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LINGUISTICS

FROM THE MANUSCRIPT TO THE SCREEN: IMPLEMENTING ELECTRONIC EDITIONS OF MEDIAEVAL HANDWRITTEN MATERIAL[1]

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ABSTRACT

This paper describes the electronic editing of the Middle English material housed in the Hunterian Collection at Glasgow University Library (GUL), a joint project undertaken by the universities of Málaga, Glasgow, Oviedo, Murcia and Jaén which pursues the compilation of an electronic corpus of mediaeval *Fachprosa* in the vernacular (http://hunter.filosofia.uma.es/manuscripts). The paper therefore addresses the concept of electronic editing as applied to *The corpus of Late Middle English scientific prose* with the following objectives: (a) to describe the editorial principles and the theoretical implications adopted; and (b) to present the digital layout and the tool implemented for data retrieval. A diplomatic approach is then proposed wherein the editorial intervention is kept to a minimum. Accordingly, features such as lineation, punctuation and emendations are every now and then accurately reproduced as by the scribe's hand whilst abbreviations are yet expanded in italics. GUL MS Hunter 497, holding a 15th-century English version of Aemilius Macer's *De viribus herbarum*, will be used as a sample demonstration (Calle-Martín – Miranda-García, forthcoming).

1. Introduction

Digital editing has been much debated for more than a decade since the advent of the first projects in English like *The Canterbury Tales* (started in 1993) and *The electronic Beowulf* (in 1994). A saga of digital editions[2] has actually prolif-

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[2] By a digital edition, it is meant a scholarly edition published in electronic form (Lavagnino 2009: 63).

erated thenceforth, either web-based (very few then, most today) or not (then on floppy disk, later on CD/DVD), which have eventually contributed to shaping this area of critical studies as in its current form.[3] The active scholarly thinking may be corroborated not only by the publication of a plethora of *ad hoc* monographs discussing the nature of digital editions from manifold perspectives (Sutherland 1997; Burnard et al. 2006; Deegan – Sutherland 2009, etc.) but also by the special-themed issue published by *Literary and Linguistic Computing* (2009), which approaches the issue both from theoretical and empirical domains. Even though a late bloom, in our opinion, digital editing has now reached the prime of its life, not only for the implementation of new software tools for the editor but also, and more importantly, for the accessibility of the web as a leading publication system.

Although it is a fact that digital editions surpass their print counterparts for the use of primary sources along with high quality images, there are two aspects which still vindicate the continuing dominance of the printed book, one is theoretical and the other exclusively practical. Theoretically speaking, on the one hand, Sutherland refers to the concept of stability of the physical book as a vehicle that "encourages sustained critical reflection" in opposition to the electronic edition, whose medium is dynamic and mutable, thus amenable to regular updating (Sutherland 2009: 24; Sperberg-McQueen 2009: 29-30). Despite this dichotomy, she still acknowledges that there are texts which perfectly accommodate to an electronic storage and display, manuscripts in particular (see also Pierazzo 2009: 169-170).

On a practical domain, on the other hand, Robinson is still sceptical about the state of the art of digital editing inasmuch as the cons are substantially more influential than the pros. For him there are two aspects hindering its scholarly adoption: "a lack of easy-to-use tools and a lack of support from major publishing houses" (2005), not to mention the supposed high esteem of print publications, at least in some academic environments. In this same fashion, Buzzetti complains about the "reluctance of the humanities scholar to devote more than cursory attention to informatics and computer science" (2009: 46-47), in the assumption that this knowledge is "essential to a successful shaping of digital text technology" (Huitfeldt 2003: 236). These allegations still justify the continuing dominance of print editions in the 21st century.

As (electronic) editors of mediaeval material, one cannot but corroborate the paramount importance of print editions over their electronic counterparts. Fortunately, however, this does not hold for all document types since there are witnesses which lend themselves better than others to electronic editing, as in the

[3] See de la Cruz and Vázquez (2005: 193-208) for a detailed account of web-based editions of mediaeval material.

case of manuscript material. In this fashion, there is now a frenetic endeavour among many manuscript holders to digitise and to publicise previously unpublished texts and/or manuscripts, thereby offering not only an edition in itself but the foundations for further work. The benefits and potentials of this activity are manifold to such extent that "digital editions of manuscripts … have opened new possibilities to scholarship as they normally include fully searchable and browsable transcriptions and, in many cases, some kind of digital facsimile of the original source documents, variously connected to the edited text" (Pierazzo 2009: 169; see also Ore 2009: 114).

Taking these premises as the basis for our editorial project, this paper describes the electronic editing of the Middle English scientific material housed in the Hunterian Collection at Glasgow University Library (henceforth GUL), an on-going project developed at the University of Málaga in collaboration with the universities of Glasgow, Oviedo, Murcia and Jaén, which pursues a twofold objective: (a) the preparation of on-line editions wherein the manuscript high-resolution images are accompanied by their corresponding diplomatic transcriptions; and (b) the compilation of an electronic corpus of mediaeval *Fachprosa* in the vernacular wherefrom the occurrences of particular items may be automatically searched, both word and lemma-based (see http://hunter.filosofia.uma.es/manuscripts). Our impetus is, therefore, the compilation of a corpus of late Middle English scientific prose allowing the synchronic study of the language from different perspectives (both phono-orthographic and morpho-syntactic), lending itself well for other areas such as palaeography or codicology. The internal coherence of the project stems from the contribution of two variables, one qualitative and the other quantitative. On the one hand, the project exclusively focuses on 14th- and 15th-century scientific treatises and, on the other, it displays complete texts, not samples. In our opinion, the model proposed has an added asset if compared with traditional products in the sense that it mirrors the original while at the same time it transmits mediaeval science in the vernacular, elsewhere considered to be less artificial than literary and/or religious prose.

The present paper then addresses the concept of electronic editing as applied to *The corpus of Late Middle English scientific prose* with a threefold objective: (a) to describe the editorial principles and the theoretical implications adopted, both linguistic and extra-linguistic; (b) to present the digital layout along with the tool implemented for information retrieval; and (c) to evaluate our proposal in terms of its potential to linguistic research and to suggest the future lines of development.

The aetiology of our work stems from the need of faithful transcriptions for research purposes, thereby avoiding the use of published editions. Lavagnino's definition of electronic/digital edition is here adopted, taken as an archive offer-

ing "diplomatic transcriptions of documents, and facsimiles of those documents. And it should avoid … the creation of critically edited texts by means of editorial emendation … What readers need is access to original sources" (1998: 149). In light of this definition, de la Cruz and Vázquez advocate a systematic avoidance of electronic editions containing: (a) a mere electronic version of the source; (b) an excessive/deficient amount of information; and (c) a focus on the editor's beliefs and attitudes. Contrariwise, for them a good digital edition would imply the use of faithful diplomatic transcriptions of the original pivoting around two different sections, one internal and the other external, where the linguistic and the extra-linguistic information are respectively allocated (de la Cruz – Vázquez 2005: 206).

The paper has been accordingly organised into five different sections. Section 2 succinctly describes the scope of the project together with the primary source used as sample text in this talk. Sections 3 and 4 propose a stopover flight simulating the stages of the editor's work: the first goes from the manuscript to the screen, discussing the guiding principles for transcription, whilst the other proceeds from the electronic edition to corpus searching and data retrieval with the use of a web-based tool. Finally, the conclusions and the future lines of development are accounted for in section 5.

2. The collection

The Hunterian legacy has been chosen on account of the following characteristics: (a) the number of scientific treatises from the 14th and the 15th centuries;[4] (b) their unedited status; and (c) their availability because GUL has provided us with digitised images of the manuscripts as well as with permission for on-line publication. In its present form, a total of six complete manuscripts have been transcribed amounting up to 285,827 words, also annotated and POS-tagged. The following list relies on the data and collation provided by Cross (2004) and Young and Aitken (1908):

– GUL MS Hunter 95 holding the *Book of Operation* (ff. 82r-156v); and an English translation of Yuhanna Ibn Masawaih's *Antidotary* (ff. 156v-185v).

[4] "The Hunter Collection, which is one of the largest holdings of historical medical manuscripts in the world, is so named after William Hunter (1718-83), doctor, Physician Extraordinary to Queen Charlotte, and collector of anatomical and natural history specimens, as well as books and manuscripts. About one third of Hunter's books, as one would expect, are about medicine. The reason why his collections came to the University of Glasgow is because he started his studies there and bequeathed all his collections to his alma mater on his death" (Caie's preface to Marqués – Miranda – Gonzaléz 2008: xi).

– GUL MS Hunter 328 housing Gilles of Corbeil's translation of the *Treatise on urines* (ff. 1r-44v) and an alphabetical list of remedies (ff. 45r-62r) and medicines (ff. 62v-68v).
– GUL MS Hunter 497, a translation of Macer's *Herbary* (ff. 1r-92v).
– GUL MS Hunter 503, a copy of Benvenutus Grassus' *Treatise on the use of the eyes* (ff. 1r-39v).
– GUL MS Hunter 509, an English translation of *System of physic* (ff. 1r-167v).
– GUL MS Hunter 513, holding a copy of Benvenutus Grassus' *Treatise on the diseases of the eyes* (ff. 1r-37r), an *Antidotary* (ff. 37v-97v) and two pseudo-Hippocratic texts on the zodiac influence (ff. 98r-104v) and on the signs of death (ff. 105r-107v).

The catalogue is being currently enlarged with the addition of the following witnesses:

– GUL MS Hunter 104, an English translation of Palladius' *Practice of husbandry* (ff. 1r-64v, incomplete).
– GUL MS Hunter 117, keeping an anonymous collection of medical receipts (ff. 1r-56v).
– GUL MS Hunter 307, an English translation of *System of physic* (ff. 1r-166v).

3. From the manuscript to the screen

The corpus of Late Middle English scientific prose makes use of two encoding systems, HTML and XML, which correspond to the two major areas of our electronic edition. The former is the scheme upon which the electronic edition relies, thereby prompting the presentation of the digitised images along with the diplomatic transcriptions. The choice of HTML in our case is mandatory on account of the intrinsic nature of the edition: on the one hand, it is a Unicode-compliant application wherein the formatted text becomes essential for transcription (i.e. italics, bold type, etc.) and, on the other, it has been designed as a Flash application. XML, in turn, is the encoding system for the handling of the search tool, thus based on the Text Encoding Initiative (TEI) guidelines.

3.1. Transcription policy

Whilst the aim of the critical edition is to provide the reader with an eclectic text with the author's ultimate intention, not yet deprived of some bias, an ideal electronic edition hosts the source text – and the digitised images, whenever

possible – thus offering "the reader a hitherto unavailable opportunity … to rewrite a whole text or version on the screen of his or her personal computer" (Ross 1996: 226; see also Lavagnino 1998: 149; Sutherland 2004: 20). In this vein, Ross is therefore certain when acknowledging that the electronic edition will soon overthrow the myth of the critical edition (Ross 1996: 230) since the former stands out as the ideal input for research purposes, not only strictly in Linguistics, but also in other fields such as Codicology, Palaeography, History of Science, etc.

The virtues of the electronic edition must not be overestimated because it is not deprived of shortcomings either. One problem has to do with the impossibility of replicating all the physical characteristics of the text in the screen of the computer –letterforms and emendations in particular. Another is that transcribing is never a complete and an unblemished task, being rather subject to the editor's bias. In this fashion, Robinson and Solopova refer to the interpretative character of transcriptions "as a series of acts of translation from one semiotic system (that of the primary source) to another semiotic system (that of the computer). … it must be seen as fundamentally incomplete and fundamentally interpretative" (Robinson – Solopova 1993: 21; Pidd – Stubbs 1997: 55).

The design of an electronic edition must therefore be preceded by a careful choice of the level of transcription. In our case, it has been predetermined by the nature of the corpus which, for reliability, needs to be an accurate reproduction of the original, editorial intervention kept to a minimum. The dilemma is then to decide whether transcription should be graphetic (i.e. every distinct letter-type is preserved) or graphemic (i.e. every spelling is preserved without distinguishing letter-types).[55] The decision is determined by the research interests which lie behind the edition itself and, for that reason, a graphemic model was eventually adopted on account of linguistic and extra-linguistic reasons, already noted by Robinson and Solopova (1993: 24-25; Robinson 2009: 45). On linguistic grounds, spelling variation in Middle English becomes of paramount importance, both inter- and intra-dialectically, as it is generally taken as the evidence to ascertain the spatial and chronological dimension of a witness, being also helpful to obtain the different layers of copying within a same tradition. On extra-linguistic grounds, on the other hand, the adoption of a graphemic model is more beneficial if a team work, insofar as a diplomatic *literatim* transcription does not leave room for editorial interpretations.

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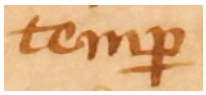
5 The graphetic transcription, in turn, was eventually cold-shouldered on account of the intrinsic nature of our edition as any scholar interested in the palaeographic side of the text would certainly go to the digitised images which accompany the corresponding transcriptions. In this same vein, Pidd and Stubbs claim that "the ideal level of transcription towards which one should aim is 'graphemic,' whereby manuscript spelling is preserved without distinction of separate letter forms" (1997: 55).

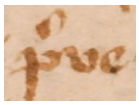
Despite this, there are usually borderline cases, and one transcription may strictly conform to one model whilst at the same time incorporating aspects of another. In our model, features such as lineation, punctuation, emendations and marginalia are reproduced as by the scribe's hand whilst abbreviations are expanded in italics. Even though expansion may be interpreted to go in hand with distortion, the claimed avoidance of editorial emendation is safeguarded by the use of italics inasmuch as our reading is accompanied by the primary source (see Fig. 3 below) and the user may at all times decide on any arbitrary reading proposed.

Abbreviations have been reconstructed using the following conventions, based on Denholm-Young (1954: 64-70), Hector (1958: 29-35) and Petti (1977: 22-25):

a) Brevigraphs with different *phonetic* values are expanded on the basis of the most frequent spelling of that same word in the piece. If the full form is not recorded, we rely on the spelling information provided by the online version of the MED in terms of dialect and chronology (Lewis et al. 1952-2001). This is particularly the case of the group <per> and <pre>, twofoldly abbreviated, either with a straight bar through the stem of letter <p> or with an ascending flourished stroke, as shown below. These instances are expanded on account of the predominant spelling of the scribe throughout the composition.

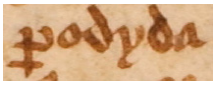


f. 5v 'temp*re*'



f. 4v '*pre*ue'

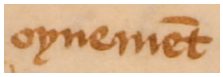
The same policy has been adopted as to the expansion of the group <par>, which is commonly abbreviated with the same straight bar through the stem of <p>, as in the example below. In this case, the word has been expanded as 'p*ar*odyda' on the basis of this same spelling in the piece.



f. 8v 'p*ar*odyda'

b) Contractions are generally limited to the use of the tilde which, according to Petti (1977: 22), is taken as a substitute for letters <m>, <n>, <u> and <i>, the latter exclusively in the *-ion* suffix. Their expansion is not problematic insofar as the context informs about the particular meaning of this symbol, built on the base of the most prevalent spelling of the scribe.

f. 11v ‘wo*m*be’



f. 39v ‘oynemen*t*’

f. 10v ‘corya*u*ndre’

f. 4v ‘cocci*o*n’

c) Suspensions are notoriously more problematic on account of the number of symbols likely to occur at word-ends. These may be classified according to the typology of the abbreviation. On the one hand, crossed double <l> and crossed <h> have not been systematically expanded assuming that this character does not have a phonetic value in final position, particularly in the 14th and 15th centuries. Flourishes and tails, on the other hand, have also been disregarded for the sake of uniformity across the corpus as it is slippery to claim the existence of an implicit <e> in these environments, particularly in the case of adjectives where the symbol becomes frequent in monosyllable singular strong adjectives.

Tildes, in turn, are taken as a substitute for letters <m>, <n>, <u> depending on context. If the tilde appears followed by minims, the question arises as to whether it should be transcribed as -o*u*n or -ou*n*; the former has been systematically adopted even when acknowledging that the latter can also be plausible. Contrariwise, final <r> with a flourish has been transcribed as a final -*e* on account of the actual occurrence of the full form of the word (*here*), both as an adverb and as a possessive, together with the abbreviated form (*here*), therefore assuming the existence of an abbreviation therein.

d) *Superior letters* are also expanded in italics, as shown in the words like *þ*^{t} ‘þ*a*t’, *w*^{t} ‘w*ith*’ and *w*^{t} *oute* ‘w*ith* out’. The use of a superior letter does not always imply an actual abbreviation, being a matter of habit rather than omission in itself. This is the case of the determiner *þ*^{e} ‘þe’ and ordinal numbers like *x*^{e}, *xi*^{e}, *xii*^{e}, etc. In view of this, the use of italics is deprecated in the transcription of these words.

3.2. Screen layout

The application has been designed as intuitive as possible for the user. Prior to accessing the electronic editions, the user is offered some background information about the scope and members of the project together with a guided tour for those not very accustomed to the scheme and layout of electronic editions. The application is conceived to display a multi-faceted range of possibilities for the user, thus pivoting around the two basic options offered in the main menu, i.e. *manuscript selection* and *words and lemmas* (allocated in the upper and lower parts of the bookcase).

The first, *manuscript selection*, is accordingly allocated in the upper part of the bookcase, thereby housing the gist of the project as it gives access both to the actual manuscripts and their linguistic component. The user only needs to select the desired witness and a pop-up window appears informing us about the treatise(s) contained therein and whether the user wants just the images or the images and text, as shown in Figure 1.

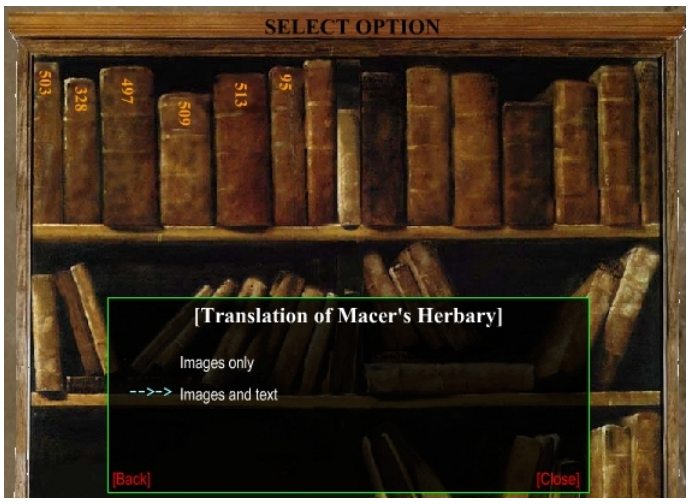


Figure 1. Manuscript selection window

The selection of any of these two options prompts a Flash animation. Figure 2 reproduces the digitised image of the manuscript wherein the user may opt for a manual or an automatic turning of the page, the former thus recreating the physical experience of browsing a medieval manuscript in a computer. As if in an actual library, a more detailed view of the MS page can be obtained by activating the magnifying glass, which provides a 2x magnification of the image onscreen.

Figure 2. Digital edition

The digital edition also offers a link to (a) the manuscript description and (b) the editorial guidelines. The former, on the one hand, includes a brief description of the palaeography and codicology of the witness in terms of the manuscript tradition, material, condition, hands, decoration and history/provenance. On the other hand, the transcription of the text is provided alongside the manuscript images, which is, in our opinion, an added asset in the sense that the user may check the editorial intervention, if any, being therefore an appropriate input for linguistic research. As mentioned above, the transcription is at all times accurate to the original, wherein lineation, coloured letters, punctuation and emendations are given as by the scribe's hand. Marginal annotations, on the other hand, can be read just by mousing over them and the transcription will automatically pop-up; they have not been included in the transcription assuming that they constitute an alternative text, either for textual organisation or for clarification purposes. The transcription is numbered every five lines for reference purposes.

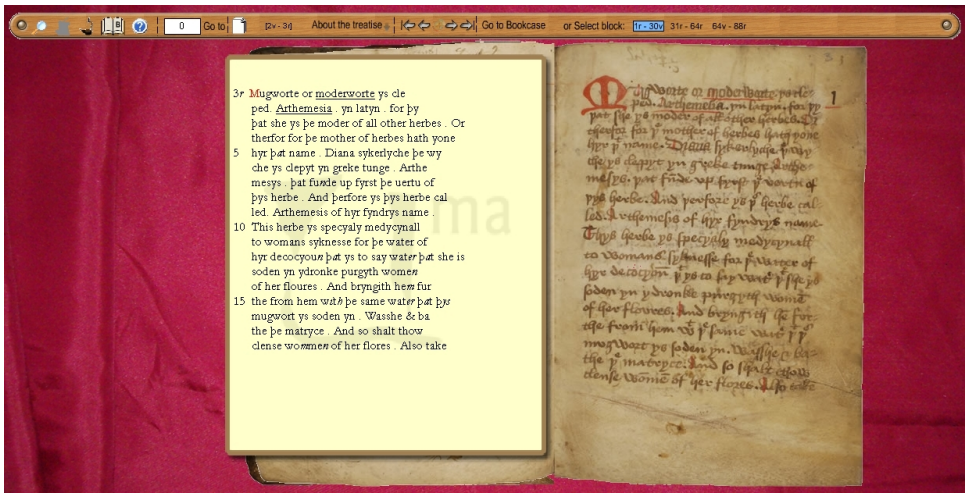


Figure 3. Electronic edition

4. From electronic editing to corpus searching

4.1. Corpus annotation

According to Lavagnino, "the principal advantages of the electronic version will be the ease of searching the text … and the ease of following cross-references from one text to another" (Lavagnino 1998: 151; de la Cruz – Vázquez 2005: 206). This statement directly leads us to the second option of the main menu, *words and lemmas*. The general impetus here is the offering of an intuitive tool which allows the automatic retrieval of linguistic information from the corpus by taking the transcriptions as the base text.

The first step consists in the implementation of a suitable database for linguistic inquiry. In our case, the transcriptions were eventually downloaded onto an Excel spread-sheet – where every word is tagged in terms of its lemma, word-class, accidence and meaning – and then exported to a data base. This information is therefore allocated into nine different fields, i.e. lemma, word-class, sub-class, type, tense/degree, number, person, gender and case. For the sake of accuracy, in case of ambiguity, i.e. here either as an adverb of place or as a possessive adjective, the lemmas are disambiguated with the inclusion of the word class of the item under scrutiny, which is provided in abbreviated form after a comma. This tag-set is modular in the sense that a word-class is assigned to every word (Noun, Adje, Dete, etc.), which successively restricts the tags containing the subclass and accidence, as shown in Table 1 below.

Tabela w pionie

Given the orthographic variation of Middle English (both inter- and intra-dialectically), lemmatisation relies on the e-MED entries for the sake of standardisation (Lewis et al. 1952-2001). Next, each lemma has been further accompanied by the word class (abbreviated), which is an added asset for disambiguation if more than one tag is feasible. The analyst's intervention is then required to select the correct label depending on the syntactic context in which that particular word is found (Civit et al. 2001: 24-25). Finally, the fields containing the word-class, type and accidence, in turn, are tagged using the terminology of a traditional descriptive grammar (Quirk et al. 1985; see Moreno-Olalla – Miranda-García 2009: 129-140 for a more comprehensive description of the corpus).

4.2. Information retrieval (word-search tool)

This annotation is accordingly taken as the input for a web-based application which automatically retrieves the occurrence of a particular word or lemma in the corpus together with the context in which it occurs. In addition, the user is offered the possibility of reading any instance in the actual manuscript for further checking. The application has been designed as intuitively as possible to facilitate the access to those not fully accustomed to the use of this type of concordancing programs.

Thus, any kind of query can be safely retrieved from the main menu with the input of a threefold information, i.e. (a) the witness under scrutiny; (b) whether word or lemma-based (the latter relying on the e-MED headwords); and (c) the lexical unit to search for. For the sake of simplicity, all the words or lemmas contained in that particular piece are shown as a middle combo to reduce the user's participation to a minimum. Figure 4 below reproduces the output obtained when the occurrence of the word *garlyk* is prompted. If desired, the results may be listed either as a whole or one by one.

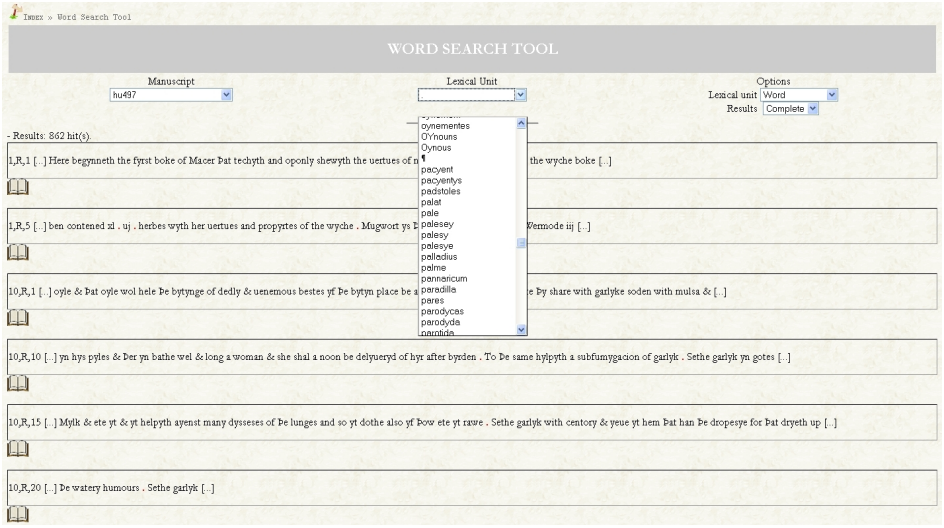


Figure 4. Word search sample

Likewise, a lemma-based search follows the same principle as one word-based insofar as the selection of the lemma as a lexical unit predetermines the listing of lemmas in the middle combo. Figure 5 below reproduces the output generated for the lemma *perselī*, which is accordingly highlighted in red. Spellings in the lemma list follow the e-MED conventions whenever this is practicable, whilst the most frequent spelling is chosen when the word is not recorded in the MED.[66] Latin lemmas, in turn, follow the spelling given in the *Oxford English Dictionary* if they are recorded in Classical Latin, and the *Mediae Latinitatis Lexicon Minus* for non-Classical headwords.

6 Among others, this is particularly the case of *tenasmon* 'a continual inclination to void the contents of the bowels or bladder'; *marubrum* 'a kind of venom', *deednesse* 'deadness', etc.

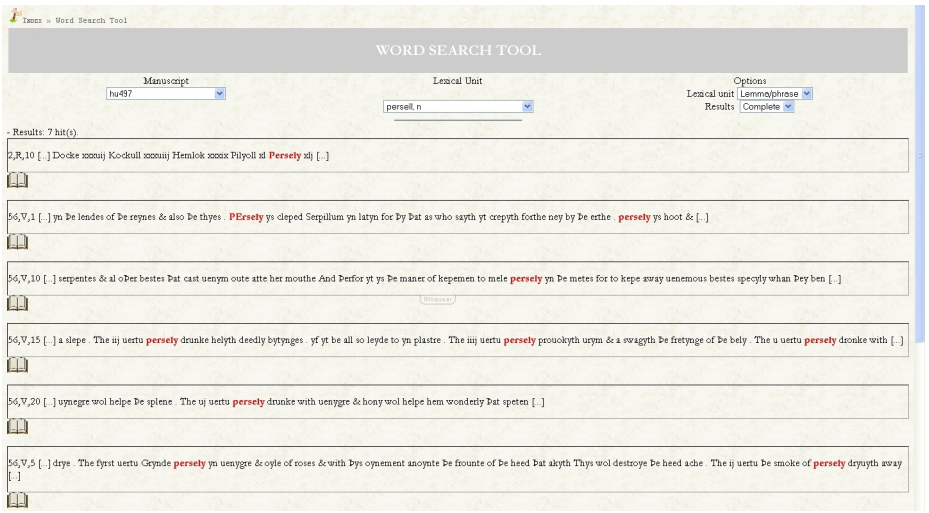


Figure 5. Lemma search sample

Finally, both word- and lemma-based KWICs show an icon with a link to the actual MS page where that particular item is recorded. As shown in Figure 6, that icon invokes a pop-up Flash window displaying an image of the actual page/folio where the word can be found. Moreover, the KWIC is also provided in a window that may be dragged up and down for ease of reading.

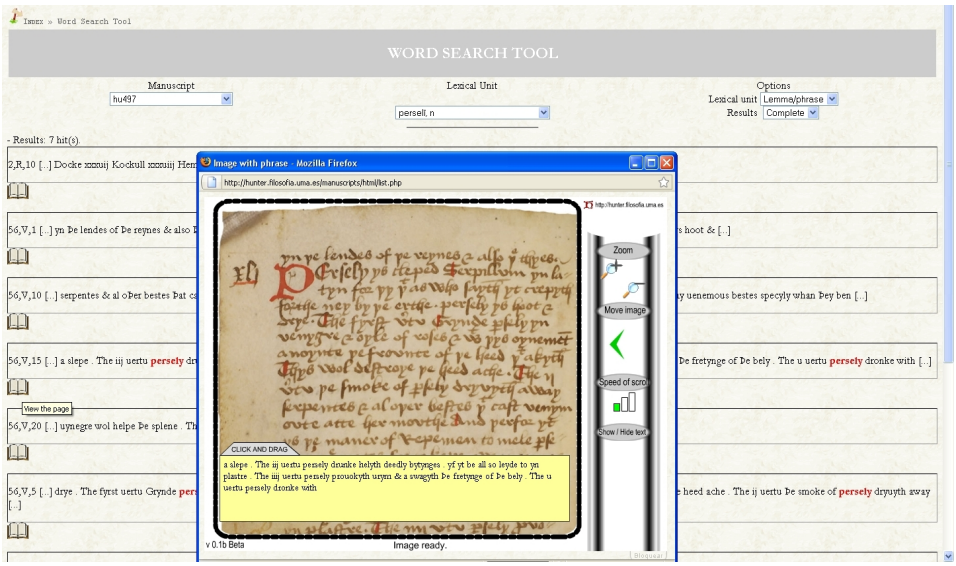


Figure 6. Manuscript reference

5. Conclusions

This paper describes the model of electronic edition adopted for *The corpus of Late Middle English scientific prose*, an on-going inter-university project which pursues the electronic editing of the mediaeval vernacular material housed in the Hunterian collection at GUL. This paper, therefore, is conceived as a state-of-the-art article from scratch to the final product by reviewing the transcription guidelines together with the physical appearance of the electronic edition.

An assessment of the project in its current form reveals that there are obviously pros and cons. In our opinion, however, the pros become more substantial than the cons. It is now time to take Solopova's claim as to whether the effort of electronic editing is worthwhile (1998: 121-132). The task is surely beneficial for other scholars in the field insofar as we provide diplomatic transcriptions of the original witnesses which are also the input for corpus searching. In a nutshell, it may be tentatively concluded that our model of electronic editing substantially surpasses critical editions in the sense that an unbiased version is provided exactly as it was penned by the scribe's hand. If compared with traditional printed editions, the crucial aspect is perfectly summarised by O'Donnell when he affirms that "the exciting thing about digital editing is not that it can do everything differently, but rather that it can do some very important things better" (O'Donnell 2009: 122).

There are yet some disadvantages, primarily quantitative and qualitative. At present, the corpus amounts to six complete treatises totalling 285,827 words, a figure which is expected to reach half a million tokens after the completion of the project. On the qualitative side, on the other hand, another shortcoming has to do with the homogeneity of transcriptions, particularly when the product is the result of different transcribers. Anyone accustomed to reading mediaeval manuscripts will surely agree that every hand is unique in itself and there are always particularities considered to be alien to other contemporary hands. For this reason, there is always a need to revise our transcription guidelines to ensure the standards of uniformity.

Finally, it is a fact that electronic editions like the one proposed here need to be upgraded on a regular basis. We consider that our proposal could also benefit from the readings of other scholars in the field and a blog is to be implemented wherein this feedback may be allocated, particularly in terms of manuscript tradition, dialect provenance along with any other linguistic component of interest. In this vein, Lavagnino suggests it is feasible "to add an archive annotation, introductions, and discussions of the relationship between texts, although these actually work counter to the apparent thinking that's generally behind this approach, which is that you should cover up any signs of mediation" (1998: 153). This information will be supervised by a webmaster to ensure the inclusion of relevant information about the witness under scrutiny.

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