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A Digital Critical Edition Model for Priscian:
Glosses, *Graeca*, Quotations

by Paolo Monella

Abstract. This essay discusses three key methodological aspects of a model for a planned digital critical edition of Priscian's *Ars grammatica*. (1) Glosses. The inclusion of these in the edition poses specific modelling challenges. A gloss lives in a manuscript's page, so it refers to the text of that specific witness, not to the editor's text, and it must be modelled as such in the edition. This can be achieved in the TEI XML encoding by linking each gloss to its manuscript siglum and to the specific manuscript reading it comments upon. (2) Greek text. As Michela Rosellini has pointed out, while contamination is common in Priscian's manuscripts, it is much less frequent for the Greek portions of the text, so the latter become key for the *recensio*. In the proposed edition model, Greek passages will be encoded on two layers, i.e. with both a normalised and a palaeographic transcription. Thus not only "substantial" readings, but also 'palaeographic' and 'orthographic' variants will be recorded for Greek passages, thus providing additional philological evidence. (3) Quotations from literature. These will be marked with machine-readable and processable citations of their sources through the Canonical Text Services (CTS) protocol and the newly developed Distributed Texts Services (DTS) specification.

Introduction

This paper will discuss some computational methods to be applied to a planned scholarly digital edition of Priscian's *Ars grammatica* within a project conducted by Michela Rosellini at the Sapienza University of Rome. The first results of the ongoing work towards a new edition of the *Ars* are the printed edition and commentary of the second part of book eighteen.[1] I shall focus on three key aspects of the *Ars* and its textual tradition that have particular philological and cultural significance and are better represented and studied with digital methods:

1. The glosses in the handwritten tradition, many of which are ancient – some going back to the author himself (see the section "Glosses")

2. The frequent Greek terms and expressions in the text, particularly valuable for the recensio (see the section "Greek text")

3. Quotations from preserved and lost classical literary works (see the section "Quotations from literature")

For each of these aspects I shall outline digital philology modelling strategies, implemented using the Text Encoding Initiative (TEI) XML text markup language,[2] in the hope that philologists – both "traditional" and "digital"

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[1] See Rosellini 2015a (edition) and Spangenberg Yanes 2017a (commentary). I am indebted to these two scholars for the stimulating discussions on the topics exposed in this essay, and to Elena Spangenberg Yanes in particular for her revision of the article itself. The errors that remain are my own.

I shall use the title *Ars grammatica* throughout this article, rather than *Institutiones grammaticae*, for the reasons outlined by De Nonno 2009, 250–259.

[2] I shall therefore provide TEI XML code samples. Since I cannot provide a general introduction to TEI encoding here, I shall refer the reader to the

– may engage in a discussion on the methodo-logical issues raised in this paper and provide precious preliminary feedback to the project.

Glosses

The *Ars grammatica* is a Latin grammar text-book written by Priscian (Priscianus Caesarien-sis) at the beginning of the sixth century CE in Constantinople. It then became the standard advanced Latin grammar textbook in medieval Europe. As is the case with many other influ-ential classical works, the interlinear and mar-ginal spaces in a manuscript of the *Ars* are typ-ically covered with glosses. The study of this rich and complex paratext sheds light on the reception of the *Ars* and on the very tradition of grammatical studies in Late Antiquity and the Middle Ages, and has received increased attention in recent scholarship.[3]

However, the very distinction between text and paratext is a blurred "threshold".[4] In fact, one can find innumerable "paratextuality lev-els within a textual tradition":[5] an interlinear substitution written above a deletion claims its right to enter the text more legitimately than the allegedly wrong deleted portion (the same applies if the original text is not physi-cally deleted); slightly further away from the "core" text we might locate glosses which provide a synonym for a difficult expression, make a cryptic reference explicit, or complete the text with a previously implicit element (it is no accident that such glosses often intrude or enter the text itself at some point); and only one step away from the latter, we find longer glosses that clarify, expand or comment upon the text.

Priscian's *Ars* offers a particularly interest-ing example of the dynamic relationship be-tween text and paratext. The textual transmis-sion of the work is characterised by a number of "unstable passages". These are complete sentences that appear and disappear in dif-ferent branches of the tradition, or are trans-posed to different points of the text, without any apparent stemmatical *ratio*. Elena Span-genberg Yanes has demonstrated that those passages were originally glosses and text add-ed by Priscian himself during his work on the *Ars*. They were originally written in the inter-linear and marginal spaces of Flavius Theo-dorus' copy of the text or in the archetype, and entered the main text at a later point.[6]

In other words, some glosses grew around the text as it made its way through the Mid-dle Ages, some were written by Priscian him-self but remained distinct from the text, while some authorial glosses even entered the main text of the *Ars*.[7]

Traditional scholarly editions in print can-not represent the text/paratext relationship systematically. Print-based textual philology must normally separate the edition of the text from that of its scholia because of space constraints. This separation is perpetuated in some digital philology projects which publish corpora of Priscian's glosses independently from his text, such as the *Online Database of the Old Irish Priscian Glosses*[8] and *St Gall Priscian Glosses* v2.0.[9]

However, a multitude of paratexts live in manuscripts alongside the text and entertain

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very informative website of the the TEI Consor-tium, <tei-c.org/>. All websites cited in this paper were last consulted on 25 December 2019.

[3] An exhaustive monograph on the topic is Cinato 2015; also see Cinato 2009 and Cinato 2010; spe-cifically on glosses commenting upon Greek text see Conduché 2009; Cinato 2011 and Spangenberg Yanes 2017b.

[4] Genette 1987.

[5] Monella 2008.

[6] Spangenberg Yanes, forthcoming. Also see De Nonno 2009. Flavius Theorodus was a pupil of

Priscianus who compiled the first exemplar of the *Ars*: on this copy, see Bianconi 2014, who offers a palaeographic reconstruction of it, and Rosellini 2015a, xxx-xxxi.

[7] In addition to the bibliography cited in the previous note, also see Rosellini 2014, 342–350 and Rosellini 2015a, xxvi-xxxvi; Pecere 2019.

[8] <www.univie.ac.at/indogermanistik/priscian>, ed. by B. Bauer.

[9] <www.stgallpriscian.ie>, ed. by B. Bauer, R. Hof-man & P. Moran.

a systemic relationship with it that cannot be fully represented and grasped if not through a joint edition of text and glosses that can model the relationship of several corpora of glosses with the text of their manuscripts. Digital philology provides the opportunity to create such an edition, not only because it is not confined by the limits of the printed page, but also because the computer is particularly capable of modelling and processing complex systems. The planned edition of Priscian's *Ars* makes use of these possibilities to make the text available together with its glosses, rendering the relationship of the two elements on the manuscript page.

The latter aspect poses a modelling challenge. Some glosses are copied (almost) identical from one manuscript to another, while others are new and created by the scribe. In either case, the gloss refers to the specific text of the manuscript in which it is found, not to the superstrate text of the editor.

An example may be useful. In Prisc. *Ars* GL 2.80.3–4 we are in the middle of a list of adjectives derived from nouns (such as *leoninus* from *leo, leonis*). In the text of most manuscripts the sequence includes lion, sheep and pig: *"leo leonis leoninus", "ovinus" quoque ab ove et "suinus" a sue.* However, according to Hertz's apparatus, manuscript B[10] had a different sequence: *leoninus ueruecinus a ueruice et porcinus a porco. Ouinus* [...]. If a gloss in manuscript B had commented on *ueruice*, it would have commented on a specific textual object (word *ueruice*) that exists in the text of that manuscript, not in that of other manuscripts or in the *textus constitutus* by the editor.

We then need a formal way to model the connection between gloss X of a specific manuscript and segment Y of the text of that same manuscript – a way that is compact enough to be practical for the digital philolo-

gist to encode. I shall provide TEI XML code samples in order to illustrate the modelling strategy that we plan to adopt in the Priscian edition, and briefly comment on each code snippet to explain the meaning of relevant TEI tags (*e.g.* <note>) and attributes (*e.g.* source="#W").

Let us consider the simplest possible case: we have a textual portion without substantial variants (e.g. Prisc. *Ars* GL 2.5.4 *accidit enim uoci auditus, quantum in ipsa est*) and one gloss (*scilicet uoce*) from one manuscript (W) pointing to *ipsa*.[11] In this scenario, the digital edition model has to represent formally:

1. The connection between the gloss and its source manuscript (i.e. the origin of the gloss)
2. The connection between the gloss and the specific passage it comments upon (the base text)

In this case there is no need to represent formally (i.e. to encode explicitly) the connection between the gloss of MS W and the specific text of MS W, because it is implicit that the text accepted by the editor also is the text of MS W. The TEI XML code should therefore be:

```
accidit enim uoci auditus, quantum in ipsa est
<note    source="#W">scilicet    uoce</note>
```

In this code snippet, the origin of the gloss (manuscript W) is encoded by attribute source="#W". The hash (#) in value #W makes it a pointer referencing a <witness xml:id="W"> element (with a short manuscript description) in a <listWit> (list of witnesses) in the <teiHeader>.[12] The very position of the <note> element marks the point of the text to which the gloss refers: this is what

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10 Bamberg, Stadtsbibliothek, Class. 43. See Hertz (ed.) 1855–1859 vol. II, XII-XIII. The example is taken from folio 13r.

11 Siglum W corresponds to Paris, Bibliothèque nationale de France, lat. 7501, digitised and avail-

able at <archivesetmanuscrits.bnf.fr/ark:/12148/ cc12453z>. The example is taken from folio 2r.

12 See TEI Consortium (ed.) 2019, paragraph 12.1 for further details.

is sometimes referred to as an "inline note".[13]

This encoding strategy provides enough flexibility to allow us to represent two separate glosses from the same MS (e.g. W) pointing to the same passage:

> accidit enim uoci auditus, quantum in ipsa est
> <note source="#W" place="above">
> scilicet uoce</note> <note source="#W"
> place="margin">... </note>

or two glosses from two different MSS (W and R) pointing to the passage:[14]

> accidit enim uoci auditus, quantum in ipsa est
> <note source="#W">scilicet uoce</note>
> <note source="#R">semper audibilis est
> ista secundum naturam eius</note>

In this example, MSS W and R have the same base text (*quantum in ipsa est*). But this is not necessarily the case: it is also possible, at a specific point of the text, for two manuscripts (e.g. W and R) to have two different readings (two different base texts), each manuscript having a different gloss, each of which points to its own text.

Since the scholarly goal of our digital edition is to provide a manuscript-based model of the relationship between text and paratext, the requirements now are to represent:

1. The origin of the gloss (as above)
2. The connection between the gloss and the specific reading of *that manuscript* it is commenting upon
3. The connection (alignment) of the MS text with the editor's text

This is how our digital edition model copes

with this slightly more complex case (Prisc. *Ars* GL 2.5.3, *altera uero a notione*):

> altera uero a
> <app>
> <lem wit="#R #P" xml:id="reading1">
> notione
> </lem>
> <rdg wit="#W" xml:id="reading2">
> no~~ta~~tione
> </rdg>
> </app>
>
> <note source="#R"
> target="#reading1">a cognitione
> quia ostenditur quid agat uox</note>
> <note source="#W"
> target="#reading2">a cognitione</note>

A brief explanation of the TEI markup. The <app> (apparatus) element marks a *locus varians*, including a list of readings, while the <lem> (lemma) element marks the reading chosen by the editor, and its attribute wit (witness) lists the MS (or MSS, as in this case) containing that reading. In addition to the aforementioned MSS W and R, I referenced another manuscript, P.[15] The <rdg> element(s), each accompanied by its wit attribute, mark variant readings. Each reading is unambiguously identified by an ID (reading1 and reading2 here) through an xml:id attribute. External <note> elements point to a specific reading via a target attribute – so they could be located in any point of the XML document, or even in a different document, with a stand-off markup strategy.[16] Element <del> denotes that letters "ta" seem to be deleted (scratched out).

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[13]   In fact, stand-off markup encoding strategies for this case might be introduced at some stage of the project, depending on the overall complexity of the markup, but this would not change the general edition model dramatically. For stand-off markup in the TEI, see TEI Consortium (ed.) 2019, par. 16.9.

[14]   Siglum R in Hertz's edition corresponds to Paris, Bibliothèque nationale de France, lat. 7496, avail-

able in <archivesetmanuscrits.bnf.fr/ark:/12148/cc12889q>. The example comes from folio 2r.

[15]   In Hertz (ed.) 1855–1859 P corresponds to Paris, Bibliothèque nationale de France, lat. 7530. The same siglum will be used for the MS in the new edition of the first part of the eighteenth book by Michela Rosellini.

[16]   See TEI Consortium (ed.) 2019, par. 16.9.

As far as the modelling requirements listed above are concerned:

1. The gloss/MS connection is expressed by the source attribute
2. The connection between the gloss and the specific MS text, by the <note target="#reading2"> → <rdg xml:id="reading2"> linking (the same applies to <note target="#reading1"> → <lem xml:id="reading1">)
3. The connection of each MS's text with the editor's text is simplified by the TEI "parallel segmentation method',[17] i.e. by the choice to include <lem> and all <rdg>s directly inside <app>

Greek text

As mentioned above, the *Ars grammatica* was composed in Constantinople, that is, in a Greek-speaking environment: it was envisaged as a Latin textbook for Greek native speakers, which explains why Priscian often compares Latin and Greek constructions and expressions, and sometimes seems to translate into Greek in order to explain Latin (Prisc. *Ars* GL 3.41.24–3.42.3):[18]

> "Erga" etiam περί Graecam significat [...]. "Contra" et separatur et componitur, quando κατά vel ἀντί significat. et tunc proprie est praepositio, ut "contra adulterum dico" κατὰ μοιχοῦ λέγω, "contradico" ἀντιλέγω, "controversia" ἀντίρρησις.

The quantity of Greek text in the *Ars* skyrockets in the second half of the eighteenth book (GL 3.278.13 ff.), which is occupied by a collection of systematic comparisons between Greek and Latin syntactical constructions.

While this abundance of Greek was responding to the needs of Greek–Latin bilingualism in sixth-century Constantinople, it later posed a huge issue for the scribes of medieval Latin Europe, who progressively lost knowledge of Greek. From the Carolingian age to the Renaissance (ninth to fifteenth centuries), most scribes omitted the Greek spans of the text altogether (including the whole second half of the eighteenth book). More precisely, almost all scribes in the tenth to fifteenth centuries omitted Greek,[19] while interestingly, starting from the fifteenth century, scholars started to interpolate missing Greek words and passages based on the context – an interesting phenomenon which sheds light on the rediscovery of Greek in the Renaissance. Only a minority of diligent scribes in the Carolingian period (ninth/tenth centuries) tried their hand at reproducing the shape of Greek glyphs that had entirely lost their linguistic meaning for them.

In this scenario, it is clear that interpolations, arbitrary scribal corrections, and contamination – horizontal, non-genealogical transmission of readings among manuscripts in a textual tradition[20] – could hardly take place for the Greek portions of the text in Carolingian manuscripts. Contamination is an interpretive operation requiring linguistic competence: comparing mere Greek glyph shapes is harder than comparing Latin text that one understands.

Scarce contamination means good news for philologists who are trying to reconstruct the genealogical relations between manuscripts (*recensio*) and aiming to produce a *stemma codicum*: on this basis, Michela Rosellini has used the presence of Greek text in the Carolingian manuscripts to produce a first *stemma* for the second half of the eighteenth book of

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[17] See TEI Consortium (ed.) 2019, par. 12.2.3.
[18] See Courcelle 1948, 307–312; Desbordes 1988; Schöpsdau 1992; Biville 2008 (see particularly pp. 33–36 for the use of a Greek "terminologie linguistique spécialisée"); Biville 2009; Rosellini 2012; Baratin 2014; Rochette 2014, 3–11 (see p. 6 on the practical usage of Latin in this environment);

Spangenberg Yanes 2014; De Paolis 2015, 621–622, 633–635; Rochette 2015, 627–628; Biville 2016, 324–327; Rosellini 2016, 350–355 and Spangenberg Yanes 2017d.
[19] With few exceptions to be found until the eleventh century: see Martorelli 2014, 376–379.
[20] See West 1973, 12–15.

the *Ars grammatica*.[21]

In view of the philological importance of Greek text in the *Ars* for the *recensio* and for the history of the knowledge of Greek in medieval Latin Europe, the planned edition will encode the manuscript variants of all Greek passages at two layers, both normalised and palaeographic:

- At the *normalised transcription layer*, words will be encoded as we would write them today (e.g. ἀπό). Greek words will be written with Unicode polytonic Greek characters, including breathings, classical accents, iota subscript, uppercase/lowercase distinction etc. Collation between variants at the normalised layer will only yield substantial variants. The *textus constitutus* deriving from this collation will thus have normalised orthography, like the rest of the edition. This will facilitate text processing, including search, natural language processing, textual statistics

- The *palaeographic transcription layer* will be closer to the writing conventions of the manuscript (e.g. aΠω). At this layer, we will represent words as sequences of "graphemes", i.e. of glyphs with distinctive value in the writing system of the manuscript. For example, we define "s" and "m" "graphemes" in a specific writing system if there exists at least a "minimum pair" of words or expressions in which by switching "s" with "m" we generate a change in meaning (e.g. *unus* vs *unum*). Instead, we define "s" and "ſ" (or "long s") as "allographs" because their switch does not change the meaning of any word or expression (e.g. *ſum* vs *sum*). This is what Hjelmslev called the "commutation test", meant to distinguish between "commutation" (switch of graphemes in our case) and "substitution" (switch of allographs).[22] It is not impossible that

specific philological needs may arise in the project requiring the attribution of "-emic" (i.e. somehow distinctive) value to specific allographs, not because they can change the denotative meaning of a word, but because they mark connotative (palaeographic) features of the writing system that become pertinent for a specific analysis of the textual tradition: for example, to reconstruct genealogical relations between manuscript, or the transmission of specific readings through the *stemma codicum*. However, the assignment of value to allographic distinctions (Saussure's *pertinentisation*) remains an open methodological issue that will be best defined in the context of the actual editorial practice. Collation at this layer will thus yield palaeographic variants that will serve not the *constitutio textus*, but other philological and cultural research interests.

Again, one example will clarify both the concepts exposed above and the TEI encoding conventions to be adopted (Prisc. *Ars* GL 2.6.5 *vel ἀπὸ τοῦ βοῶ, ut quibusdam placet*):

```
<app>
<lem wit="#R #W">
<reg>ἀπὸ</reg>
<orig>ΑΠΟ</orig>
</lem>

<rdgGrp type="palaeographic">
<rdg wit="#F">
<reg>ἀπὸ</reg>
<orig>ΑΠω</orig>
</rdg>
</rdgGrp>
</app>
```

In this example <reg>(ularisation) elements include the normalised transcription: at this layer, all three manuscripts referenced above

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[21] See Rosellini 2014, particularly 349–350, and Rosellini 2015a.

[22] Hjelmslev 1961, 73–75.

(R, W and F)[23] provide the same text (ἀπὸ). The <orig>(inal form) elements, instead, provide the palaeographic transcription, i.e. the graphemes with which that word is actually written in the manuscript(s). As usual, <app> marks a locus varians, <lem> the editor's text, and <rdg> other MS variants. The <rdgGrp> (readings group) element groups readings of the same type.

In the example above, we can say that MS F provides a palaeographic variant because

- An automatic collation between the <reg>ularised transcription of its text and the <reg> of MSS R and W yields no difference: the textual content of both <reg> elements is ἀπὸ
- An automatic collation, however, between the two <orig> TEI elements (which include the paleographic transcription) does yield a difference: ΑΠΟ vs aΠω

Two words later, MS F provides what we can consider a substantial – not merely palaeographic – variant (βῶ instead of βοῶ):

```
<app>
<lem wit="#R #W">
<reg>βοῶ</reg>
<orig>ΒΟω</orig>
</lem>

<rdgGrp type="substantial">
<rdg wit="#F">
<reg>βῶ</reg>
<orig>Βω</orig>
</rdg>
</rdgGrp>
</app>
```

The computer is able to process the code and conclude that in this passage the variant is not only palaeographic (<orig>ΒΟω</orig>

vs <orig>Βω</orig>) but also substantial (<reg>βοῶ</reg> vs <reg>βῶ</reg>). This means that the software assisting the philologist would also be able to generate automatically the markup identifying the variant type (<rdgGrp type="substantial"> *vs* type= "palaeographic").

I wrote above that software can distinguish between "substantial" and "palaeographic" variants based on automatic comparison between <reg> elements, but the entire process is far from being objective. In fact, it is based on the editor's regularisation, i.e. on the population of the <reg> elements themselves – which is subjective. In the case above, for example, the editor might have regarded βοῶ and βῶ as variant spellings of the same word, so they might have included the same regularised form <reg>βῶ</reg> in <lem wit="#R #W"> and in <rdg wit="#F">. On the basis of this editorial decision, the software would have labelled the variant as palaeographic: <rdgGrp type="palaeographic">.

Greek passages in the *Ars* will not be the only "privileged" textual elements to be encoded at those two layers owing to their philological and/or cultural significance. The complete list includes:

1. All expressions and literary quotations in Greek
2. The glosses commenting on them
3. The Renaissance interpolations of Greek passages
4. All literary quotations from lost Latin texts

The multi-layered digital encoding of variants for privileged textual portions will provide very detailed philological evidence for them of a kind that would not have been available without the application of digital philology methods.

23 Siglum F corresponds to Paris, Bibliothèque nationale de France, lat. 7504, available online in <archivesetmanuscrits.bnf.fr/ark:/12148/cc66736v>. The example is taken from folio 2r.

Quotations from literature

In Late Antiquity and the Middle Ages, authors that we now call "archaic", like Alcman and Ennius, were still very respected and quoted as classical texts, but in many cases their works were not copied in a sufficient number of medieval manuscripts to have survived until today. In these cases, the fragments from their works quoted by ancient grammarians like Priscian remain their sole testimony today.[24]

Literary quotations in the *Ars grammatica* are therefore particularly precious, especially when they refer to works otherwise lost. For this reason, the list of privileged passages to be encoded at two layers above includes all quotations from Greek literary works – given the focus on Greek text in the edition – and all quotations from lost Latin works. The multi-layered transcription will thus provide additional information for the philological study of the indirect tradition of ancient works.

Moreover, the intertextual relationships between Priscian and the works he quotes has a cultural relevance of its own: its systematic analysis sheds light on the reception of classical literature in Late Antiquity and in Priscian's sources. It is not uncommon, for example, for Priscian to mention another grammarian (e.g. Charisius) who mentions a classical author.

The planned edition of Priscian will identify citations of classical texts (such as Hom. *Il.* 2.278) and will use the CTS/DTS protocols to encode them in a machine-actionable form that can be further processed for hypertextual navigation, statistics, network analysis, and visualisation, as well as exported as Linked Open Data (LOD).[25]

The DTS (Distributed Text Services) specification[26] is an evolution of the CTS (Canonical Text Services) protocol.[27] At this time, however, DTS is not yet implemented by many web services,[28] while CTS is implemented by the Perseus Digital Library 4.0[29] and the Perseus Catalog,[30] two key resources for digital classical philology.

At the current state of our work, we plan to use CTS URNs[31] to encode citations of quoted texts in the new Priscian edition. We plan to update intertextual references in our edition to the new DTS specification as it is implemented by Perseus, or by other projects providing comprehensive catalogues and repositories of classical texts.

"Uniform Resource Names (URNs) are intended to serve as persistent, location-independent, resource identifiers."[32] A CTS URN is a string identifying a canonical citation in machine-actionable form. For example, "Hom. *Il.* 2.278" would become urn:cts:greekLit:tlg0012. tlg001:2.278, in which:

- cts identifies the CTS protocol

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[24] On Priscian's quotations, see Nitzschner 1884; Karbaum 1886; Karbaum 1889; Jeep 1908; Jeep 1909; Jeep 1912; Müller 1911; Dierschke 1913; Wessner 1924; Craig 1930; De Nonno 1977; De Nonno 1988; De Nonno 1990b, 479–494; De Nonno 1990a, 642–646; Giavatto & Garcea 2007; Rosellini 2011; Rosellini 2016; Valente 2012; De Nonno 2014, 73–78; Fassino 2014; Mazzotti 2014; Menchelli 2014; Sonnino 2014; Visconti 2014; Monda 2015, 129–136; Rosellini 2015b; Spangenberg Yanes 2017a LXVII-LXX; Spangenberg Yanes 2017c; Spangenberg Yanes 2018a and Spangenberg Yanes 2018b. On digital methods to publish fragmentary texts, much work has been done by the research group connected with the Perseus Digital Library: see Romanello *et al.* 2009a; Romanello *et al.* 2009b; Berti 2009; Romanello 2011; Berti 2012; Berti 2013; Almas & Berti 2013a; Almas & Berti 2013b and Berti *et al.* 2014.

[25] See Berners-Lee 2006 and Heath & Bizer 2011 for a general introduction to the LOD, and Cayless 2019 for a recent overview of LOD applications to classics.

[26] <distributed-text-services.github.io/specifications/>.

[27] The CTS protocol is part of the CITE Architecture <cite-architecture.org/>. Also see Smith & Weaver 2009; Smith 2009; Tiepmar *et al.* 2014 and Monella 2017, 151–158.

[28] One including a very limited selection of classical texts is Alpheios: see <texts.alpheios.net/> and <texts.alpheios.net/api/dts>.

[29] Also known as the Perseus Hopper <www.perseus.tufts.edu/hopper/>.

[30] <catalog.perseus.org/>. "[T]he Perseus Catalog is designed to support also the Canonical Text Services Protocol and associated CITE Architecture" (Gregory Crane, from <sites.tufts.edu/perseuscatalog/?page_id=208>).

[31] <cite-architecture.org/ctsurn/>.

[32] URN Syntax (RFC 2141), <tools.ietf.org/html/rfc2141>.

- greekLit, the collection of texts "Ancient Greek literature" as listed in the TLG (Thesaurus Linguae Graecae) Canon[33]
- tlg0012, author Homer ("workgroup Homeric poems") in that collection
- tlg001, work *Iliad* by that author/in that workgroup
- 2.278, book 2, verse 278 in that work[34]

Likewise, "Prisc. *Ars* GL 3.184.9–10" (*Grammatici Latini*, volume 3, page 184, lines 9 to 10) could be expressed with CTS URN urn:cts:latinLit:stoa0234a.stoa001:3.184.9–3.184.10, in which stoa0234a identifies Priscian, stoa001 the *Ars grammatica*, and the final 3.184.9–3.184.10 has a dash separating initial and final line.

Thus in our edition, the text of Prisc. *Ars* GL 3.184.9–10 (... *quomodo et Homerus:* ὣς φάσαν ἡ πληθύς), which includes a quote from Hom. Il. 2.278 (ὣς φάσαν ἡ πληθύς: ἀνὰ δ'ὄ πτολίπορθος Ὀδυσσεύς), would be encoded as follows:

```
<p cRef="urn:cts:latinLit:stoa0234a.
stoa001:3.184.9–3.184.10">
... quomodo et Homerus:
 <quote>
 <ref cRef="urn:cts:greekLit:tlg0012.
tlg001:2.278" type="source">
 ὣς φάσαν ἡ πληθύς
 </ref>
 </quote>
</p>
```

In the previous code sample, both Priscian's text (<p> is the TEI tag for "paragraph") and the quoted text (<ref> is for "reference") are identified by CTS URNs through cRef (canonical reference) attributes.

Another example is Prisc. *Ars* GL 2.163.4–5, in which Priscian quotes Accius, *Annales*, 1.1, an archaic Latin work preserved today only through indirect tradition, i.e. through quotations in later texts:

```
<p cRef="urn:cts:latinLit:stoa0234a.
stoa003:2.163.4–2.163.5">
Accius tamen masculinum hoc protulit an-
nali I:
 <quote>
 <ref cRef="urn:cts:latinLit:phi0400.
phi001:1.1" type="source">
 Maia nemus retinens gravido concepit in
alvo
 </ref>
 </quote>
</p>
```

In this TEI code sample, stoa0234a.stoa001 identifies Priscian's *Ars* (as in the previous example), 2.163.4–2.163.5 Priscian's passage, while urn:cts:latinLit:phi0400.phi001:1.1 identifies Accius's fragment (phi0400, author Lucius Accius; phi001, work "Annales"; 1.1 the specific passage).

This markup makes explicit the intertextual relationship between a passage in Priscian and a passage in his textual source, thus allowing the software to process it in the ways listed above.

Conclusions

The project of a new integral digital scholarly edition of the *Ars grammatica* by Priscian is currently under way.

Roberto Busa, considered by many to be the father of the digital humanities, wrote: "Non c'è macchina che eguagli il computer nel far perdere somme enormi in tempo reale".[35] In fact, a DH project typically requires team-

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33 <stephanus.tlg.uci.edu/>, whose canon of authors and works is based on Berkowitz & Squittier 1990.

34 A client (software) would be able to retrieve the text of this Homeric verse from a DTS-compliant online service like Alpheios through an URI including the aforementioned CTS URN, namely: <texts.alpheios.net/api/cts?request=GetPassage&

urn=urn:cts:greekLit:tlg0012.tlg001.alpheios-text-grc1:2.278> (string alpheios-text-grc1 identifies the specific digital edition).

35 "No machine matches the computer's ability to waste enormous amounts of money in real time": Busa 2001, aphorism 0348.

work and large funds: if Busa is to be proved wrong, it must demonstrate that the additional computational work yields scientific added value. Even better, it must prove that it does things that one could not do without digital methods. In the specific field of digital philology, as Patrick Sahle has clearly stated, this means that "[a] digital edition cannot be given in print without significant loss of content and functionality."[36]

In the planned new edition of the *Ars*, the modelling and subsequent processing of glosses and quotations from literary texts make it possible to represent and study them as components of complex systems: on the one hand, the system of paratextual relationships between glosses and base text in the material context of the manuscript; and on the other, the system of intertextual relationships between Priscian's text and the passages he quotes. In the case of Greek textual portions, their multi-layered transcription provides detailed philological information at the palaeographic layer, which may help scholars use Greek segments for the *recensio* of Priscian's otherwise unmanageable textual tradition. The palaeographic information is also of relevance for the study of the knowledge of Greek in Latin medieval Europe.

These three types of information could not be made available in a printed edition:

- *Glosses*: publishing text and glosses together in print would not be feasible for obvious reasons of space constraints, while recording the relationship between each MS's glosses and its text would require apparatus note conventions that would soon become unreadable
- *Greek text*: the space constraints inherent in a printed critical apparatus impose a strict selection of the palaeographic details that can be provided, and do not allow us to publish distinct normalised and palaeographic transcriptions of readings
- *Quotations from literary texts*: intertextual relationships may easily be annotated in footnotes, but cannot be further processed automatically so as to produce statistics or customised queries

In terms of visualisation, the digital edition will be published on the web, allowing for different viewing modes. In the graphical interface we foresee, the reader can (1) visualise the editor's text or the text of a specific MS by means of a dynamically generated critical apparatus resembling the traditional printed one; (2) generate a synoptic view of the text of two or more MSS, possibly including the editor's text, in which variant passages are visually connected. In all viewing modes, specific formatting highlights the textual portions that have glosses, palaeographic/orthographic variants, substantial variants, and intertextual relationships (quotations).

Other visualisation/interface options that the reader can choose among include: visualisation of glosses aside the base text *vs* hypertextual navigation between text and glosses; normalised *vs* palaeographic transcription of Greek text and other "privileged" passages (when visualising the text of an individual MS); clear grouping of variants in types (palaeographic *vs* substantial) in the critical apparatus (in view mode 1); hypertextual navigation between Priscian's text and its sources; graphics with statistics on intertextual relationships; and advanced textual search functions.

Paolo Monella
Sapienza-Università di Roma
paolo.monella@uniroma1.it

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[36]   Sahle 2016, 27.

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