

Digital Corpora and Scholarly Editions of Latin Texts: Features and Requirements of Textual Criticism

By Franz Fischer

INTRODUCTION

Digital philology has produced a wide range of new methods and formats for editing and analyzing medieval texts. The provision of digital facsimiles has put the manuscripts, the very material base of any editorial endeavor, into focus again. Several editions have been created that engage primarily with individual manuscripts; others have posited a wide range of variance as a central characteristic of medieval literature instead of relegating variants to the footnotes of ahistorically normalized and regularized texts or speculative reconstructions of archetypes and authorities.¹

Nevertheless, the idea of a critical text, especially of nonvernacular medieval works, does not yet seem to be obsolete. Quite the opposite: the number of digital facsimiles of manuscripts and early print books and the quantity of document-oriented transcriptions available online is growing continually, and with it the need for critically examined and edited texts increases.² Like a medieval reader having little choice but to rely on the only manuscript copy available at her or his library, without a critical text the modern reader is at a loss to adjudicate on the quality of the textual version picked up randomly on the internet. Moreover, digital technologies, methods, and standards have steadily improved, creating possibilities for digital critical editions the quality of which former generations of editors could only imagine. As of yet only a relatively small number of born-digital critical editions of Greek and Latin texts exists.³

This article stems from a specialized seminar at the University of Oklahoma on “Latin Textual Criticism in the Digital Age” organized by the Digital Latin Library (DLL), a joint project of the Society for Classical Studies, the Medieval Academy of America, and the Renaissance Society of America funded by the Andrew W. Mellon Foundation’s Scholarly Communications Program.

¹ E.g., editions of *Parzival* (<http://www.parzival.unibe.ch>), the *Canterbury Tales*, Dante’s *Divina Commedia* and *Monarchia* (<http://www.sd-editions.com>), or the Vercelli Book (<http://www.collane.unito.it/oa/items/show/11>), to name just a few. All URLs have been verified and the referenced websites have been archived as far as possible in the Internet Archive (<https://archive.org/>) on 26 June 2017.

² Franz Fischer, “All Texts Are Equal, But . . . Textual Plurality and the Critical Text in Digital Scholarly Editions,” *Variants* 10 (2012): 77–92; online: <http://kups.ub.uni-koeln.de/5056>; Caroline Macé and Jost Gippert, *Oxford Handbook of Greek and Latin Textual Criticism*, ed. Wolfgang de Melo and Scott Scullion (Oxford, forthcoming), ch. 6, “Textual Criticism and Editing in the Digital Age.”

³ Paolo Monella, “Why Are There No Comprehensively Digital Scholarly Editions of Classical Texts?” (paper first published online April 2012; revised version [April 2014] online at http://www1.unipa.it/paolo.monella/lincei/files/why/why_paper.pdf).

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Even so, the (albeit slowly) growing number of digital critical editions increases the demand for assembling and providing critical texts that are in the form of a textual corpus, because only collections or corpora of texts that are otherwise dispersed on various websites allow for a systematic analysis and for efficient research across the works of a specific author, genre, subject, period, or language as a whole.⁴ In this article, some features and requirements for a digital corpus of critical texts are proposed and discussed in order to realize the heuristic, explorative, and interpretative potential of integrated historical texts from the classicist and postclassicist tradition of Greek and Latin works.

Generally speaking, when corpora of classical or medieval Latin or Greek texts are compiled and published, they are stripped of their critical features, namely the accompanying introduction, commentary, and apparatus notes. One reason for this omission might be economic: if the texts are published by a traditional publishing house (such as Brepols, with its Library of Latin Texts⁵), the digital text versions of the corpus are considered an additional means of entry to the printed version in order to give access to a large variety of texts and promote the canonical print products, which remain indispensable for accurate citation and reference.

If the texts are published by an academic institution not primarily driven by economic interests (such as, most notably, the Perseus Digital Library⁶ or the Digital Library of Late-Antique Latin Texts⁷), the reason for skipping the critical features of a printed scholarly edition might be more practical in nature. While it is rather easy to digitize plain texts, it is very hard to encode the complex and often idiosyncratic reference system of apparatus notes (lines, lemmata, variant readings, sigla, etc.). This task requires both a lot of time and a high degree of skill on the part of the digitizing person.⁸

⁴ On the general aspects and purposes of digital corpora see the catalog of “Criteria for Reviewing Digital Text Collections,” by Ulrike Henny and Frederike Neuber in collaboration with the members of the Institut für Dokumentologie und Editorik (IDE), version 1.0, February 2017, <http://www.i-d-e.de/publikationen/weitereschriften/criteria-text-collections-version-1-0/>: “A few examples for collection design principles are completeness (e.g. if the corpus aims to represent the work of an author as a whole), representativeness (if the corpus claims to be representative for a specific subject domain and functions as a reference for that domain) and balance (e.g. if the corpus is built to allow for contrastive analyses between its components such as different text genres or regional language varieties).”

⁵ Library of Latin Texts–Online (LLT-O, 2016), online: <http://www.brepols.net/Pages/BrowseBySeries.aspx?TreeSeries=LLT-O>.

⁶ There are some exceptions to the rule of stripping away features of textual criticism, for example, in the edition of Cicero’s speeches, *M. Tulli Ciceronis Orationes*. See, for example, *Against Catiline*, work URI: <http://data.perseus.org/texts/urn:cts:latinLit:phi0474.phi013>; there you also find commentary notes, a translation, a vocabulary tool, and a search tool. For the time being, the only digital corpus of Latin texts providing (mostly retrodigitized) critical editions is “Musisque Deoque: A Digital Archive of Latin Poetry, from Its Origins to the Italian Renaissance,” <http://www.mqdq.it/public/>.

⁷ Digital Library of Late-Antique Latin Texts (digilibLT): <http://digiliblt.lert.unipmn.it>.

⁸ For a semiautomated method of mapping apparatus entries on the annotated section of the main text, see Federico Boschetti, “Methods to Extend Greek and Latin Corpora with Variants and Conjectures: Mapping Critical Apparatuses onto Reference Text,” in *Proceedings of the Corpus Linguistics Conference* (Birmingham, 2007), online: http://ucrel.lancs.ac.uk/publications/CL2007/paper/150_Paper.pdf.

There are other causes for the omission of text-critical features, such as copyright issues⁹ or a predominant interest in simple text analytics and computational methods, such as stylometry, topic modeling, computational semantics, text mining, or search and retrieval applied to plain text versions.¹⁰ Be that as it may, one might ask whether it would be sufficient simply to add the information as given in the *apparatus criticus* and in the philological introduction to make these texts “truly” digital critical editions. A “truly” and fully fledged digital scholarly edition is surely something more than, or at least something different from, a traditional scholarly edition in a digital format.¹¹ But if that is the case, how does this fit into a corpus of digital scholarly editions?

DIGITAL CRITICAL EDITIONS: SIX CASE STUDIES

In the following analysis, six editions will be presented. They are all critical and digital editions of Latin or Greek works. They have been or are being created in connection with my personal and institutional involvement under very specific conditions, at a certain place and time, with very specific aims and scope. They serve here as case studies to identify some general characteristics of digital critical editions. On the basis of these examples, four proposals will be made for how to create a digital corpus of critical editions.

First Study: Historians from Late Antiquity

The collection and edition of fragments and testimonies of historians from late antiquity is a long-term project carried out at the University of Düsseldorf. It has been conceived as a traditional critical print edition with a parallel online presence. The edition comprises a critical text furnished with an *apparatus criticus* and a philological introduction. A commentary, German translation, and bibliography are planned to be published exclusively in print—as a concession to the business model of the publisher. The online version is being realized by the Cologne Center for eHumanities (CCeH) of the University of Cologne. The critical texts are edited

⁹ The copyright status of edited ancient or medieval texts varies according to national legislation. For instance, under German law, a critical text of an edition (created by an author deceased centuries ago) might not be copyrighted, while the introduction, commentary, and apparatus are. Otherwise there is legal uncertainty, and uniform international guidelines or legal assistance are missing. See a recent article by Wout Dillen and Vincent Neyt, “Digital Scholarly Editing within the Boundaries of Copyright Restrictions,” in *Digital Scholarship in the Humanities* 31/4 (2016): 785–96, doi:10.1093/lc/fqw011, on the possibilities and limitations when working with modern manuscripts.

¹⁰ Good examples for advanced corpora of Latin texts created for this purpose are the Corpus Corporum, a “Latin text (meta-)repository and tool” developed at the University of Zurich (<http://www.mlat.uzh.ch/MLS/>); and the Computational Historical Semantics (CompHistSem) Latin text database and lexicon created at the Goethe-University Frankfurt (<http://www.comphistsem.org>). For a discussion about the gap between digital scholarly editions and text analysis see the panel discussion “Text Analysis Meets Text Encoding” at the DH2012 conference in Hamburg: <http://www.dh2012.uni-hamburg.de/conference/programme/abstracts/text-analysis-meets-text-encoding.1.html>.

¹¹ For a definition see, most recently, Patrick Sahle, “What Is a Scholarly Digital Edition (SDE)?,” in *Digital Scholarly Editing: Theory, Practice and Future Perspectives*, ed. Matthew Driscoll and Elena Pierazzo (Cambridge, UK, 2016), 19–39; online: <http://www.openbookpublishers.com/download/book/527>, doi:10.11647/OBP.0095.

with Classical Text Editor (CTE),¹² a software tool widely used by traditional philologists for creating multiple apparatus in printable format, namely PDF. The tool also provides an HTML and even TEI-XML output, marking up all relevant layout information of the print version: sections, fonts, italics, borders, spaces, and so on. Semantic information (such as readings, witnesses, lemmata, quotes, sigla, and references) is not marked up explicitly. As a consequence, the digital version is a mere reproduction of the print, lacking any additional features except for basic browse and search. For this reason, it can be labeled a critical edition, as it provides a philological introduction and critical annotations (even if based on the work of previous editors), descriptive information, and indices, as well as—after a so-called moving wall, that is, after a certain period of time—commentary and translation. In essence, the edition follows the print paradigm. Digital methods or functionalities have not been applied. Its usability does not significantly differ from the usability of a printed book. Even if critically annotated and digitally presented, from a technological perspective the established texts are plain and single-dimensional (Fig. 1).¹³

Second Study: Saint Patrick's "Confessio"

The digital edition of Saint Patrick's *Confessio*, a fifth-century open letter by Ireland's patron saint, is based on a critical print edition from 1950 including critical apparatus, *apparatus fontium*, *apparatus biblicus*, and commentary, but also adding various text layers (facsimiles, translations) and features (paratexts, bibliography, scholarly articles, fiction, and more)—all of which are closely interlinked and furnished with user-friendly functionalities (hyperlinks from sigla to facsimile, from lemma to text, from reference to bibliography, and so on).¹⁴ The realization of the edition entailed a wide range of tasks and actions: OCR cleanup; the acquisition of facsimiles; copyright negotiations; encoding of the canonical work structure and alignment with the structure of manuscript witnesses, prints, and translations; and, last but not least, a detailed encoding of the apparatus entries and the editor's commentary. The presentation of various textual layers, versions, and annotations relies heavily on the application of hypertext technology and is suitably labeled a hypertext stack edition (Fig. 2).¹⁵

Third Study: Guillelmus Autissiodorensis

The digital *editio princeps* of William of Auxerre's treatise on liturgy, the *Summa de officiis ecclesiasticis*,¹⁶ has been generated from a detailed transcription of the prin-

¹² Classical Text Editor, version 9.2 (2016): <http://cte.oeaw.ac.at/?id0=main>.

¹³ A similarly "flat" edition (from the technological point of view) is Donald J. Mastronardo's digital edition of the scholia on Euripides: <http://euripidesscholia.org/>.

¹⁴ *Saint Patrick's Confessio*, ed. Anthony Harvey and Franz Fischer (Dublin, 2011); online: <http://confessio.ie>; Franz Fischer, "Who is Patrick?—Answers from the Saint Patrick's Confessio Hyper-Stack," in *Conference Proceedings: Supporting Digital Humanities* (Copenhagen, 2011); online: <http://kups.uni-koeln.de/id/eprint/5054>; Fischer, "All Texts Are Equal."

¹⁵ A comparable edition (if on a slightly smaller scale) is the edition of the *Schedula diversarum artium* (<http://schedula.uni-koeln.de/>), providing all relevant texts and documents to assess and analyze the complex stages of editorial revision and textual transmission. In the form of a digital collection of three critical print editions, that edition might even be labeled a metaedition.

¹⁶ *Magistri Guillelmi Autissiodorensis Summa de officiis ecclesiasticis*, ed. Franz Fischer (Cologne, 2007–12); online: <http://guillelmus.uni-koeln.de>; Franz Fischer, "The Pluralistic Approach—The First *Speculum* 92/S1 (October 2017)

The screenshot displays the digital edition interface for 'Kleine und Fragmentarische Historiker der Spätantike'. At the top, there is a header with the project title and logos of the Heinrich-Heine-Universität Düsseldorf and the Nordrhein-Westfälische Akademie der Wissenschaften und der Künste. Below the header, there is a navigation bar with a search box and a 'Beta-Version' label. The main content area is titled 'A1 Asinius Quadratus' and features a navigation menu with 'Einleitung', 'Text', 'Siglen', and 'Inhaltsverzeichnis'. The 'Inhaltsverzeichnis' tab is active, showing a list of testimonia with their corresponding page numbers. The list includes:

- (A 1) Asinius Quadratus
- testimonia
- 1. (1) Suda κ 1905 (codd. A[F][GVM])
Κόδρατος· Ρωμαῖος ἱστορικός. Ἐγραψεν ἰδίᾳ διαλέκτῳ ἱστορίαν
Ρωμαϊκὴν ἐν βιβλίῳ κ', ἐπιγραφὴν δὲ Χλικτηρίδα, καὶ περιέχει
ἀπὸ κτίσεως Ρώμης ἕως Ἀλεξάνδρου τοῦ Μαμαίας υἱοῦ Καίσαρος.
- 2. (3) Evagr. h. e. 5,24 p. 219,7–10 B-P. (codd. ALPB)
καὶ Εὐσεβίου (A 6 test. 1) δὲ ἀπὸ Οὐσταβιανοῦ καὶ Τραιανοῦ καὶ
Μάρκου Λαβίων ἕως τῆς τελευταίας Κάρου κατήγητησιν. γέγραπται
δὲ περὶ τῶν χρόνων τούτων ἕνα Ἀρριανῶ (FGHist 156 F 30b) τε
καὶ Ἀσινίου Κουαδράτου.
- **3. IGRom IV 1013 (IG XII 7 267)
[ἀγαθὴ] τύχη· [Αὐτοκ]ε[λ]ά]τορα Καίσαρα [Μ]άρκο[ι] Λιούβιλον
Ἀνωικειῶν Εὐσεβίῃ Σίβαστον, τὸν γῆς [καὶ] θαλάσσης [δ]εσπότην,
Γάιοι [Α]σίνιοι Πρόττιμος [Κο]μμάδρατος καὶ Ρούφος, [οἱ] κρείττι-
στοὶ ἀδελφοί, [τὸν ἑαυτῶ]ν σωτήρα [καὶ ἐνργέ]την.

On the right side of the page, there is a vertical list of page numbers: Seite 9, Zeile 4, Zeile 5, Zeile 6, Zeile 9, Zeile 10, Zeile 11, Zeile 12, Zeile 16, Zeile 17, Zeile 18, and Zeile 19.

Fig. 1. A critical text version of testimonia on Asinius Quadratus (preview of the KfHist beta version).

principal manuscript witness, includes variant readings from a selection of other witnesses, and is enriched with critical editorial markup. Published in 2007, it is the first of its kind in medieval Latin philology, as it follows a pluralistic textual paradigm and provides a critical text with a threefold apparatus, links to all facsimiles on the page level, extensive descriptions of the manuscripts, a detailed transcript of the principal manuscript witness, a reading text of an almost-contemporary revision of the text, an introduction, indices, and so forth. Applying a digital methodology and addressing a wide range of notions of text, this edition might be labeled a born-digital, multi-dimensional, or pluralistic scholarly edition (Fig. 3).

Fourth Study: Carolingian Capitularies

The Capitularia project provides transcriptions of important law texts from the Carolingian era: collections of decrees of Frankish rulers regulating political, mil-

Scholarly Edition of William of Auxerre's Treatise on Liturgy," *Jahrbuch für Computerphilologie* 10 (2010): 151–68; online: <http://computerphilologie.tu-darmstadt.de/jg08/fischer.html>; Fischer, "All Texts Are Equal."

SAINT PATRICK'S CONFESSIO
Read what St Patrick actually wrote *in his own words*

Home | Confessio/Epistola | Manuscripts/Prints | Special Features | About

Paragraph: ← 01 / 62 → Search Latin

I. CONFESSIO
LIBRI EPISTOLARUM SANCTI PATRICII EPISCOPI.
LIBER PRIMUS: CONFESSIO.

Ego Patricius peccator rusticissimus et minimus omnium fidelium et contemptibilissimus apud plurimos patrem habui Calpornium diaconum filium quendam Potiti presbyteri, qui fuit uico †bannaem taburniae†; uillulam enim prope habuit, ubi ego capturam dedi. Annorum eram tunc fere sedecim. Deum enim uerum ignorabam et Hiberione in captiuitate adductus sum cum tot milia hominum — secundum merita nostra, quia a Deo recessimus et praecepta eius non custodiimus et sacerdotibus nostris non oboedientes fuimus, qui <nos> nostram salutem admonebant: et Dominus induxit super nos iram animationis suae et dispersit nos in gentibus multis etiam usque ad ultimum terrae, ubi nunc paruitas mea esse uidetur inter alienigenas,

Relevant passage in: Manuscripts Print editions Translations

Fig. 2. The first paragraph of Saint Patrick's *Confessio*, with interlinked entries of the three-fold apparatus and links to manuscript facsimiles, previously relevant print editions, and translations.

itary, ecclesiastical, social, economic, and cultural matters, usually drawn up and issued during the course of royal assemblies and distributed by so-called *missi*, counts and bishops. Previous critical editions published in print all failed to reflect adequately the diversity and complexity of the textual transmission. In a new editorial approach, all manuscript witnesses are being transcribed with a focus on structural information, such as rubrics, initials, and the order of chapters and capitularies. This serves the twofold aim of respecting the individual and regional characteristics of each of these historical documents and enabling a semiautomated comparison for detecting and highlighting differences and commonalities among the witnesses (Fig. 4).

These automated collations, made using the collation tool CollateX,¹⁷ constitute the basis for a critical assessment of the textual tradition and for establishing a critical text version to be published both in print and online as part of the Monumenta

¹⁷ CollateX—Software for Collating Textual Sources: <http://collatex.net/>.

**Magistri Guillelmi Autissiodorensis
Summa de officiis ecclesiasticis**
Kritisch-digitale Erstaussgabe

Kritischer Text | Transkription P1 | Cambrai-Fassung | Faksimiles | Handschriften | Register | Projekt

Inhaltsverzeichnis | Volltext

Blättern: << | < | > | >>

Suchen

I.5. De tertia¹

1. Sequitur tertia. In hac hora secundum marchum crucifixus est ihesus linguis iudeorum². In hac etiam hora datus est³ spiritus sanctus³, sollicit⁴ apostolis, utilisiter. Vnde adictibus: "non sunt isti ebrii, cum⁵ sit hora diei tertia⁶". Vnde etiam dicit hymnum⁷: "nunc sancte nobis spiritus⁸ et cetera". Et cantat "legem pone⁹ et cetera, quia tunc data est noua lex¹⁰ apostolis. Et cantantur tres psalmi ratione predicta, et quia per legem dei sanatur homo a morbo peccati. Vnde sapientia: "non herba, nec¹¹ mallagma¹² sanauit eos¹³ et cetera. Dicit "sana me¹⁴, domine, et sanabor¹⁵ in capitulo et in responsorio: "sana animam meam" et cetera¹⁶. Ex predictis autem¹⁷ patet¹⁸ ratio omnium istorum, sollicit psalmodum, capitulorum, responsorium¹⁹ et eorum, que precedunt.

Lesarten

1 De tertia: om P2; de tertia hora man rec T
2 est: om T
3 sanctus: om T
4 sollicit: om P2, T
5 cum: es man rec T
6 hymnum: hymnum T
7 et cetera: om P2, T
8 noua lex: lex noua P2; lex noua T
9 nec: es T
10 mallagma: malangina T
11 sanauit eos: om P2, T
12 me: post me cancellauit T
13 et cetera: quia peccati tibi P2, (e ante tibi exp) T
14 autem: om P2
15 patet: et addi P2, T
16 responsorium: rubricarum P2, T

Quellen

a In hac ... iudeorum: cf Marc 15,25
b non ... tertia: Act 2,15
c nunc ... spiritus: Repertorium Hymnologicum 12586 (Chevalier II, p 171); Hymnus ad tertiam
d legem pone: Ps 26,11
e non herba ... eos: Sap 16,12
f sana ... sanabor: Ier 17,14

Rezeption

A In hac ... iudeorum: Durandus, Rationale V, xl, 1.3sq (CCCC 140A, p 100)
B In hac ... et cetera: Durandus, Rationale V, xl, 1.8-18 (CCCC 140A, p 100)

Zitiervorschlag: Guillelmus Autissiodorensis, Summa de officiis ecclesiasticis, tract. I, cap. 5, hrsg. v. Franz Fischer, Köln 2007-2013, guillelmus.uni-koeln.de/crit/tcrit_11c5

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Fig. 3. The chapter on the Third Hour in William of Auxerre's *Summa de officiis ecclesiasticis*, critical text with threefold apparatus and links to manuscript facsimiles and other text versions.

Germaniae Historica (MGH and dMGH, respectively).¹⁸ Aiming to document both the full textual transmission and a critical text and following a twofold publication strategy, this edition might be labeled a multiwitness hybrid edition (Fig. 5).

Fifth Study: *Monasterium.net*

Monasterium.net is a collaborative and virtual digital archive, presently providing access to facsimiles and descriptions of more than six hundred thousand me-

¹⁸ See Gioele Barabucci and Franz Fischer, "The Formalization of Textual Criticism: Bridging the Gap between Automated Collation and Edited Critical Texts," in *Advances in Digital Scholarly Editing*, ed. Peter Boot et al. (Leiden, forthcoming).

Collation output for BK.139_1

ik-text superstruktur	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
berlin-ab-phill-1737	si	quits	aut	—	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
cava-del-tirreni-bdb-4	si	quits	qualibet	—	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
gotha-fib-memb-1-84	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
hrea-bc-xxviii	si	quits	aut[em]	[ex]	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
kopenhagen-kb-1943-4	si	quits	aut	—	leu	causa	—	—	causa	hominem	in	ecclesia	interfecit
london-bl-egerton-2832	si	quits	autem	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
montpellier-bl-h-136	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
muenter-sa-msc-vii-5201	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-2718	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4280a	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4626	si	quits	autem	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4628	si	quits	aut	—	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4628a	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4631	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4632	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4788	si	quits	autem	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-4995	si	quits	—	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
paris-bn-lat-9553	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesiam	interfecit
paris-bn-lat-18238	si	quits	aut	—	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
selestat-bh-14	si	quits	—	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
st-paul-abs-4-1	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
stuttgart-wib-lur-4-134	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
vatican-bav-chigi-f-iv-75	si	quits	—	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
vatican-bav-reg-lat-338	si	quits	aut	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit
wolffenbuetel-hab-blankemb-130	si	quits	autem	ex	leu	causa	aut	siro	causa	hominem	in	ecclesia	interfecit

ik-text superstruktur	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
berlin-ab-phill-1737	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
cava-del-tirreni-bdb-4	uoluerit	de	uita	componat	—	si	uero	—	risati	fuertit	et	unum	alterum	in
gotha-fib-memb-1-84	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
hrea-bc-xxviii	—	[de]	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alteru[m]	in
kopenhagen-kb-1943-4	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
london-bl-egerton-2832	—	de	uita	componat	—	si	uero	—	risati	fuertit	et	unus	alterum	in
montpellier-bl-h-136	—	de	uita	componat	—	si	uero	foris	risati	fuertit	[et]	unus	alterum	in
muenter-sa-msc-vii-5201	—	de	uita	componat	et	—	—	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-2718	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4280a	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4626	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4628	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4628a	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4631	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4632	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-4788	—	—	d.ta	componat	—	si	uero	foras	risati	fuertit	et	unus	pratherum	in
paris-bn-lat-4995	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
paris-bn-lat-9553	—	de	uita	componat	—	si	uero	foras	risati	fuertit	et	unus	alterum	in
paris-bn-lat-18238	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
selestat-bh-14	—	de	uita	componat	—	siue	—	foris	risati	fuertit	et	unus	alterum	in
st-paul-abs-4-1	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
stuttgart-wib-lur-4-134	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
vatican-bav-chigi-f-iv-75	—	—	debita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in
vatican-bav-reg-lat-338	—	de	uita	componat	—	si	uero	—	risati	fuertit	et	unus	alterum	in
wolffenbuetel-hab-blankemb-130	—	de	uita	componat	—	si	uero	foris	risati	fuertit	et	unus	alterum	in

Fig. 4. A collation table of various witnesses generated by the collation tool CollateX, implemented into the Capitularia website (internal).

dieval and early modern charters from more than one hundred and fifty archives. The online platform allows for digital editing of the charters at all scholarly levels: in some instances, scans are provided, along with the most basic metadata, such as repository and shelf marks; in others, short descriptions and abstracts are included and, if available, retrodigitized print editions; whereas in others, veritable born-digital diplomatic editions are produced that include introductions or prefaces, diplomatic transcripts encoded according to the standard of the Charters Encoding Initiative (CEI), a diplomatic analysis, and bibliographies. Since charters usually survive as single documents, there is no critical annotation in the form of critical apparatus entries. The nature of these charter editions varies and ranges from digital diplomatic editions in their original sense, that is, focusing on dating, proof of authenticity, and the analysis of the content structure of a charter;¹⁹ digital documentary

¹⁹ According to the definition given in the *Vocabulaire international de la diplomatie*, ed. Maria Milagros Cárceles Ortí, 2nd ed. (València, 1997), 24; online: http://www.cei.lmu.de/VID/VID#VID_19: “Une édition diplomatique est la publication d’un document, après établissement critique de son texte

Paris, Bibliothèque Nationale, Lat. 9653

[fol. 32v]

INCIPIUNT CAPITULA QUÆ LEGIBUS · ADTENTA SUNT QUÆ ET MISSI ET COMITES HABERE
ET CETERIS NOTUM FACERE DEBENT ·

IN PRIMO CAPITULO DE HONORE ECCLESIASTIC[O]

[BK 139 c. 1]

Si quis aut ex leui causa aut sine causa hominem in ecclesiam interfecerit de uita componat · Si uero foras rixati fuerint et hunus alterum in ecclesiam fugierit et ibi se defendendo eum interfecerit si huius facti testes non habuerit cum XII coniuuratoribus legitimis per sacramento adfirmem se defendendo eum interfecisse et postea · DC · solidos ad parte ecclesie quam illo homicidio polluerat · et insuper banno nostro soluere cogatur · His uero qui interfectus est absque compos[it]ione iaceat · hac deinde interfecto secundum iudicium canonicum congruam facinori quod admisit penitentiam haccipiat · Si proprius seruus hoc commiserit iudicio aque fer[uen]tis examinetur utrum hoc sponte ad se defendendo fecisset · et si manus eius exsusta fuerit interficiatur · Si autem non fuerit dominus eius iuxta quod uari[gil]dus^a illius est ad

[BK 139 c. 18]

presumpserint [fol. 33r] LX · ictibus uapulent · a[ut] si] magister [eorum] uel aduocatus qui liber est^a eos uel comiti uel missum nostrum iussus presentare maluerit predictum bannum · LX solidorum componat

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Fig. 5. Online edition of the Frankish Capitularies, transcription of the Parisian manuscript witness Bibliothèque nationale de France, MS lat. 9653.

editions, focusing on external features of the documents; and data-enriched editions, with information on historical persons, places, events, or decoration (for example, in the art historical subcollection of illuminated charters)²⁰ (Fig. 6).

Sixth Study: Digital Averroes Research Environment (DARE)

The Digital Averroes Research Environment (DARE) collects and edits the works of the Andalusian philosopher Averroes (Abū l-Walid Muḥammad Ibn Aḥmad Ibn Rušd), born in Cordoba in 1126, died in Marrakesh in 1198. Through the portal, images of as many textual witnesses as possible, that is, manuscripts, incunabula,

compte tenu de la tradition de celui-ci et d'un examen critique de sa sincérité et de sa datation." The term was established in the seventeenth century during the historical debate between the Maurist scholar Jean Mabillon and the Bollandist hagiographer Daniel van Papenbroeck: see Paul Bertrand, "Du *De re diplomatice* au nouveau traité de diplomatique: La réception des textes fondateurs d'une discipline," in *Dom Jean Mabillon, figure majeure de l'Europe des lettres: Actes des deux colloques du tricentenaire de la mort de dom Mabillon*, ed. Jean Leclant, André Vauchez, and Daniel-Odon Hurel (Paris, 2010), 605–19. Nowadays the term "diplomatic" is usually applied to very detailed transcriptions of any type of document: see *Lexicon of Scholarly Editing*, ed. Wout Dillen et al., s.v. "transcription (diplomatic)," <http://uahost.uantwerpen.be/lse/index.php/lexicon/diplomatic-transcription/>.

²⁰ See <http://www.monasterium.net/mom/IlluminierteUrkunden/collection>; <http://www.monasterium.net/mom/glossar>.

mom

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Charter: Serbische Herrscherurkunden (1306-1388) 13460820 - Dusan

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Stephanus dei gratia Romanie, Sclauonie et Albanie Imperator. Universis et singulis hominibus universitatis civitatis Ragusie, tam presentibus quam futuris, [2] devotis nostris, gratiam et bonam voluntatem. Specialis illa devotio, quam erga confessorem mirificum et egregium beatissimum Nicolaum felicis recordationis [3] dominus Vrossius, dominus avus noster, et bone memorie dominus Stephanus, dominus genitor noster, illustrissimi reges condam Arascie, habuerunt et quam nos multomagis habemus, spe [4] cialiter nos inducit ut archam ipsius beatissimi Nicolai in Baro, in qua corpus ipsius sancti venerabiliter requiescit et de cuius tumba incessanter mana manat, honore [5] et comodo benivolo prosequamur. Cum itaque, sicut pro parte capituli dicte ecclesie peticio nobis exhibita continebat, in ipsa ecclesia est necessitas certe quantitatis cere anno quolibet [6] pro cultu divino. Nos autem, considerantes ut divinus cultus in ipsa ecclesia augeatur et ut specialiter pro animabus dominorum avi et genitoris predictorum, ac etiam pro salute nostra et domini [7] nati nostri et nostre consortis oratio semper fiat, a presenti mense augusti presentis anni, quaterdecime indictionis. [9] Mandantes propterea universis et singulis hominibus, consiliariis et aliis officialibus dicte civitatis Ragusie, tam presentibus quam futuris, ut anno quolibet in perpetuum de nostro tributo [10] predicto, quod habemus in dicta civitate Ragusie, ad requisitionem dominorum Nicolai archipresbyteri Aquive barenis diocesis, et Nicolai de Barolo, canonicorum et procuratorum [11] capituli dicte ecclesie et aliorum procuratorum dicte ecclesie, qui pro tempore erunt, a presenti mense augusti presentis anni incipiendo, ducenta perpera grossorum venetorum, duo [12] decim pro quolibet perpero computatis, dare et assignare ac ab aliis assignari facere pro emendo ceram predictam, et de dictis perperis singulis vicibus a dictis procuratoribus, [13] presentibus et futuris, recipiatis ydoneam apodixiam eorum sigillis sigillatam ad certitudinem et cautelam, tam nostre curie quam vestre universitatis Ragusie.

Datum [14] Scopie, sub pendenti sigillo et suscriptionibus manus nostre maiestatis, Anno Domini Millesimo trecentesimo quadragesimosexto, indictione quartadecima, [15] die vicesimo mensis augusti, imperatus nostri anno primo.

МИЛОСТИЮ БОЖИИЮ СТЕФАНЪ ВЪ ХРИСТА БОГА ВЪРНИ ЦАРЬ СРЪБЛСМЪ И ПОМОРИНО И ГРЪКСОМЪ И ЗАПАДНОИ СТРАНАМ

Source Fulltext: S. Cirkovic, Povelja cara Dusana Opstini dubrovackoj o isplati 200 perpera godisnje crkvi Svetog Nikole u Barju, SSA 4 (2005) 88-89. [hr]

▼ Diplomatic Analysis

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Fig. 6. Facsimile and transcription of a medieval Serbian charter on monasterium.net: Bari, Archivio di S. Nicola Periodo Angioino L. 22 (20 August 1346, Skopje).

and early printed editions, are provided online.²¹ At present, DARE includes only a small number of edited texts, most of these textual versions that have not yet been critically annotated. However, the portal is already a key resource for a long-term editorial project to create critical editions of the works of Averroes that reflects and analyzes their extremely complex transmission back and forth through Latin, Greek, Arabic, and Hebrew—an enterprise that would have been considered impossible without digital methods and resources. The established critical-text versions will eventually be integrated into the DARE platform in order to complement a digital resource that can be labeled a knowledge site (Fig. 7).²²

VARIETY OF EDITIONS VERSUS HOMOGENEITY OF A CORPUS

We have just presented six examples of critical approaches towards (mostly) Latin texts in a digital editorial format. They show a great variety with respect to the content and the notion of what the text is and what the respective edition actually should do. Some digital editions (1) provide a critical text following the Lachmannian paradigm, reconstructing some archetypal text version by following a strict methodology of *recensio* (transcription, collation, establishment of a *stemma codicum*), *selectio*, and *emendatio*.²³ Others (2) abide by the *Leithandschrift* principle and follow a principal manuscript witness. Accurate transcriptions (3) might focus on very different details and characteristics before being enriched with critical annotations. Nowadays most digital editions provide digital facsimiles of manuscripts and prints, all of which may vary in the quality of the digital scans and in the degree to which they are integrated into and interlinked with the critical text. Some editions are multidimensional, providing various versions or layers of text, parallel texts, and translations. All digital editions are labeled according to the material and the editorial method applied: critical, diplomatic, semidiplomatic, documentary, multiwitness, archive edition, and so on. Moreover, even editions with similar labels feature various differing functionalities and presentational modes, all of which are based on a large variety of encoding, since even within the de facto standard for text encoding, as provided by the guidelines of the Text Encoding Initiative (TEI),²⁴ there are various ways of modeling textual variance. More generally speaking, digital scholarly editions all differ with respect to the application and degree of both textual criticism and digitality (that is, the degree to which they employ and integrate digital technologies).

But if textual, or rather editorial, plurality seems to be one of the main characteristics of digital editions, how is a coherent digital corpus of scholarly editions to be constructed? How does such diversity fit into a corpus if the usefulness of a corpus is based largely on the homogeneity and representativeness of the texts that it includes? These texts are expected to be homogenous in order to be detectable,

²¹ For an overview of texts available, see <http://dare.uni-koeln.de/?q=node/32>.

²² Peter Shillingsburg, "How Literary Works Exist: Convenient Scholarly Editions," *Digital Humanities Quarterly* 3/3 (2009), par. 4; Thomas Stäcker, "Creating the Knowledge Site—Elektronische Editionen als Aufgabe einer Forschungsbibliothek," *Bibliothek und Wissenschaft* 44 (2011): 107–26.

²³ Martin Litchfield West, *Textual Criticism and Editorial Technique Applicable to Greek and Latin Texts* (Stuttgart, 1973).

²⁴ Guidelines of the Text Encoding Initiative (P5): tei-c.org/release/doc/tei-p5-doc/en/html/index.html.

DARE

The Digital Averroes Research Environment, a digital project at the THOMAS-INSTITUTE of the University of Cologne

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chunk 812

Textus/Commentum [86]



91v

Ibn Rushd

Averrois Cordubensis Commentarium magnum super Aristotelis librum VIII Physicorum (c.78, c.79, c.86)Translated by [Michael Scotus](#)ed. [Guy Guldentops](#), [2002], chunk 812[p. 15] **Textus/Commentum [86]****Hic ergo distinctis manifestum est quod primus motor, qui nunquam movetur, non potest habere magnitudinem omnino, quoniam si haberet, necesse****esset ut esset finita aut infinita. Et iam declaravimus in sermone nostro naturali****quoniam impossibile est magnitudinem esse infinitam. Et nunc declaravimus quoniam finitum non potest habere virtutem infinitam, et quod finitum non potest movere tempore infinito. Sed primus motor movet motu eterno tempore infinito. Ergo manifestum est ipsum esse indivisibilem et impartitum et nullam****habere magnitudinem.**

In hoc capitulo inducit conclusionem quam a primo intendit, quoniam cum induxit propositiones que necessarie sunt ad hoc et solvit questiones que accidunt in illa propositio | nibus quibus usus est, concludit quoniam primus motor, de quo declaratum est ipsum non moveri, non habet corpus, idest non habet formam in materia. Et dicit **Manifestum est quoniam primus motor, qui nunquam movetur, non potest habere magnitudinem**, idest et cum iam ostendimus quod omnis corporis finiti actio est finita et similiter omnis virtutis in corpore, et quod primi motoris actio est infinita, manifestum est quod primus motor non habet magnitudinem omnino. Post dixit **Nam si haberet magnitudinem** etc., idest nam si hoc non est verum, contradictorium eius erit verum, scilicet quod habet magnitudinem. Et posuit hoc quasi antecedens. Et dixit **Et si habet magnitudinem, necesse est quod sit finita aut infinita**. Deinde destruxit utramque partem consequentis ut consequente destructo destruat antecedens. Et dixit **Et iam declaravimus in sermone** etc., idest in tertio tractatu huius libri. Illic enim declaravit quoniam omne corpus est finitum. Deinde dixit **Et nunc declaravimus** etc., idest et si est corpus finitum, constat quod virtus eius est finita. In corpore enim finito non potest esse [p. 16] virtus infinita. Post dixit **Sed primus motor movet motu eterno tempore infinito**, idest ergo virtus eius est infinita. Et cum sit manifestum quoniam omnis corporis virtus est finita, et quod primi motoris virtus est infinita, concluditur in secunda figura primum motorem non esse corpus nec virtus in corpore.



Assisi, Biblioteca Comunale, 279



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Fig. 7. Averroes's commentary on Aristotle's *Physics*, translated into Latin by Michael Scotus, and a manuscript witness from Assisi (Biblioteca Comunale, MS 279, fol. 91v).

comparable, and analyzable across the whole corpus. Texts that are part of a corpus are supposed to be representative for a specific work, genre, or period. Having a variety of versions or textual layers of one specific work is clearly not what suits the idea of a corpus of texts. Even if it were possible to integrate complex digital resources into one portal, the amount of work and expertise needed to maintain a resource of such exponentially increased complexity would seem impracticable, given the pace of ongoing technological and methodological innovations.

Speculum 92/S1 (October 2017)

FOUR PROPOSALS TO ACHIEVE A COMPROMISE

In the following four proposals we shall explore how the two conflicting concepts and practices of idiosyncratic digital critical editing on the one hand and creating a homogeneous textual corpus on the other can be reconciled despite the apparent contradictions.

First Proposal: Digital in a Wide Sense, Critical in a Narrow Sense

The first proposal to resolve the conflict between variety of editions and homogeneity within a corpus is to create and provide editions that are both digital in a wider sense and scholarly in a narrow sense. This proposal can be divided into two strategic approaches: the first approach starts from the definition of “digital,” the second from the definition of “critical.”

1. Digital in a Wide Sense

As part of a digital corpus, each individual scholarly edition does not necessarily need to be digital in a strict sense. What does “digital edition in a strict sense” mean? According to the “Catalogue of Criteria for Reviewing Scholarly Digital Editions” as issued by the Institute for Documentology and Scholarly Editing (IDE), a scholarly edition is “an information resource which offers a critical representation of (normally) historical documents or texts. Scholarly digital editions are not merely publications in digital form; rather, they are information systems which follow a methodology determined by a digital paradigm, just as traditional print editions follow a methodology determined by the paradigms of print culture. Given this narrow understanding of SDEs, many digital resources cannot be considered digital editions in this strict sense.”²⁵ And in an even more apodictic manner, in his most recent article on the subject, Sahle states what can be regarded as common sense among today’s digital humanities scholars:

- “A digitized edition is not a digital edition.”
- “A digital edition cannot be given in print without a significant loss of content and functionality.”
- “A digital edition is guided by a digital paradigm in its theory, method, and practice.”²⁶

Given these definitions, the point here is exactly the opposite: individual critical editions as part of a corpus need not strictly follow a digital paradigm, which, although desirable, is not a requirement. As demonstrated above, textual plurality and the complexity of the editorial approach towards an edited work is a main characteristic of a fully fledged digital scholarly edition. In contrast, the purpose of a corpus lies in its capacity to provide a large number of homogeneously edited texts, not only to ensure a high degree of usability but also to guarantee its feasibility and long-term maintainability. Therefore in principle these editions can be digitized critical editions.

²⁵ Patrick Sahle et al., “Criteria for Reviewing Scholarly Digital Editions,” 2014 (version 1.1), <http://www.i-d-e.de/publikationen/weitereschriften/criteria-version-1-1/>.

²⁶ Sahle, “What is a scholarly digital edition?” According to Tara Andrews a scholarly digital edition is something “beyond a feature-rich electronic book”: “It is the practice of deep and/or large-scale text analysis, rather than that of textual criticism itself, which must drive the development of digital editions in all their potential.” See Tara L. Andrews, “The Third Way: Philology and Critical Edition in the Digital Age,” *Variants* 10 (2012): 61–76; postprint online version: <http://boris.unibe.ch/43071/>.

Content and functionalities do not have to significantly exceed the content and functionalities of the print edition, that is, on the level of the individual text as part of a corpus, even though, even here, a certain minimum of requirements should be met (see below). However, additional digital value does need to be realized on the level of the entire corpus. What additional digital value across the entire corpus can mean will be discussed under proposal 4 below.

2. Critical in a Narrow Sense—Four Manifestations of Textual Criticism

The other half of the first proposal needs to be clarified: create and provide editions that are scholarly in a narrow sense. The term “critical” (even though often used as a synonym for “scholarly”) qualifies the meaning of scholarly, but what precisely does critical mean?

Peter Robinson, with his notorious six essential aspects of electronic digital editions, refers with the first three criteria to an essential philological methodology and scholarly rigor.²⁷ According to Robinson, a digital critical edition is anchored in a historical analysis of the materials; presents hypotheses about creation and change; and supplies a record and classification of difference over time, in many dimensions and in appropriate detail. These points are widely accepted by most scholars. This definition and others brought forward by renowned scholars are supported by the wide range of digital scholarly editions currently seen.²⁸ Be this as it may, and whatever the material, methodology, or requirements of a community, in order to make critical editions fit into a digital corpus of homogeneous texts representing works of Latin literature, the various aspects of textual criticism can be broken down into four basic manifestations of criticism: (1) critical annotation, (2) markup, (3) metadata, and (4) documentation. These essential features of a critical text must be accommodated by any model of a digital corpus, a model defining indispensable requisites and requirements for a text to be incorporated into the corpus.

(1) The first manifestation of textual criticism is critical annotation to the text, more specifically, the presence of an *apparatus criticus* or other means of recording textual variants and all justifications for the state of the edited text. In addition, critical annotation might include an *apparatus fontium*, giving references to sources and paratexts; an *apparatus biblicus*, as a typical feature of patristic or medieval texts; a commentary with explanatory notes or historical and philological notes, and discursive notes with present-day relevance, such as references to gender issues and sociopolitical subject matter.

(2) The second manifestation comprises the potentially very deep and extensive markup of the text: structural markup (including identifiers); markup of internal and external references or named entities; linguistic and semantic markup, such as part-of-speech tagging; lemmatization or syntactical markup; markup of typical

²⁷ The fourth criterion mentions the presentation of an “edited” text (only) as an option; the fifth and sixth criteria refer to digital usability: see Peter Robinson, “What Is an Electronic Critical Edition?,” *Variants* 1 (2002): 51–57.

²⁸ Daniel Apollon and Claire Bélisle, “The Digital Fate of the Critical Apparatus,” in *Digital Critical Editions*, ed. Daniel Apollon, Claire Bélisle, and Philippe Régner (Urbana, 2014), 81–113, here esp. 86; Elena Pierazzo, *Digital Scholarly Editing: Theories, Models and Method* (Farnham, Surrey, 2015); Patrick Sahle, *Digitale Editionsformen: Zum Umgang mit der Überlieferung unter den Bedingungen des Medienwandels*, 3 vols. (Norderstedt, 2013), here esp. 2:125–57.

features of an apparatus entry, such as sigla, references, or quotes and readings. It might also include markup of the types of apparatus entries according to categories²⁹ such as textual,³⁰ intertextual,³¹ exegetical, rhetorical,³² and metrical.³³

(3) The third manifestation of textual criticism comprises all kinds of metadata and structured information on the author, the work, and the edition itself,³⁴ that is, bibliographical information concerning the work itself, including its genre, dates, appropriate keywords, and so forth; as well as imaging parameters, responsibilities, licenses, and so on in regard to the edition; and contextual information in the form of a “critical bibliography.” Ideally, all this information is given in a standardized format (such as TEI, METS, Dublin Core, or some other bibliographic standard) with references to authority files (such as GND, VIAF, Getty Thesaurus) for named entities and using taxonomies and ontologies (SKOS, CIDOC CRM) that are relevant for the respective field of research.

(4) The fourth manifestation comprises information traditionally provided in a philological introduction, paratexts, and other kinds of accompanying texts and materials, which can all be subsumed under the term “documentation.” Ideally, the material basis of the edited text is documented by digital facsimiles of manuscript witnesses and relevant printed editions. These surrogates should be the result of what has been labeled “critical digitization” in the sense that information is provided about the decisions involved in setting up the parameters for digitizing.³⁵ The manuscripts should then be described thoroughly according to scholarly practice. Where transcriptions have been created, these should be included as well as the source code of all manuscript descriptions, transcripts, and the critical text itself. Moreover, it is essential to present a historical analysis, hypotheses about the creation of the text, and a record and classification of differences over time.³⁶ Most importantly, however, the editorial principles need to be made explicit.

²⁹ For a discussion on types and categories (and respective taxonomies), see Michael Hendry’s blog post on “Categories of Adversaria” at <http://curculio.org/?p=1112> (10 March 2014; Paola Italia, Fabio Vitali, and Angelo di Iorio, “Variants and Versioning between Textual Bibliography and Computer Science,” in *AIUCD ‘14—Proceedings of the Third AIUCD Annual Conference on Humanities and Their Methods in the Digital Ecosystem*, ed. Francesca Tomasi, Roberto Rosselli del Turco, and Anna Maria Tammaro (New York, 2015); doi:10.1145/2802612.2802614; see also TEI-L thread on “Types of edits” started by Christof Schöch (10 May 2016).

³⁰ E.g., variants (substantive, orthographic), conjectures, deletions, obelizations, transpositions, lacunae, (marginal or interlinear) additions, punctuation, speaker attribution, structure (e.g., boundaries between books, chapters, paragraphs, poems, stanzas, verses, etc.).

³¹ E.g., sources, parallels, later usage, reception and *Nachleben* (modern allusions and imitations).

³² E.g., figures of speech, tropes, style.

³³ Cf. “Pede certo—Metrica latina digitale,” software developed by the University of Udine for the automatic analysis of Latin verses: <http://www.pedecerto.eu/>.

³⁴ A metadata model needs to take into account the various levels of possible entities like those represented in the Functional Requirements for Bibliographic Records (FRBR) model, such as work, expression, manifestation, and item.

³⁵ Mats Dahlström, “Critical Editing and Critical Digitization,” in *Text Comparison and Digital Creativity: The Production of Presence and Meaning in Digital Text Scholarship*, ed. E. Thoutenhoofd, A. van der Weel, and W. Th. van Peursen (Amsterdam, 2010), 79–97; Mats Dahlström, “Critical Transmission,” in *Between Humanities and the Digital*, ed. P. Svensson and D. T. Goldberg (Cambridge, MA, 2015), 467–81.

³⁶ Robinson, “What Is an Electronic Critical Edition?,” 51–57.

Again, the viability and success of a digital corpus of critical texts depends on finding an appropriate and functional overarching data model that is able to accommodate these forms of critical annotation and information. To this end, it may be useful to reduce the force of the term “critical” to a rather prosaic meaning and to define an absolute minimum of requirements for the incorporation of a critical text into a digital corpus. Referring to the four manifestations of textual criticism described above, this minimum of requirements could be:

(Ad 1) The critically constituted text bears all critical information (for example, in the traditional annotation format of an apparatus) required to justify the linguistic or philological form of the edited text.

(Ad 2) The work structure is clearly defined: entities such as book, chapter, paragraph, and so on are marked up accordingly in order to fit in with a corpus-wide schema for addresses and the citation of the respective text entities.

(Ad 3) Metadata is provided on the author, work, and the edition itself.

(Ad 4) The text has sufficient material documentation (manuscript descriptions and facsimiles) and a philological introduction specifying the editorial principles.

Defining the texts that are to be included into the corpus as “digital in the wider sense” (that is, not necessarily following a digital paradigm) and as “critical in a narrow sense” (fulfilling the minimal requirements of the critical textual scholarship) would allow for the inclusion of (a) printed critical editions created with a digitizing process that is not too demanding; (b) existing born-digital critical editions³⁷ with a transformation or spin-off process that is not too complicated; and (c) new born-digital critical editions created within the editorial framework provided by the corpus portal (as it is currently planned for the Digital Latin Library).³⁸

Second Proposal: Works Rather Than Documents

The second proposal to resolve the conflict between variety of editions and homogeneity within a corpus is to focus on works rather than documents. A text corpus is not an archive. Digital editions tend to start from or grow into some sort of digital archive.³⁹ In order to provide texts that are to some extent homogeneous, the editorial features within a corpus should not focus on contingent and individual material aspects of the text or on paleographic or codicological details. Instead of accumulating textual evidence and transcriptions of witnesses, they should focus on critical value, i.e. critical annotation, deep mark-up and the establishment of

³⁷ The catalogs of existing digital scholarly editions prepared by Patrick Sahle, “A Catalog of Digital Scholarly Editions,” version 3.0, snapshot 2008ff, <http://www.digitale-edition.de/>; Greta Franzini, “A Catalogue of Digital Editions,” https://github.com/gfranzini/digEds_cat (with a list of further catalogs at https://github.com/gfranzini/digEds_cat/wiki).

³⁸ Digital Latin Library (DLL): <http://digitallatin.org/>.

³⁹ Patrick Sahle, “Digitales Archiv und Digitale Edition: Anmerkungen zur Begriffsklärung,” in *Literatur und Literaturwissenschaft auf dem Weg zu den neuen Medien*, ed. Michael Stolz (Zürich, 2007), 64–84; online: http://www.germanistik.ch/scripts/download.php?id=Digitales_Archiv_und_digitale_Edition; Kenneth Price, “Edition, Project, Database, Archive, Thematic Research Collection: What’s in a Name?,” *Digital Humanities Quarterly* 3/3 (2009), <http://www.digitalhumanities.org/dhq/vol/3/3/000053/000053.html>; Dirk van Hulle, “Editie en/of Archief: Moderne manuscripten in een digitale architectuur,” in *Verslagen en mededelingen van de Koninklijke Academie voor Nederlandse Taal- en Letterkunde* 119/2 (2009): 163–78.

some kind of representative text version with a canonical work structure. This does not mean that transcriptions and facsimiles etc. should not be included; they should in some way. It is just a matter of prioritizing when creating a digital corpus. Individual scholarly editions will always have to define their own priorities and tend to emphasize particularities of the textual material and specificities of the individual research perspective. The challenge here for future corpora of critical texts is to establish a basic and interchangeable data format to which a required set of data components of complex editions as described above can be translated, transformed or downgraded.

Third Proposal: Leave to Others What Others Do Better

Digital editions as part of a corpus cannot and should not be all inclusive. To the contrary: a characteristic of digital editions is the overcoming of the limitations of the publication itself through integration of or, here even more importantly, through linkage to external resources.⁴⁰ The theory of digital scholarly editing envisions an all-encompassing model of highly complex, layered, rich information resources. Individual digital editions, however, do not need to provide and maintain the full range of possible modules, such as high-resolution facsimiles, translations in various languages, all sorts of visualizations, additional contextual material, and user-friendly tools within one clearly delimited and self-contained publication. All these features and information enriching the reading experience and supporting individual research can hardly be provided and maintained within a single corpus. Rather, any additional feature that is not required according to the criteria of the corpus should be outsourced and either referred to via hyperlink or, if possible, embedded from external resources.⁴¹ This is especially reasonable with regard to authority files; encyclopedic knowledge, as part of online reference works and compendia; paratexts, as part of other digital corpora; and facsimiles. As for the latter, ideally cultural heritage institutions, such as archives and libraries, take care of their own material and provide descriptions, high quality reproductions, and tools to engage with material in a standardized way so that it can be embedded and used by users and editors alike. The embedding of external resources can be realized in two different ways, both of which have advantages and disadvantages. The easiest method from a technical point of view is simply to include a link out of the edition that targets the external resource. An example of the application of this method is the digital edition of the St. Gall Priscian, which links to manuscript images at the Codices Electronici Sangallenses (CESG) Virtual Library (Figs. 8 and 9).⁴²

⁴⁰ This according to Patrick Sahle is one aspect of overcoming the limitations of print editions (“die Entgrenzung der Publikation”) both quantitatively (with no restrictions on space) and qualitatively (by inclusion of texts, images, audio, video): see “Zwischen Mediengebundenheit und Transmedialisierung: Anmerkungen zum Verhältnis von Edition und Medien,” in *Editio* 24 (2010): 23–36; doi:10.1515/edit.2010.004.

⁴¹ Cf. Joris van Zundert and Peter Boot, “The Digital Edition 2.0 and the Digital Library: Services, Not Resources,” in *Bibliothek und Wissenschaft* 44 (2011): 141–52; online: <http://peterboot.nl/pub/vanzundert-boot-services-not-resources-2011.pdf>.

⁴² St. Gall Priscian glosses, ed. Pádraic Moran, <http://www.stgallpriscian.ie/>; Codices Electronici Sangallenses (CESG)—Virtual Library, <http://www.cesg.unifr.ch/en/index.htm>.

St Gall Priscian glosses

Rijklof Hofman (transcription), Pádraic Moran (digital edition)

Browse

Go to book:

Or to Hertz, ed. page

Or to MS page (1–249):

Search

Search for text:

Gloss type:

In book:

Search in: glosses/lemmata Priscian

Hertz, ed., *GL II*, p. 1

Praefatio

[next page](#)

Point to any link below for more information. Note that the text of Priscian below is that of Hertz's edition, and that of the St Gall manuscript may differ. (See [introduction](#) for further notes.)

Priscianus Caesariensis grammaticus Iuliano consuli ac patricio

[II.1.0](#)

II.1.1 cum omnis eloquentiae doctrinam et omne studiorum genus

1a2	a 1,1	Praefatio 424	omnis: i. adit conatus sum usque grammaticorum
1a2	1,1	Praefatio 4111	omnis: . > (ibid.) eloquentiae: .
1a2	1,1	Praefatio 4132[?]	omnis: > (1a9=1,3) celebrasse inuenio: a latinos: b celebrasse: c proprio: d doctrinam: e omnis: f omne: g studiorum: h prefulgens: i luce: k sapientiae: l
1a5	b 1,1	Praefatio 212	[stud]iorum: i. scientiae
1a5	1,1	Praefatio 4111	genus: . > (1a7=1,2) dirivatum: .
1a5	c 1,1	Praefatio 3115	genus: i. accusativus

II.1.2 sapientiae luce praefulgens a Graecorum fontibus deriuatum Latinos proprio

1a7	d 1,2	Praefatio 541	dirivatum: <i>anastrophe</i>
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[next page](#)

CONSPECTUS SIGLORUM

G [Sanit Gallen, Stiftsbibliothek, MS 904 \(a. 851\)](#)
L [Leiden, Universiteitsbibliotheek, MS BPL 67 \(a. 838\)](#)
K [Karlsruhe, Badische Landesbibliothek, Reichenauer Pergamenthandschriften, Augiensis ccccc \(s. ix^b\)](#)
E [Paris, Bibliothèque Nationale, MS Latin 10290 \(s. ix^{c-9}\)](#)
M [Milano, Biblioteca Ambrosiana, Cod. A 130 sup. \(s. ix\)](#)
T [Dublin, Trinity College, MS 229 \(C.1.8\) \(s. xi\)](#)

Lemmata:

[] the enclosed part is in the preceding or following line in the MS
+ the gloss is not in the hand of the usual glossator A (in all MSS)
* the gloss explains a corrupt lemma and/or sentence

Glosses:

7 *et/ocus*
i. *id est/ed-ón*
† = *spiritus asper*
<> part of the gloss is illegible (note: <> sometimes also enclose later additions in the MS; these are being revised and distinguished with ())
[] letters which should be deleted
abc letters marked as deleted (but legible) in the MS

Funded by the [Irish Research Council for Humanities and Social Sciences](#). Priscian text courtesy of [Corpus Grammaticorum Latinarum](#).

Fig. 8. St. Gallen, Stiftsbibliothek, MS Cod. Sang. 904, fol. 1r. The digital edition of St. Gall Priscian glosses (on the left), with links to the manuscript images and descriptions at the Codices Electronici Sangallenses (CESG) Virtual Library (on the right).

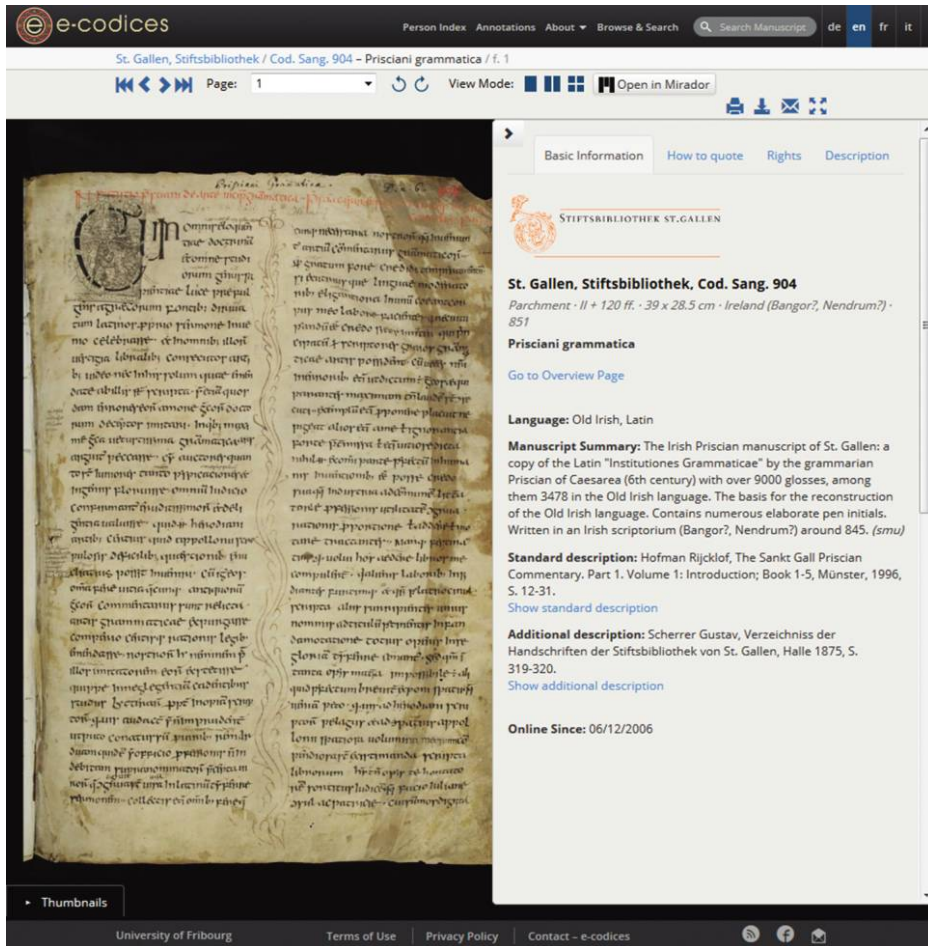


Fig. 9. St. Gallen, Stiftsbibliothek, MS Cod. Sang. 904, fol. 1r. The digital edition of St. Gall Priscian glosses (on the left), with links to the manuscript images and descriptions at the Codices Electronici Sangallenses (CESG) Virtual Library (on the right).

The integration of external information into the edition itself might be more user-friendly. Images or texts can be either included from the external server or, if restrictions relating to technical infrastructure or copyrights do not prevent it, mirrored onto a dedicated server. A technically advanced publishing framework has been developed by Jeffrey C. Witt: the LombardPress Web application⁴³ is designed to understand and consume common interfaces (so-called IIIF application programming interfaces⁴⁴) as adopted by a growing number of leading research libraries with

⁴³ See <http://lombardpress.org/web>.

⁴⁴ International Image Interoperability Framework (IIIF): see <http://iiif.io>.

manuscript collections in order to allow for the possibility of querying images of manuscript folios directly from library servers across the world (Fig. 10).⁴⁵

Fourth Proposal: Create Additional Value across the Corpus

As pointed out under the first proposal, critical editions as part of a corpus need not be “truly digital” in the sense that they follow a digital paradigm and that they are created applying digital methods. Rather, the fourth proposal advocates the creation of additional value across the whole range of texts through the features and the technical framework of a “truly digital” corpus—based on an elementary data model for metadata, text, annotation, and paratexts.

As soon as a suitable and robust data model has been found to accommodate the various forms of textual criticism, additional value can be generated by enabling a full exploration of the data captured across the entire corpus.⁴⁶ This additional value cannot be provided in print editions, and it is characteristic of both individual digital editions and digital text corpora in general.

A set of generic and corpus-wide tools, features, and functionalities should address researchers’ needs and expectations.⁴⁷

(1) First, the *search function* is of the highest importance for any digital corpus. It should not only provide a full-text search over all textual material included in the corpus (edited texts, apparatus, introductions, etc.), but also advanced search options, such as searching by logical operators and connectors and allowing for truncation and wildcards. Needless to say, a fuzzy-search function is indispensable for finding words and strings with orthographic variance within one and the same text as well as across various texts. Ideally, each and every word of the corpus is lemmatized to allow queries to match different forms of words, which may include even synonyms.⁴⁸ In addition to this, metadata allows for faceted searching of all kinds. It could be used to search by geographical regions or places of origin or provenance; by specific centuries, decades, or years of creation; by genres (like the Thesaurus Linguae Graecae categories of *historici*, *poetae*, *philosophi*,

⁴⁵ LombardPress-Web builds on the “Scholastic Commentaries and Texts Archive” (SCTA: see <http://scta.info/>). The SCTA database first points to the ID of a respective codex surface. If the holding library’s image repository is IIIF compliant, the SCTA database will link out further to the ID of the IIIF canvas and from there to the URL of the image itself. For a draft proposal of this SCTA data model see <http://lombardpress.org/2016/08/09/surfaces-canvases-and-zones/>; about LombardPress in general, see <http://lombardpress.org/about/>.

⁴⁶ In the area of linguistic corpora there have been attempts to address the issue of reconciling different formats. See, for example, Salt and Pepper at <http://corpus-tools.org/>. Salt and Pepper are not just methodological recommendations, they are functioning, extensible open source tools that support the integration of linguistic corpora created according to different principles into a larger framework.

⁴⁷ Cf. Henny and Neuber, “Criteria for Reviewing Digital Text Collections.” There should be also a set of tools, features, and functionalities for the wider public in order to extend the usability of critical editions beyond a scholarly audience. This, however, lies beyond the scope of this article.

⁴⁸ For an automated form analysis and translation, most advanced digital corpora of Latin texts, such as Perseus, Corpus Corporum, and Computational Historical Semantics (CompHistSem), use specific TreeTragger software as developed and maintained by the Perseus project: The Ancient Greek and Latin Dependency Treebank (AGLDT, http://perseusdl.github.io/treebank_data/). For an overview of current tools for lemmatization and morphological analysis, see the Digital Classicist Wiki: https://wiki.digitalclassicist.org/Morphological_parsing_or_lemmatising_Greek_and_Latin (last modified on 6 December 2016).

Librum IV, Distinctio 1 [Aarau Transcription]
Diplomatic Transcription
By William de Rothwell

Edited by: Jeffrey C. Witt
Edition: 2015.09-dev-master | September 09, 2015
Original Publication: Lombard Press, Baltimore, MD, September 09, 2015
License Availability: free, Published under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 License

[A157ra]

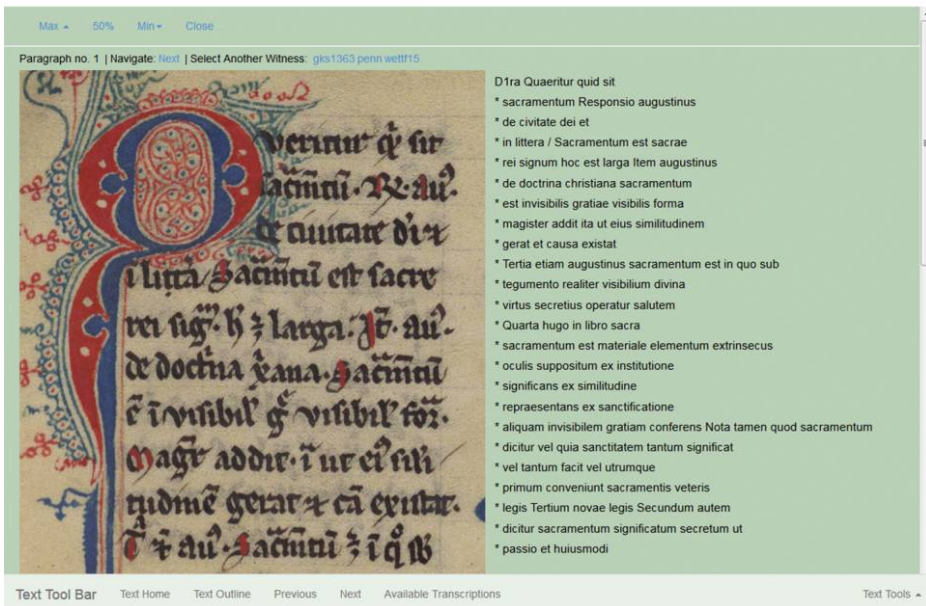
1

Quaeritur quid sit sacramentum Responso Augustinus de civitate dei et
in littera Sacramentum est sacrae rei signum hoc est
largi Item Augustinus doctrina christiana sacramentum est invisibilis
gratiae visibilis forma / magister addit ita ut
eius similitudinem generat et causa existat Item Augustinus sa
cramentum est in quo sub tegumento realiter visibilium / divina virtus
secretius operatur salutem / Quarta hugo in libro sacra sacramentum
est materiale elementum extrinsecus oculis suppositum ex institutione
significans ex similitudine repraesentans ex sanctificatione aliquam invisi
bilem gratiam conferens ¶ Nota tamen quod sacramentum dicitur vel quia sancti
tatem tantum significat vel tantum facit / vel utrumque / primum convenit sacra
mentis veteris legis / tertium / novae legis / secundum / autem dicitur sacramentum
significatum vel secretum / ut passio et huiusmodi

Comments - Manuscript Images - Paragraph Text Tools -

Max - 50% Min - Close

Paragraph no. 1 | Navigate Next | Select Another Witness: gks1363 penn wettf15



D1ra Quaeritur quid sit
* sacramentum Responso augustinus
* de civitate dei et
* in littera / Sacramentum est sacrae
* rei signum hoc est largi Item augustinus
* de doctrina christiana sacramentum
* est invisibilis gratiae visibilis forma
* magister addit ita ut eius similitudinem
* gerat et causa existat
* Tertia etiam augustinus sacramentum est in quo sub
* tegumento realiter visibilium divina
* virtus secretius operatur salutem
* Quarta hugo in libro sacra
* sacramentum est materiale elementum extrinsecus
* oculis suppositum ex institutione
* significans ex similitudine
* repraesentans ex sanctificatione
* aliquam invisibilem gratiam conferens Nota tamen quod sacramentum
* dicitur vel quia sanctitatem tantum significat
* vel tantum facit vel utrumque
* primum conveniunt sacramentis veteris
* legis Tertium novae legis Secundum autem
* dicitur sacramentum significatum secretum ut
* passio et huiusmodi

Text Tool Bar Text Home Text Outline Previous Next Available Transcriptions Text Tools

Fig. 10. The Scholastic Commentaries and Texts Archive (SCHA): First distinction of book 4 of the *Sentences Commentary* by William of Rothwell, edited by Jeffrey C. Witt and published through Lombard Press, here in a diplomatic transcription of a manuscript from Aarau (Aargauer Kantonsbibliothek, MS WettF 15), displaying in the bottom the same paragraph in a manuscript from Copenhagen (Danish Royal Library, MS GKS 1363).

theologi, oratores, etc.), or by a specific meter.⁴⁹ Based on the markup, searches could be limited to a certain type or content of apparatus entries (see above).

(2) Another essential feature of a text corpus is an elaborated *index function*. Indices should be generated and interlinked both work-wide and corpus-wide from the metadata (as regards authors, works, genres, periods, keywords, etc.) and from the markup (depending on the encoding schema with respect to named entities, that is, marked-up persons, places, dates, events, etc.), and where the texts are lemmatized, word indices could be provided. Lists of manuscripts should be created according to the structured information given in the documentation.

(3) The third fundamental functionality of a digital corpus is the provision of *hyperlinks* generated from explicit references, pointers, and identifiers in the markup and metadata. Internal links are to be realized as text-wide (especially connecting text and critical annotations), as work-wide (connecting text, manuscript witnesses, translations, and accompanying material) and as corpus-wide (connecting intertextual references, dictionary entries, registers, and indices). External links might point to digital archives (providing manuscript facsimiles, catalog entries and descriptions, etc.), digital corpora (providing relevant texts and contextual material), digital encyclopedias and dictionaries, and to any outsourced or externalized material (forums, audios, videos, blogs, etc.; see above).

(4) The aptitude of a digital corpus for scholarly use then completely depends on *addressability and citability* of all its parts and components, namely of the critical text (according to books, chapters, paragraphs, stanzas, verses, lines, words, and the respective critical annotations) and of the documentation (manuscript descriptions, transcripts, and introduction) as well as on the addressability and citability of versions, in case changes have been carried out or a progressive publication mode has been established. If the editorial framework allows for progressive publications, updates, additions, corrections, and so on (which in open software development and in digital humanities research is generally recommended⁵⁰) this would have an enormous impact on all areas of the corpus. Keeping track of versions is an extremely challenging task, especially if the corpus is supposed to provide canonical text versions that do not change.⁵¹ Be that as it may, the data model and publication framework need to make sure that every part, layer, and format

⁴⁹ Cf. above, n. 33, on “Pede certo.”

⁵⁰ The “release early, release often” policy was originally applied in the Linux development community. Following the publication of the essay “The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary,” by Eric S. Raymond (Beijing and Cambridge, MA, 1999); online: <http://www.catb.org/~esr/writings/cathedral-bazaar/>, this policy became increasingly popular among digital humanities scholars and has been adapted to publication strategies not only for tool development but also for the creation of digital scholarly editions (“progressive editions”) in order to create a tight feedback loop between the editor and expert scholars in their respective fields of research: see Gunther Vashold, “Progressive Editionen als multidimensionale Informationsräume,” in *Digital Diplomats: The Computer as a Tool for the Diplomatist?*, ed. Antonella Ambrosio, Sébastien Barret, and Georg Vogeler (Böhlau, 2014), 75–88; Andrew Dunning, “Rethinking the Publication of Premodern Sources: Petrus Plaoul on the *Sentences*,” *RIDE* (A review journal for digital editions and resources, published by the IDE [Institut für Dokumentologie und Editorik]) 3 (2015); doi:10.18716/ride.a.3.3, esp. pars. 5–7.

⁵¹ Possible negative effects of updating editions have been described by Gabriel Bodard, “The Inscriptions of Aphrodisias as Electronic Publication: A User’s Perspective and a Proposed Paradigm,” *Digital Medievalist* 4 (2008), doi:10.16995/dm.19, pars. 30–33.

of the critical edition is clearly addressable, according to a URN-naming convention as specified, for instance, by the Canonical Text Services (CTS) and used by the Perseus project and the Homer Multitext project;⁵² or by something similar to the Documents, Entities, and Texts (DET) system as recently presented by Peter Robinson in his widely discussed draft article on academia.edu.⁵³

(5) No matter how user-friendly the interface of an edition or corpus may be, user scenarios and research questions cannot be anticipated always and everywhere. For this reason, it is imperative to provide as much raw data and material as possible via *interfaces (APIs) and downloads* in order to enable scholars to access and collect the data directly. The editorial framework should allow for an import of various formats (such as TEI/XML, plain text, docx, pdf, tiff, and jpg) specified by the editorial guidelines. Ingested text files would be converted into corpus-specific XML, ideally customized TEI, in order to be stored and provided in the same format as the files created within the framework directly.

(6) In connection with downloads and APIs there is the question of *copyright and licenses*. Digital humanities scholars and open-knowledge activists commonly agree today that a *Creative Commons Attribution ShareAlike* (CC BY-SA) license is the best way to make sure the editor's work is appropriately credited and to ensure that the data is openly accessible and remains open data.⁵⁴

CONCLUSION

Creating a digital corpus of critical editions is a complex task. It involves a wide range of strategic decisions to harmonize the heterogeneity of digital scholarly editions with the core feature of a corpus residing mainly in the homogeneity of the way the texts are prepared and presented. Several suggestions have been proposed to convey a maximum of textual criticism with a minimum of formal requirements in order to provide a suitable data model, a practical editing environment, and a maintainable publishing framework that is attractive to both critical editors and scholarly users. A technical and institutional framework for integrating and exploring critical editions on a large scale is a great desideratum. It also seems to be a possibility worth the effort to attain.

⁵² For Canonical Text Services (CTS), see the information at Sourceforge: <http://cts3.sourceforge.net/>; and, especially on CTS URNs, "The CITE Architecture Technology-Independent, Machine-Actionable Citation of Scholarly Resources": <http://cite-architecture.github.io/ctsum/>.

⁵³ The article is soon to be published in *Digital Humanities Quarterly*: see Peter Robinson, "Some Principles for the Making of Collaborative Scholarly Editions in Digital Form"; a draft is on academia.edu at https://www.academia.edu/12297061/Some_principles_for_the_making_of_collaborative_scholarly_editions_in_digital_form; see here esp. 7–10 (with n. 11).

⁵⁴ Material published under a CC BY-SA license can be copied and redistributed in any format and adapted for any purpose, even commercially, as long as the original creator is appropriately credited and the adapted material is distributed under the same license as the original; see <https://creativecommons.org/licenses/by-sa/4.0/>.