) remains virtually unexplored.[36]

Whereas there is solid and plentiful evidence for the use of wax tablets for all kinds of writing purposes in the fifteenth century, evidence consisting chiefly of artifacts, and direct textual references, there is much less for the use of slate tablets for these purposes.[37] The best evidence for the use of slates is to be found in the practise of the mathematical sciences in the fourteenth and fifteenth centuries. In several sections of his *Treatise on the Astrolabe*, Chaucer instructs the user to note figures 'in thy slate', and the same instruction, 'writ hem in thy sklat', occurs in the contemporary *Equatorie of the Planetis*.[38] The late fifteenth-century painting of the mathematician Fra Luca Pacioli may be among the best pieces of visual evidence for the use of slate, at least for scientific drawings.[39] The black slate is set into a frame, probably of wood. An object which could be a small lump of light coloured slate, or even 'chalk' (soft, relatively pure calcitic lime-

[35] See the Fosses-la-Ville slate, cited in note 30 supra. A similar, but less complete artifact was found among the post-Dissolution rubble of Battle Abbey, and is now Battle Abbey Museum, acc. no. 896914; J. N. Hare, 'Stone Objects', in J. N. Hare *et al., Battle Abbey: The Eastern Range and the Excavations of 1978–80*, Historic Buildings and Monuments Commission of England, Archaeological Report 2 (London, 1985), 175–6. I must thank Michael Gullick for informing me of this artifact.

[36] Owens, *Craft*, table 5.1, pp. 76–7, entry from Cretin (1512): *ardoyse*; entry from Coclico (1552): *tabula lapidea*; plate 5.4, p. 85, engraving of Maarten van Heemskerck, Allegory of Good and Bad Music, detail (1554) (this is less sure, for the tablet could be of wood); also Hermelink, 'Tabula', 224.

[37] For wax tablets, see Lalou, 'Tablettes'; Antjekathrin Grassmann, 'Die Texte auf den Wachstafeln', *Die Latrine des Augustinereremiten Klosters in Freiburg im Breisgau*, ed. Matthias Untermann, Materialhefte zur Archäologie in Baden-Württemberg 31 (Stuttgart, 1995), 317–20. Iconographical evidence does exist, but it is less plentiful than, and of a different nature from, that of the preceding centuries, i.e., tablets are mostly shown in cases, when previously they were shown out of them; I. Fingerlin, 'Lederabfall', in *Die Latrine*, 170–5. There is, on the other hand, good evidence for the use of slate as a support for permanent engraved inscriptions: Robert Favreau, *Epigraphie médiévale*, L'atelier du médiéviste 5, ed. Jacques Berlioz and Olivier Guyotjeannin (Turnhout, 1997), 47.

[38] *A Treatise on the Astrolabe Addressed to his Son Lowys by Geoffrey Chaucer A.D. 1391*, ed. Walter W. Skeat, Early English Text Society, Extra Series 16 (Oxford, 1968, originally published 1872), part II, 44–5, pp. 54–6; Kari Anne Rand Schmidt, *The Authorship of the Equatorie of the Planetis*, Chaucer Studies 19 (Cambridge, 1993), 129 (probably composed 1393).

[39] Anonymous, Portrait of Fra Luca Pacioli and Guidobaldo di Montefeltro(?), Naples, Museo Nazionale di Capodimonte, saec. XV$^{ex.}$; *Leonardo e il leonardismo a Napoli e a Roma*, ed. Alessandro Vezzosi (Florence, 1983), fig. 79, colour plate II, and 74–7.

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stone, or steatite) for writing is shown just to the right of the slate board, but one wonders if such a relatively amorphous mass would be much good for precise drawing. It is just possible that the figure on Fra Luca's slate may be engraved.[40] The framed slates in Raphael's slightly later *School of Athens* are similar, though less good examples, for although a pair of compasses are used to measure geometrical figures on one of the black slates, there is not even the hint of a tool that could be used for writing on any of the tablets depicted in the fresco.[41] The evidence for the use of slate tablets in astronomy/astrology and geometry certainly strengthens the case for their use in music, an allied quadrivial art. Some of the paucity of evidence for the use of erasable slates in music may be a problem of nomenclature, but it is a problem none the less.

There are few cases of technical nomenclature from the Middle Ages which are not complex and challenging to explain. Tablets are no exception. One aspect of the problem is that tablets were not just tools, but were objects which could also serve a symbolic function. The Rouses have observed that:

> The fact remains that the Middle Ages when reading the Vulgate was a wax-tablet culture. Most medieval readers of the Bible automatically assumed that *tabula* meant 'wax tablet', and interpreted the text accordingly . . . We can confirm this from miniatures and sculpture, which, for example, sometimes depict the four evangelists writing on wax tablets . . . and which even illustrate the phrase *tabulae lapideae* with a picture of Moses holding what is unmistakably a wax diptych.[42]

An eloquent illustration of the Rouses' last point is the decalogue held by Moses in The Moses Well (1395–1405) by Claus Sluter at the Chartreuse de Champmol, Dijon.[43] This sculpture of Moses' tablets clearly shows the raised borders and sunken surfaces indicative of wax tablets. The duration of the symbolic association is striking; one of the wax tablets used at the 'Halle au poissons' of Rouen in the mid-nineteenth century was referred to as *Moïse*.[44] The conclusion is inescapable. Any reference to a 'stone tablet' in the fifteenth or sixteenth century may not be a reference to a stone object at all. 'Stone tablet' may be a metonymic, symbolic designation for 'wax tablet'.

One term that seems quite clear is *cartella*. For elucidation of this term Owens' rightly directs our attention to the lexical works of the celebrated Elizabethan

[40] Interestingly enough, the use of an erasable slate is not mentioned in the 'Distincio nona, Tractatus XI, particularis de computis et scripturis' of Fra Luca's *Summa de arithmetica geometria, proportioni, et proportionalita* (Venice, 1494), fols. 198v–210v, reproduced in the rather incompetent *Paciolo [sic.] on Accounting*, trans. R. Gene Brown and Kenneth S. Johnston, with an introduction by Alvin R. Jennings (New York, 1963), 118–42.

[41] Vatican City, Vatican Palace, Stanza della Segnatura (1508–11); Arnold Nesselrath *et al., Raphael's School of Athens*, Recent Restorations of the Vatican Museums, ed. Allen Dustan, 1 (Vatican City, 1997), pls. 15–7, 20; and Konrad Oberhuber, *Polarität und Synthese in Raphaels 'Schule von Athen'* (Stuttgart, 1983), which allows the cartoon to be compared to the fresco.

[42] Rouse and Rouse, 'Vocabulary of Wax Tablets', 229.

[43] Kathleen Morand, *Claus Sluter, Artist at the Court of Burgundy* (London and Austin, 1991), pls. 31, 42, p. 332. There has been some restoration to the tablets, but the features characteristic of wax tablets appear attested from original portions.

[44] Lalou, 'Tablettes', 247.

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translator of Montaigne, John Florio.[45] Florio's definitions of *cartella* truly and accurately define the easily correctable draft text supports of his day (excepting the use of lead on paper and parchment, for which see below). The first edition of his dictionary (1598) defines 'Cartelle, a paire of tables, writing tables . . .', and 'Tabélla, a table to write in'.[46] The second edition (1611) gives: 'Cartella, a kind of sleeked pasteboord to write vpon and may bee blotted out againe. Also leaves of writing tables . . . Cartelle, writing tables . . .', and 'Tabella, a writing table or tables'.[47] Florio must be taken with Horman (1519), who writes: 'Tables be made of leues of yuery [=ivory], boxe, cyprus, and other stouffe daubed with waxe, to wrytte on. Pugillares: qui caere [=cerae] appellantur, fiunt tabellis eboreis, bucceis, aut citreis caera [=cera] litis'.[48] These definitions strongly imply that the *cartelle* used by sixteenth-century composers were chiefly wax tablets, and plastered boards, that is, boards covered with a white ground. Both supports were conveniently correctable. In addition to composers, writers and record keepers, those who laboured at the graphic and plastic arts also had need of a correctable support for drafts. Not surprisingly, they too employed wax tablets, and plastered boards.[49] The fullest information on the 'sleeked pasteboord' variety of *cartelle* is preserved in the technical literature of the graphic arts.

The Book Concerning the Art (*c*. 1390) by the Florentine-born Paduan painter Cennino d'Andrea Cennini (*c*. 1370–*c*. 1440), a pupil of Agnolo Gaddi, contains directions for two types of plastered board *cartelle*:

> First, have a small tablet of boxwood, in length the span of a hand on every side, well polished and cleaned; that is to say, washed with clear water, and rubbed and polished with cuttlefish bone (the type goldsmiths employ for marking). And when the said small tablet is well dried, remove enough [material from the outer surface of a piece of] bone, and have it ground adequately for two hours, which will be good; and the finer the bone is ground, the better. Then gather the bone, take it, and preserve it dry, bundled in a parchment. And when you have need to put plaster on the said tablet, take less than half a bean [i.e., very little] of this bone, or less. And combine that bone with spittle. Work the ground, spreading it out with a finger over all of that small tablet. Before the ground dries, hold the said small tablet in the left hand, and, with a tip of a finger of the right hand, knock on the small tablet as much as necessary to see that the ground is well dry. And the bone ground will be distributed equally, as much in one place, as

[45] Owens, *Craft*, 78.

[46] *A worlde of wordes, or most copious, and exact Dictionarie in Italian and English collected by Iohn Florio* (London, 1598), 62 (cartelle), 419 (Tabélla).

[47] *Qveen Anna's new world of words; or Dictionarie of the Italian and English tongues, collected, and newly much augmented by Iohn Florio Reader of the Italian vnto the Soueraigne Maiestie of Anna . . .* (London, 1611), 86 (Cartella, -e), 549 (Tabella).

[48] William Horman, *Vulgaria* (London, 1519), fol. 81r; reprinted in The English Experience, no. 745 (Amsterdam, Norwood, 1975). Horman's Latin rendering of his English adds the further information that the tablets (*pugillares*, literally 'handheld tablets') are also referred to as wax tablets (*caere*).

[49] Robert W. Scheller, *Exemplum: Model-Book Drawings and the Practice of Artistic Transmission in the Middle Ages (ca. 900–ca. 1470)*, trans. Michael Hoyle (Amsterdam, 1995), 3–4 (on wax tablets, with citations to contemporary accounts); Nigel Morgan, 'Pattern Book. I. Western. 1. Before c. 1440', *The Grove Dictionary of Art*, ed. Jane Turner, 34 vols. (London, 1996) (hereafter *Grove Art*), 24:268.

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in another . . . [there are also] certain small tablets which are used by merchants, which are of parchment made from sheep, and plastered and covered with white lead in oil, according to the method given above for covering with bone.[50]

Cennini recommends either of two metals for the writing tip of styli used on these boards. The first is the silver point, which may be part of a stylus made of brass (i.e., copper-alloy), or one entirely of silver, or of 'any other material'.[51] The second is of lead, suitable, apparently, for 'boards' of paper (i.e., plastered paper, paper with a white ground), as well as for paper which has not been so treated:

On a sheet of paper you can draw with the above-mentioned lead [i.e., a stylus made from this], without bone, and with bone. If a mistake should happen, that is, if you desire to remove some mark made by the said small lead, take a little of the pith from some bread, and rub it on the sheet of paper, and it will remove that which you desire.[52]

An anonymous treatise from about a century after Cennini, the *Liber illuministarum pro fundamentis auri et coloribus ac consimilibus* (from the region around the Tegernsee), recommends that 'white tablets' be made of calf parchment, covered with nine coats of a ground of pulverised white lead mixed with linseed oil.[53] Styli for these *cartelle* can be made of lead, tin (i.e., pewter-alloy), copper (i.e.,

[50] 'Prima, abi una tavoletta di bosso, di grandeza, per ongni faccia, un sonmesso; ben pulita e netta, cioe lavata con aqua chiara; fregata e pulita di seppia, di quella che gli orefici adoperano per inprontare. E quando la detta tavoletta e asciutta bene, togli tanto osso, ben tritato per due hore, che stia bene; e quanto piu sottile, tanto meglio. Poi rachoglio, tiello e conervalo involto innuna charta, asciutto. E quando tunn'ai bisongno per ingiessare la detta tavoletta, togli meno di mezza fava di questo osso, o meno. E colla sciliva rimena questo osso. Va distendendo con le dita per tutta questa tavoletta; e innanzi che asciughi, tieni la detta tavoletta dalla man mancha, e col polpastrello della man diritta batti sopra la detta tavoletta tanto, quanto vedi ch'ella sia bene asciutta. E viene innossata igualmente, chosi innulluogho chome innun altro . . . anche certe tavolette le quali s'usano per merchatanti, che sono di charta pechorina ingiessate e messe di biaccha ad olio, seguitando lo innossare con quello hordine che detto o'; Cennino d'Andrea Cennini da Colle di val d'Elsa, *Il libro dell'arte*, ed. Daniel V. Thompson, 1 (New Haven, 1932) (hereafter Cennini, *Libro dell'arte*), 4–5. On Cennini, see [Anonymous], 'Cennini, Cennino (d'Andrea)', *Grove Art* 6:168–70.

[51] Cennini, *Libro dell'arte*, 5.

[52] 'Nella carta banbagina puoi disengniare col perdetto pionbo, senza osso, ed eziandio con osso. Esse alchuna volta t'avenisse trascorso, che volessi tor via alchuno sengnio fatto per lo detto pionbino, togli una pochia di midolla di pane, e freghavela su per la carta, e torrai via quello che vorrai'; Cennini, *Libro dell'arte*, 7. For extant medieval leads, see Martin Biddle and David Brown, 'Writing Leads', in *Object and Economy in Medieval Winchester*, ed. Martin Biddle, Winchester Studies 7/ii: Artefacts from Medieval Winchester 2 (Oxford, 1990), 735–8, 743–6; Christopher de Hamel, *Scribes and Illuminators*, Medieval Craftsmen Series (London and Toronto, 1992), 23, fig. 16 (n.b., objects not reproduced to scale, and the lead may not have been a writing tool); Arthur Forgeais, *Crayons écritoires et ampoules du moyen âge d'après les plombs historiés trouvés dans la Seine* (Paris, 1875), 3–21. Lead styli were also used for making notes directly on parchment; Gregor Maurach, 'Daniel von Morley, ''Philosophia'' [saec. XII$^{ex.}$]', *Mittellateinisches Jahrbuch* 14 (1979), 212. 'Stili plumbei' may also have been the tools used for lead rulings in some manuscripts (saec. XI–).

[53] Ludwig Rockinger, *Zum baierische Schriftwesen im Mittelalter*, Abhandlungen der historischen Classe der königlich bayerischen Akademie der Wissenschaften, vol. 12, part 1 (Munich, 1872), 18–19. The treatise is probably saec. XV$^{ex.}$–XVI$^{in.}$. The Germanisches National Museum is producing a critical edition.

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copper-alloy), or silver; and pen and ink is also an option. Writings executed in any of these media could be erased with spittle. Presumably the pigments were dispersed through rubbing the suspended particles into the white ground. The 'whiteness' would require occasional renewing with either 'white lead and spittle', or 'shavings of bone-like shell', or 'a powder of burnt bone and spittle'.[54]

Tablets with correctable writing supports other than wax do not figure plentifully in medieval or early modern iconography. Pieter Bruegel the Elder's pen and ink drawing *Temporancia* [*sic*] (1560), and the engraving after it by his colleague Philips Galle for their employer Hieronymus Cock, clearly shows a tablet without recessed field suspended from a hook in the end of a desk. Suspended from the same hook is a cord which holds a stylus of elongated tear-drop shape, with an eye at its widest point – a form quite unlike the classical spatulate-, or tau-ended stylus.[55] The tablet bears the date 1560. Although not being used, it is included in the scene of accounting in the right foreground of the drawing, a position corresponding to the left foreground of the print. It is worth remarking that one writer uses a similar tablet as a portable desk on which to place his paper (or parchment) as he works. Comparable tablets (i.e., without recessed fields), and with identical styli are depicted in Cornelis Cort's engraving for Cock of *Arithmetica*, after a design of Frans Floris' (1565).[56] A small round-headed tablet with elongated tear-drop stylus rests on the desk. More importantly, Arithmetica herself is writing figures on a large rectangular tablet with the same type of stylus.

The importance of the images by Bruegel and Floris is that they show tablets without recessed fields in use or association with a form of stylus not found with wax tablets. Are these tablets plastered boards? Quite possibly. They are different from the slate tablets in the portrait of Fra Luca, and in Raphael's *School of Athens*, for they are not set in frames, and frames are not mentioned in any of the descriptions of plastered boards. If the Bruegel and Floris images are of plastered boards, then the elongated tear-drop shaped styli shown with them are probably images of the metal styli described by Cennini, and the Tegernsee anonymous. Yet so little is known about the appearance of plastered boards and tablets of slate, and their associated writing tools, that we cannot always distinguish an image of one from that of the other, particularly in monochrome representations such as pen-and-ink drawings, or uncoloured prints. It must be admitted that the unframed tablets in the images by Bruegel and Floris

[54] 'de albo plumbo cum saliua . . . uel cum rasura testarum ossarum uel puluere ossium conbustorum et saliua'; *ibid.* I accept Thompson's reading of 'saliua' for Rockinger's 'saluia' (sage); Cennini, *Libro dell'arte*, trans. Daniel V. Thompson, 2 (New Haven, 1933), 4–5, n. 1. Wattenbach mentions a source which recommends writing on a chalked wooden tablet with a copper-alloy stylus; Wilhelm Wattenbach, *Das Shriftwesen im Mittelalter* (Leipzig, 1896[3]), 232. The chalk would provide an abrasive ground similar in effect to the white lead, shell shavings, and burnt bone mentioned by Cennini.

[55] A. W. F. M. Meij, entry 18, in Ger Luijten and A. W. F. M. Meij, *From Pisanello to Cezanne: Master Drawings from the Museum Boymans-van Beuningen, Rotterdam* (Rotterdam, 1990), 63–5.

[56] Ger Luijten, entry 21, in *ibid.*, 72–3, fig. b.

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might be of slate, and the tear-drop shaped styli would then be of a material (slate or chalk?) suitable for writing on slate.

The technology of the plastered board, a parchment (or paper) support treated with a white ground, was not quickly abandoned. The examples cited by Hermelink from eighteenth- and nineteenth-century sources which mention *tabula compositoria* for which the preparation is specified are clearly based on this technology.[57]

Several aspects of the evidence presented here for the technologies used for musical drafts in the Middle Ages and early modern period are immediately striking. Chief among these are the tenuity and fragmentation of the information; it is figuratively comparable to a broken slate. Few direct witnesses to medieval practices remain, and for most times and places musical sources preserve almost nothing. When a musical source, medieval or early modern, is forthcoming, it provides less information than we might wish. The poverty of direct sources aside, it is demonstrable that there were more technologies available for correctable musical drafts than is now generally acknowledged. It is also clear that the relative frequency of use of the different sorts of correctable support, with respect to one another, has been poorly calculated. The only such technology for which we have direct medieval evidence is that of the wax tablet and stylus, and this rests on a single twelfth-century witness, Renier of St Laurence. The indirect evidence of the technological milieux of writing throughout the Middle Ages more than justifies our taking Renier's account as a description of an ordinary method for writing easily correctable drafts of music. Unfortunately, direct archaeological evidence in the form of an extant wax tablet bearing musical notation is thus far lacking.

There is some good, though sporadic, evidence for the use of slates in the mathematical sciences in the period from the late fourteenth to the late fifteenth century. The presumption is that these slates were erasable. Direct evidence that slates were used in some mathematical arts is indirect evidence that they were used in all the mathematical arts. That would include, by extension, musical composition, although, at present, there is no direct textual evidence to confirm this.

Sources of information increase dramatically in number in the sixteenth century. Most references in musical sources to *cartelle* and *tabulae/tabelle* do not give information on their physical properties. A few sources specify slate as a material, and imply that it was correctable. While it is not unreasonable to extend this direct evidence to immediately preceding periods, it is difficult to do so with any precision. Since the extant musical slates bear notation engraved directly into the stone, we currently lack (with several possible exceptions) the archaeolog-

[57] Hermelink, 'Tabula', 227. The term 'varnish' used in some of these descriptions had then a wider semantic range in Western European languages than the term enjoys at present. It referred not only to the protective coatings applied to a finished painting, but also to grounds applied to a support before work commenced; J. P. Gumbert, 'On ''outils'' and ''vernice'' ', *Gazette du livre médiéval* 33 (1998), 44–5.

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ical evidence for correctable slates. Still unknown is the material used to write on the correctable slates, and nothing should be assumed about these tools until we are better informed on this matter. The *cartelle* detailed in the contemporary literatures of lexicography and craft techniques are of hardwood, parchment (or paper), covered with a white ground of bone, lead or shell, in a vehicle of spittle or oil, written on with metal styli, and corrected simply with local moistening and rubbing. Most sixteenth-century references to *cartelle* used as *tabula compositoria* are to these plastered boards, some are to wax tablets, and a few at least are to 'slate' tablets. It is, indeed, somewhat disturbing that no evidence for correctable slates appears in the standard literatures of palaeography or epigraphy, a fact which surely requires some explanation.

Two other technologies that offer ease of correction should be considered as possibilities for the writing of musical drafts. One is the use of a lead writing tool on paper (or parchment) without a white ground, as mentioned by Cennino Cennini. The other is composition in the mind, without the use of an external correctable support; the work, when finished, would be entered directly on to parchment or paper, a process analogous to Guibert of Nogent's procedure for writing theological works. I know of no direct statement that the first of these methods was used for composing music, but it is not inherently unlikely. Regarding the second, it is important not to discount the possibility that it may have been more generally used among the 'learned' than we might think, and guard against our inclination to favour technologies of written record, over the unwritten.

Before concluding, I should mention the evidence for the use of either a liquid, a paste, or a powder preparation to remove ink from parchment. Extant formulae are in Jean Alcherius' *Experiments Concerning Colours* (1398–1410), but it is difficult to estimate how widespread was their use in the late Middle Ages.[58] Without trials of these formulae it would be difficult, moreover, to assess their effectiveness in removing ink.[59] There are indications in Alcherius' account that parchment that had been subjected to one of his erasing formulae could not be used immediately afterwards.[60] I am unaware of any writings which state that composers employed formulae like those of Alcherius for erasing ink from parchment, and I suspect that few authors, merchants or administrators used them.

There were clearly several potential choices of erasable technology for the

[58] Jean Alcherius, 'Experimenta de coloribus', in Mary P. Merrifield, *Medieval and Renaissance Treatises on the Arts of Painting. Original Texts with English Translations* (Mineola, 1999; re-print of 1849 edition) (hereafter Alcherius, 'De coloribus'), 46–7 (distillation of potassium nitrate and copper(II) sulphate, applied with a sponge), 56–7 (powder made of a dressed and salted hare's skin, reduced through calcination, applied with pumice), 58–9 (juice of an orange applied with a sponge, or cotton, or wool), 62–3 (paste of roche alum dissolved in the juice of an orange); Michael Gullick, 'A Bibliography of Medieval Painting Treatises', in *Making the Medieval Book: Techniques of Production*, ed. Linda Brownrigg, Proceedings of the Fourth Conference of the Seminar in the History of the Book to 1500, Oxford, July 1992 (Los Altos Hills and London, 1995), 243, no. 38.

[59] It would be useful to apply the methods of experimental archaeology to this question, particularly if it could be ascertained that any of Alcherius' formulae left characteristic traces on parchment.

[60] Alcherius, 'De coloribus', 58–9 (juice of an orange).

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writing of musical drafts in the Middle Ages and in the early modern period. Basic research is still required on many aspects of these technologies, apart from any consideration of their use in the composition or transmission of music. The further discovery of instances of composers or music scribes utilizing these technologies will be of great value in advancing our understanding of their application in the *ars musica*. Perhaps the most important questions arising out of this research are how these technologies may have affected composers' working methods, the teaching and *Überlieferungsgeschichte* of music, and even musical style. Eventual answers to those questions should not invoke a strict technological determinism except as a last resort, for without first taking into account the human element in these technologies (i.e., the level of skill that can be achieved by experts, and the degree of flexibility in the results they produce), the technologies cannot be said to have been fully understood. This concern can be stated as a simple question: to what extent does the technology control the composer, or the composer control the technology?

Appendix

The manuscript history of Renier's *De inepcijs cuiusdam idiote ad amicum* is wholly uncomplicated, though not untouched by adversity. Previous editions are Bernhard Pez, osb, *Thesaurus anecdotorum novissimus*, vol. IV, 3 (Augsburg, 1723), cols. 17–52, the *editio princeps*, which was reprinted by the abbé Migne in *Patrologia Latina* 204 (Paris, 1855), cols. 15–40 (*siglum* = **P-M**), and that of Wilhelm Arndt in his *Reineri monachi sancti laurentii leodiensis opera historica*, in *Monumenta Germaniae historica . . . scriptorum tomus XX* (Hannover, 1868), 593–603 (*sig*. = **A**). These editions are based on a manuscript regarded as Renier's apograph (perhaps even autograph): Leuven (Louvain), Bibliotheek der Katholieke Universiteit, MS VI Janssens Theol. Profana (*sig*. = **L**). Unfortunately, **L** fell victim to the devastation of the Great War, perishing in the 1918 conflagration that swept through the University Library.[61] Although the partial text of Renier's tablet passage in Reusens' *Eléments de Paléographie* (*sig*. = **R**) is purportedly from **A**, the orthography strongly suggests it was transcribed directly from **L**.[62] The tragedy here is that the specimen plate from **L** in *Eléments* does not reproduce this passage.

Differences between the readings of **P-M**, on the one hand, and those of **A** and **R** on the other, while not radical, are significant. The natural inclination is to favour the readings of **A** and **R** over those of **P-M**. Another manuscript witness to Renier's text is extant, however: Brussels, Bibliothèque Royale Albert I^{er}, MS 9332–46, 66v–74v (*sig*. = **B**).[63] Dated 1428, **B** was written by Jean de

[61] The disaster is described by an eyewitness in Edouard de Moreau, *La Bibliothèque de l'Université de Louvain, 1636–1914* (Louvain, 1918), 2–3. A summary description of **L** is at p. 58.

[62] See note 18 supra.

[63] Joseph van den Gheyn, *Catalogue des manuscrits de la Bibliothèque Royale de Belgique. Tome troisième: Théologie* (Brussels, 1903), 308–11; François Masai and Martin Wittek *et al., Manuscrits datés conservés en Belgique, tome II: 1401–1440. Manuscrits conservés à la Bibliothèque Royale Albert I^{er} Bruxelles* (Brussels and Ghent, 1972), entry 162, pp. 38–9.

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Stavelot (1388–1449), a monk of Renier's house and an accomplished music scribe (as in the MS containing **B**, 92r–108r).[64] Neither **P-M, A,** nor **R** mention **B** – perhaps understandably, as they had access to **L**. Collation with **B** confirms the readings of **A** and **R** against those of **P-M**, and attests to the accuracy of Jean de Stavelot, Canon Reusens, and Wilhelm Arndt as transcribers. They only disagree in one instance, with **A** and **R** presenting the better reading.

In view of the importance of Renier's tablet passage, and the loss of **L**, the edition below reproduces the reading of the sole surviving medieval witness to the text, **B**. This may be regarded as '. . .a ''scribal version'' of a text – a version that was acceptable to its scribe and was read and understood by medieval readers'.[65] Both the orthography and the punctuation follow those of the manuscript. The punctuation of **B** makes good sense (with one exception); it is followed whenever possible in the translation above, except when this would render solecistic English. Pez and Arndt (– and Reusens) are equally deficient in *fontes*, a shortcoming this edition attempts to remedy.

Renier's use of allusion is most skilful, giving his words depth and a sometimes surprising colour. The reference to 'fruits of study' (from Jer. 2:14) foreshadows his punishment, and in comparing that punishment to being 'severely boxed', the word choice echoes 2 Cor. 12:7, and so likens the second prior to an agent of Satan. The latter allusion implies both that Renier requires the check, lest he become prideful, and that his compositional ability is a Divine gift, like Paul's revelations(!). Renier, imagining himself accused in chapter, is a new Paul before the Sanhedrin (Acts 23:6–7). At the time of his distress he thinks it futile to attempt to transfer his text to a more permanent support (parchment), for that would only invite further destruction, as happened to Jeremias' scroll. Only at his peril could a junior monk defy institutional authority (or a tyrant), as did the prophet Jeremiah and his associate Baruch (Jer. 36:4; 27; 32). Nonetheless, Renier likens himself to Jeremiah and Baruch, who rewrote their book after its destruction by king and official. Their example alludes to what Renier will do in the future, when he recalls his text through prayer. Ultimately, Renier's patience in suffering seems a superior virtue, for he was punished for merely doing good (cf. 1 Pet. 2:20).

/fol. 72r, col. A, lin. 31Prete*r*ea du*m* arte instituerer musica, quo assignasse*m* fructu*m* studio, melodia*m* co*m*posui de s*anct*is sixto, felicissimo et agapito. Quippe uegetati*o* ingenij. Sedulitas est exercitij. Simul q*uo*d mira uis indita p*ro*bat*u*r arti, ut pijs cordibus/ multu*m* affect*ion*is, multu*m* parere soleat c*on*pu*nct*i*on*is sua dulcedine. Id minime quida*m* attende*n*tes, ea sedulo cu*m* exercerer, leuitati et lasciuie deputaba*n*t, quor*um* uidelic*et* un*us*, que*m* s*ecun*di p*rior*at*us* tu*n*c fulcire*n*t t*ri*bunalia, arripie*n*s tabellas q*uib*us exiles imp*re*ssera*m* cogitat*us*, aliqua*n*tisp*er* considerauit. Interi*m* oscitaba*m* metu. Eteni*m* toruus ho*min*is uult*us*, suspe*n*saq*ue*

[64] Hubert Silvestre, 'Les écrits de Jean de Stavelot (1449) relatifs a l'histoire de l'abbaye de Saint-Laurent, a Liège', *Revue Bénédictine* 62 (1952), 143–8.

[65] A. George Rigg, 'Preface', *Peter the Venerable: Selected Letters*, ed. Janet Martin with the collaboration of Giles Constable (Toronto, 1974), vii.

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supercilia: futurum mihi malum presagiebant. O iudicem, minoe uel radamanto seueriorem! Legens, infremuit, cantans, ex hoc in hoc inclinauit. Cum ecce ueluti magna colaphizatus iniuria, cepit innocentes ceras obruere, et que exarata erant, emulo unguis aratro confundere. Quid facerem? Luctarerne, streperem, conuitiarer? Uirgarum fasces in capitulo, accusatores multi, ut recogitanda magnopere mihi phariseorum esset saduceorumque tumultuatio, qua pereclitatus olim paulus fuerat in concilio. Pestem murmure imprecarer? Pressum dentibus, nichil prodesset anathema. Quid igitur? Depono auriculas, ut inique mentis asellus, cum grauius dorso subijt onus, ypochritarumque patientia mansuesco ad calamitatem. Num uero iterum ceris deleta mandarem? Unguis ille truculentior immineret. Menbranulis resarcirem? Arulam et prunas regis ioachim et scalpellum iudi scribe: animo uersabam, maxime cum nec ego iheremias. Nec mihi baruch esset notarius. Ergo refrigueram ab incepto. Longum denique iam tempus decesserat. Reuoluere tandem cepi si que eiusdem apud memoriam cantus reliquie superessent. Quj tam prompte/ recuperatus est, ac si ante oculos haberem exteriores annotatum, ut senserim certe quodammodo uota non despicere deum simplitia. Igitur dedi membranule. Quod redditum erat memorie.

apparatus criticus

Titulus: De inepcijs . . . ad amicum] Libellus magistri reneri, loci huius monachi, super opuscula quorundam abbatum et fratrum. Incipiens de inepcijs cuiusdam idiote ad amicum ***B***, *rub. in fol. 66v, col. B, linea 15*
3 Simul quod] ***A***; Simulque ***P-M***
8 radamanto] ***A R***; Athamanto ***P-M***
9 Legens] ***A R P-M***; Ingens ***B***
13 fasces] ***A***; falces ***P-M***
14 esset] ***A***; *om.* ***P-M***
16 igitur?] ***A R P-M***; igitur. ***B***
18 deleta] ***A R***; delecta ***P-M***

fontes

1–2 fructum studio] Ier. 21, 14
2–3 Quippe uegetatio . . . exercitij] *cf. Catonis disticha* IV. 21; *Proverbia sententiaeque Latinitatis medii aevi. Lateinische Sprichwörter und Sentenzen des Mittelalters in alphabetischer Anordnung*, ed. Hans Walther, Carmina medii aevi posterioris latina 2/1, 9 vols. (Göttingen, 1963), 1:1069 (no. 8436); Ricarda Liver, revised Eva Delz, 'Lernen', in *Thesaurus proverbiorum medii aevi. Lexikon der Sprichwörter des romanisch-germanischen Mittelalters*, founded by Samuel Singer, ed. 'Kuratorium Singer', 12 vols. (Berlin and New York, 1998), 7:370–81, at p. 371 (nos. 1.1.1.9–10)
8 toruus hominis uultus] *cf.* Hor., *Ep.* I, 19. 12
9–10 O iudicem . . . severiorem] *cf.* Verg., *Aen.* VI, 432–3, 566–9
11 colaphizatus] *cf.* II Cor. 12, 7; I Pet. 2, 20

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13 Uirgarum fasces in capitulo] *cf. Reg. Benedict.*, 28.1
14–5 phariseorum . . . concilio] *cf.* Act. 23, 6–7
15 Pestem . . . imprecarer] *cf.* Num. 14, 27–37; I Cor. 10, 10; *Reg. Benedict.*, 23.1–5, 34.6–7
16–7 Depono . . . onus] Hor., *Sat.* I, 9. 20–1
19–20 Arulam . . . notarius] *cf.* Ier. 36, 22–3; 4, 27, 32
24 deum simplitia] *cf.* I Pet. 2, 20; Ier. 6, 20

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