Medical terminology across the centuries: distinctive features of a chronological study in the field of ophthalmology

María José Esteve Ramos
Universitat Jaume I
resteve@ang.uji.es

Abstract

This article deals with the comparison of the lexical features of two texts from a diachronic point of view. Interest in lexical comparison arises from the fact that the two texts belong to a specialised field within medicine –ophthalmology– and both can be considered of the same genre. The linguistic analysis focuses on morphological and etymological aspects, based on previous studies with a historical perspective in the field of medicine (Norri, 1992). As a result of the study, different implications concerning the use of words from the Germanic native stock or from other sources, together with the different social and scientific changes, are shown in this article.

Key words: Medical English, historical linguistics, lexicology, corpus linguistics

Resumen

La terminología médica a través de los siglos: rasgos distintivos de un estudio cronológico en el campo de la oftalmología

Este artículo trata de comparar las características léxicas de dos textos desde una perspectiva diacrónica. Este interés en la comparación léxica surge del hecho de que los dos textos pertenecen a un campo de especialidad dentro de la medicina –oftalmología– y ambos se pueden considerar del mismo género. El análisis lingüístico se centra en aspectos morfológicos y etimológicos, criterios basados en estudios anteriores sobre el inglés médico desde una perspectiva histórica (Norri, 1992). Como resultado de este estudio, destacan las diferentes implicaciones sobre el uso del vocabulario de origen germánico o de otras fuentes, junto con los diferentes cambios científicos y sociales que se muestran en este artículo.

Palabras clave: inglés medico, lingüística histórica, lexicología, lingüística de corpus

Introduction

Survival makes a difference in natural selection, and the resources for the historical study of language are no exception. In this sense, materials related to medicine and other areas of science have been in many cases luckily preserved and it seems obvious that the purpose of the text may have facilitated its survival and conservation through the years. The result is a vast collection of materials which offers an excellent opportunity for the study of language in these contexts.

A highly increasing interest in the use of the diachronic perspective to study scientific issues and texts is reflected in different publications (Sournia, 1994; Atkinson, 1996; Salager Meyer & Défives, 1998; Salager-Meyer, 1999; among others). These studies suggest that a historical approach to the analysis of the language used in a particular field of knowledge can provide valuable results. In other words, as Atkinson (1996: 334) recalls, "the study of scientist's communicative practices across historical times is a crucial aspect in the study of science." Even though the idea of specific language sounds modern, older specialist texts show a remarkable degree of specificity. They can be interestingly compared with their contemporary homologues, allowing for a diachronic focus on ESP, especially in areas of high specificity, such as ophthalmology, or fields with substantial textual sources. In this article, I offer an overview of the lexicon of two texts dealing with ophthalmology, and compare the results obtained according to its morphological composition and etymology. This study may serve as an incipient basis for a diachronic description of the discourse of ophthalmology.

Medical terms have evolved over the centuries; however, the different stages in the evolution of terms related to sickness and health do not run parallel with the increasing efficiency of medicine or the development of language in general. The delimitation of these periods is also quite subjective. Sournia (1994: 692) commented that "over the centuries, physicians´ terminological imagination has been fertile, but an over-luxuriant neology has resulted in a rapid turn-over, and the percentage of 'wastage' has been high."

All in all, medical vocabulary usage is intrinsically connected to the evolution of medicine and complementary to the evolution of language in general. Research has focused on specific periods of the English language, ranging from the work done in the field of Medieval Studies to the studies based on the use of Medical English today (see, for example, Webber, 1994; Williams, 1996; or Nwogu, 1997; Valero & Calle, 1997). Only some linguists adopted the diachronic point of view for their research, for instance, Atkinson (1996), Salager-Meyer (1996), or McConchie (1997) analysed texts within an average range of 300 years. The issue then is to consider why a diachronic perspective may be relevant.

The relevance of a diachronic perspective

Diachronic approaches to linguistic studies have been widely considered as an interesting –and to some extent– necessary complementation to synchronic studies:

> As Adams (1973: 5) points out, this is because the distinction between synchrony and diachrony drawn by Saussure, which has had a profound effect on linguistic studies since 1916, effectively precluded the study of word-formation, where synchrony and diachrony are most fruitfully considered together. (Bauer, 1993: 3)

Thus, the diachronic perspective helps and complements similar studies in other areas that have traditionally been more benefited from this approach, as it is the case of literary or historical analysis. However, recent studies have shed some light upon the history of scientific writing and its different discourse aspects (Norri, 1992, 1998). The example of Atkinson's (1996) work shows an approach in which studies on language for specific purposes (LSP) –including, of course, medical language– based their classification of texts on the writer's and reader's roles and their evolution in time. Atkinson analysed *Transactions of the Royal Society* published over the past 330 years, and studied the evolution of scientific research writing in English from 1675 to 1875. Some of his conclusions confirmed the above mentioned approach of his study:

> Findings indicate that: (a) research writing in the 17th-18th centuries was substantially influenced by communicative norms of author-centred genteel conduct; (b) greater attention to methodology and precision in the interest of scientific specialisation brought about pronounced textual changes in the 19th century, although gentlemanly norms were still in evidence [...]. (Atkinson, 1996: 33)

Additionally, Salager-Meyer & Défives (1998), studied the use of hedges from a diachronic perspective, and described their results according to socio-historical and pragmatic factors. These studies also revealed the importance and the need for continuing research in the diachronic study of medical texts. Moreover, in a different article, Salager-Meyer (1999) emphasised the importance of a diachronic approach to scientific discourse:

> Applied linguistics and especially those interested in discourse and genre analysis studies of scientific discourse, are showing a growing interest in the diachronic analysis of older scientific texts. The main motivation of these studies is to gain insight into the history and development of scientific thinking, of the scientific community and of the process and construct of special purpose knowledge. LSP (Languages for Specific/Special Purposes) diachronic research is thus mainly concerned with the evolutionary changes in textual macro/micro structure, language and style in a particular disciplinary culture. (Salager-Meyer, 1999: 279).

Even though we focus on one specific discourse of medicine, it is still too wide in scope for a comprehensive diachronic study of its vocabulary. I have then chosen the

field of ophthalmology, as it is possible to trace treatises as far back as the 11th century and expand the traditional diachronic perspective in the study of scientific lexical evolution to its origin.[1] This particular sub-field of medicine is especially appropriate to be studied diachronically as opposed to other areas of medicine because as Singer (1962: 640) stated: "From an early date the treatment of ailments of the eye has stood somewhat apart from the rest of medical practice." The treatises have been selected for the present study according to the assumption that:

> The more specialised and technical vocabulary is much denser in the academic and surgical treatises than in the remedy books, where the lexicon is on the whole somewhat elementary. (Norri, 1992: 291)

Selected material and their characteristics

Two texts have been chosen: *De Egritudinibus Oculorum*, generally attributed to Benvenutus Grassus (late 14th century) and *On the Diseases of the Eye*, written by W. F. Mittendorf (19th century). Both of them belong to the major sub-discipline, ophthalmology, and both are manuals showing a common purpose: to describe the symptoms and the cure of ocular disorders. Both texts have the same structure: first, the description of the diseases, and after that, the remedies. The similarities and differences regarding the specialised vocabulary used in the two texts constitute the basis for the description of its evolution. The time span separating the chosen texts is wide enough for a historical comparison of the lexical features.

The first text is a late 14th century treatise on the diseases of the eye, edited by L. Eldredge and based on four manuscripts that have survived to our days. It was written by a recognised practitioner of the time known as Benvenutus Grassus.[2] In that period, the language used by different medical practitioners reflected the existing social differences between them, separating the "relatively few university-trained physicians like Chaucer's "doctor of phisik" from the unlatined others, specifically, the on-the-job-trained surgeon, barber-surgeon, apothecary, apprentice, cunning man, wise woman, lay sister in a convent, and midwife" (Robbins, 1970: 394).

However, the distance between the University doctor and the lay practitioner or *leech* (using the Old English term) was not as rigid as one should think. Often, lunaries, recipes, or astrological recommendations written in English (Norri, 1992: 28) were included in complicated theoretical treatises in Latin and Greek. The question, then, is who would use this material or what it was intended for. Apparently, the exchange of information between all levels of medical practitioners was more than sporadic. In England, until the middle of the fifteenth century at least, many professional,

specialised, and technical subjects were presented in Latin. This principle applied to theology, law, alchemy, astrology, and medicine, although in some of the disciplines, English was slowly coming into recognised, terminological usage.

The second text, *A Manual on Diseases of the Eye and Ear for the use of students and practitioners* (1881), was written by W. F. Mittendorf, who worked as a surgeon at the New York Eye and Ear infirmary. More specifically, he was an ophthalmic surgeon at Bellevue Hospital out-door department and assistant to the chair of ophthalmology and otology at Bellevue Hospital Medical College. Edited by Putman and Sons in 1881 in New York, the manual was conceived as a tool for an educated audience, specialists or medical students as its author explained in the preface:

> The want of a short practical manual of the diseases of the eye and ear in the English language has long been felt by the medical student. I have, therefore, at the request of many members of my private classes, given in this little book my lectures upon these subjects, somewhat enlarged. (Mittendorf, 1881: Preface)

Despite the fact that most of the volume is devoted to the eye, there is also a second part on the diseases of the ear. The reason for this association, which was frequent during the 19th century, was made explicit by the author himself:

> I have thought that it would be of additional value to give, together with the description of the diseases of the eye, a short account of the diseases of the ear, which deserve more attention from the general practitioner than has been accorded to them. (Mittendorf, 1881: Preface)

It has 429 pages of text and 18 pages of illustrations, and the plates shown before the appendix containing coloured illustrations of the diseases described in the book. It has an appendix at the end with a glossary in alphabetical order. It is important to note that in this period, medicine was going through a golden age, and the development of the so-called "medicine of observation" (Sournia, 1994: 696) in the 19th century brought an increase of new vocabulary, especially in the second half of the century. Medicine at the end of the 19th and the beginning of the 20th century incorporated vocabularies from the many sciences it drew from. An important contribution was that of chemistry –organic chemistry in particular– together with bacteriology, which became the leading research area thanks to scientists such as Pasteur. Ophthalmology also started to take off as an independent area thanks to the ophthalmoscope, which allowed a real insight of the eye.

In the last quarter of the 19th century, specialisation was a fact, and this required a new organisation of the work in the academic and scientific community:

> By the next period, 1875, extreme development has taken place in terms of research becoming contextualized in research communities working on similar problems. Literature reviews are relatively common, and typically exhaustive. Problem-

> statements and attempts to link projects to more general concerns are also prominent [...]: it clearly represents the will to report research exhaustively, which pervaded this period. Other indices of this trend are the large average number of pages devoted to each article […]; the first appearance of tables of contents for individual articles; and the extremely large numbers of results reported in quantitative articles [...] this must result at least partly from having to organise, in some comprehensible way, the enormous amounts of information contained in the articles. (Atkinson, 1996: 348)

In terms of language, from the beginning of the 19th century onwards we can consider that the founding of our contemporary English had been laid. The 19th century language with its constant increase in vocabulary started a tendency which continues in our present times, when some of the new words are the product of recent technology or derive from new concepts in the various scientific fields.

Both texts share similar characteristics, although some parts of the general macro-structure are not totally equivalent when compared. As expected, the prognosis section is missing in Mittendorf's text, given the evolution of the scientific method used in diagnosing. Diagnosis is precisely the second part in the structure of the volume followed by treatment, which includes chemical solutions in contrast with the more homeopathic-oriented proposals of the 14th century text. The following example illustrates how chemical solutions are introduced in this last section of the 19th century Manual:

> Mild astringent lotions, such as: R. Alum. Gr. V; tinct. Opii simp. Gtts x; aq. Camphor. 3i, instilled into the eye, two drops at a time, three times a day, are of great service. (Mittendorf, 1881: 24)

A remarkable innovation is the use of the ophthalmoscope, which contributes immensely to the accuracy in the disease descriptions. It appeared in 1850 and represented a turning point in this area of medicine; such an important fact is referred to in the book: "[...] whilst the study of the affections of the choroid, the retina, and the optic nerve, which is only possible with the ophthalmoscope" (Mittendorf, 1881: Preface). This ophthalmoscope not only enabled the physician to observe and classify abnormalities of the retina, but it proved to be extremely valuable in the measurement of errors of refraction in the eye. In this sense, the book also includes a chapter –the last one– devoted to accommodation and refraction, something that was very recent at that time.

Criteria and method for the study

The methodology in this study uses computer resources available. The use of concordancers to extract data for linguistic analysis has been frequent in recent diachronic linguistic studies. According to Rissanen (2000: 7),

> Computerized corpora can be said to have revolutionized the study of the history of English. Corpora as such do not increase our knowledge of the language of the past; they are based on manuscripts and editions available [...] corpora give us an opportunity to master huge quantities of textual material, to collect and sort evidence with a speed and level of accuracy that the scholars of earlier decades could only have dreamt of. (Rissanen, 2000: 7)

The software used in this research project is the programme Monoconc Pro, version 1.0, one of a wide range of text analysis software. It can be used with large corpora, as well as for complex text searches. Other characteristics are that the loaded corpus can be modified at any time, and information about frequency and collocation patterns can be easily obtained.

The lexical study of the selected words is based on several criteria, taking Norri's (1992) study and his classification as a major reference. This means that the principles of classification adopted to study the etymology of the words are three:

(i) the origin of the word, according to its Germanic (Gmc) or non-Germanic (non-Gmc) origin;

(ii) the word-formation process of the word, defining its morphology as simplex or complex (following Bauer, 1993), and

(iii) the identification of the semantic properties of the word, focusing on the use -or not- of the metaphor.

The corpus contains a total of 188,035 words, i.e.: the sum of Benvenutus' text (21,601 words) and Mittendorf's text (166,434 words). The different scales reflected in graph 1 and 2 below correspond to the different amount of words in each case. The total number of examples reflected in each column showing the three different variables used have been calculated by adding the different occurrences. The overlapping words in both texts also show similarities in their frequency percentage within each text. Out of 62 selected words, 9 of them were used in both texts: the percentages reflect the sum of the percentages belonging to the different occurrences of the same word, as is reflected in Table 1.

14th century text		19th century text	
blode	0.10%	blood	0.10%
cause	0.05%	cause	0.07%
cateract	0.08%	cataract	0.11%
day/days/daye	0.12%	day	0.10%
eye/eye/eyon/ey$_2$e, ey$_3$en	1.64%	eye/eyes/eyeball	1.01%
pacyent/pacyentes	0.33%	patient	0.29%
poynt	0.06%	point	0.07%
tyme	0.10%	time/times	0.27%
water	0.12%	water	0.08%

Table 1. Occurrences and percentages of the overlapping words.

Linguistic analysis

The results obtained suggest that the method used may be relevant since it reveals interesting facts that require comment. Needless to say, although results and the conclusions drawn apply only to the analysed corpus, it seems probable that similar data may be obtained in corpora related to other Medical English sub-disciplines. However, and despite the fact that further research is needed to validate this hypothesis, it is hoped that these results will encourage further diachronic lexical studies in scientific texts.

The words in table 1 showing the similar frequency values in both texts are only 9 out of 62. The reasons for this may be found in the percentages that are also very similar (with the exception of *tyme* [0.10%] and *time* [0.27]), a fact which would indicate a similar usage of the overlapping vocabulary.

The words with a high frequency have not been found in the 19th century text. Their use has diminished, perhaps due to the change of method, as it may be the case of words like *lynen*, or *aloes*. The change of narrative structures in scientific discourse is reflected in the low frequency of the word *men* in the 19th century. Instead, the use of passive to express impersonality in the 19th century is found, showing an evolution of the discourse in this context. By contrast, in the first text, this very same type of meaning, as we indicated above, is expressed through the use of *men*:

> […] such oþer, or with any infecte ayre that [[men]] calle blastyng, wherthough the ey wex […]

The absence of the word *humor* in the second text is also representative of the evolution of medical knowledge. In fact, *humor* occurs in the 19th century text, but all the occurrences show the word modified by *aqueous* (24 items) or by *vitreous* (31 examples). This reveals the use of this word as part of a fixed term denoting a specific part of the anatomy of the eye, while in the 14th century text it has a much more general sense. Similarly, the word *vnce* does not appear in the 19th century, probably due to the evolution in treatment, in which this unit of measure is not used.

The words *syght* and *vision* are also interesting. *Syght* occurs in the 14th century text, but not in the 19th century one. The reverse happens with *vision*, occurring in the 19th century text, but not in the 14th century one. This fact may be interpreted as a transfer of meaning from *syght* to *vision*, changing the Gmc word for a non-Gmc one in order to express the same concept. This would be in line with the general results shown in graphs 1 and 2, discussed below. *Syght* (sight, as it is spelled nowadays) has remained, however, as a more lay term to denote the concept. Similarly, the words *sekenes* and *disease* present this change in a transfer of meaning. The lay word for *disease* would be

sickness, presenting the Gmc stock as identified with the more popularised version of the specialist vocabulary of medicine. Norri's (1992: 102-103) findings show "that simplex terms of Germanic origin are terms with a primary medical meaning: this group represents the earliest layer of English medical vocabulary."

Another observation derived from the results refers to the fact that the more detailed the knowledge of the eye anatomy, a larger quantity of this vocabulary occurs in the second text. This is most likely due to an improvement in medicine. Examples of this increasing vocabulary are, among others: *iris*, *lens*, *lid*, *fibres*, *cornea*, *conjunctive*, *ciliary*, *cell*, *retina*, *sclera*, *nerve*, *choroid* and *vessels*. All these words –from non-Gmc stock– have a more descriptive function within the treatise. By contrast, the terminology of the gross anatomy is still mostly of Gmc origin, supporting Norri's (1992: 71) results:

> It has been pointed out that although modern medical English relies heavily on technical terms composed of foreign elements, "the foundation or substrate is still 'plain' English." (Dirckx, 1986: 44)

Generally, the words that have not appeared in the frequency results of the second text belong to the vocabulary more closely related to treatment processes, since the description was less important in the 14th century due to the little knowledge of the anatomy in this period: *aloes*, *egg*, *wyne*, *suger*, *powder*, *plaster*, *oynement*, *nedyl*, *medycyne*, *lynen* and *cure*. Among these words, six of them (*aloes*, *suger*, *powder*, *oynement*, *medycyne* and *cure*) are from non-Gmc stock, whereas four terms (*egg*, *wyne*, *plaster* and *nedyl*) are of Gmc origin. This shows a stronger presence of vocabulary of native stock at that stage, which will gradually change into non-Gmc. These results seem to support Norri's study of the names of sicknesses:

> Simplex terms of Gmc origin typically denote common and well-known ailments or afflictions. [...] The largest group of names of sicknesses, covering a multitude of disorders both physical and mental, consists of simplex terms and derivatives of foreign origin. Adoptions from French with no direct Latin counterpart tend to form part of the more fundamental and everyday medical vocabulary. (Norri 1992: 285)

The analysis of the vocabulary in the 19th century text confirms this. However, a more detailed study considering a corpus made from texts of different periods would allow us to trace how this change was produced and when. In terms of frequency, it has been observed that in both texts, as expected, the word eye and its variants is the noun with the highest frequency. In the 14th century text, the words with the highest frequencies are related to method or procedure. However, in the 19th century one, the most frequently occurring words refer to descriptive items referring to anatomy, revealing the particular increase of knowledge in this field of medicine. The word *humor* does not appear in the second text in the frequency list, although it has a presence of 0.0395% in examples that will be referred to below. This may be due to

the withdrawal of certain medical theories concerning humours, which will start to be questioned from the Renaissance onwards, in a period where works like Vesalius' *De Humani Corporis Fabrica* will mark a new era in the history of science.

Apart from the overlapping terms, their absence in both texts may lead to interesting questions. It may seem obvious –from the point of view of medical history– that words like *humor* do not appear in the selected words according to the criterion of frequency. However, a further search of this word in the 19th century text reveals an interesting feature concerning collocation: it is always modified by the Latin adjectives *aqueous* (24 instances) and *vitreous* (31 instances), establishing a fixed pattern within the terminology used in the 19th century treatise.

The lexical study proposed established a classification according to origin (Gmc/non-Gmc), morphology (simplex/complex) and meaning (metaphorical use/non-metaphorical use). In relation to origin, our general results show a shift that can be observed between the amount of words of Gmc origin and of simplex morphology towards an increase of non-Gmc words also increasing in complex morphology (see graphs 1 and 2 below). These respond to the initial claim about the evolution of medicine as a science, which suggests that specialised vocabulary increases as science keeps spreading new terms among the different related areas (Sournia, 1994: 696). The new vocabulary is taken, as the results show, from non-Gmc stock, at least as far as ophthalmology is concerned. Further distinction in terms of origin between these words and the non-Gmc stock seems to pose a difficult problem, as Norri (1992: 286) points out:

> It often proves impossible to dissociate the French from the Latin influence, and for many names of sicknesses a joint source is probable. Words of French and Latin provenance include common terms, and also rarer items of a more technical kind.

A different matter is to distinguish a specialised from a lay origin of the word. In the first text, the lexicon seems to have originated with an already specific meaning in the native language, with the exception of examples like *colour*, *maner* and *place* which are non-specifically medical. This is an issue also referred to by Dirckx (1986: 44):

> Many of the most used medical terms have been taken from lay English and date back much farther than modern scientific medicine. Some of these mean the same thing to the physician that they mean to the layman (heart, measles, wound) [...] Though many English medical terms come of AS stock, others entered our language from French during the Norman period (pain, plague, bowel). Besides English words of literal denotation, there are many which are used figuratively in medicine […].

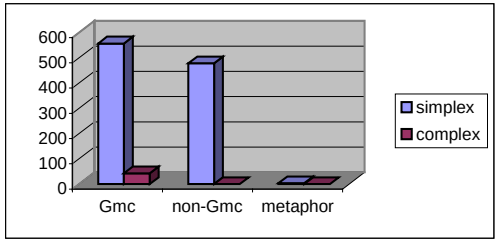
Dirckxs strongly argues that the Gmc stock is still an essential part of medical language:

> No matter how thickly our speech and writing are strewn with technical terms, the foundation or substrate is still "plain" English. Moreover, a great many technical

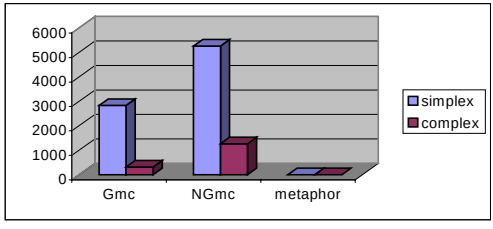
> terms used by speakers of English are native to the language rather than importations or coinages from the learned tongues. (Dirckx, 1983: 23)

This position may be argued, but I shall leave further discussion on this matter for another more related essay, since this subject requires complementary research.

Concerning morphology, graphs 1 and 2 show a shift towards the increase of complex words in the second text. As explained above, the results are presented reflecting the total amount of occurrences (as numbers indicate on the left) of each of the variables used:



Graph 1. Results in the 14th century text.



Graph 2. Results in the 19th century text.

Norri's (1992: 286) findings suggest that "Derivatives of English origin consist almost exclusively of suffix formations. English writers rarely practised prefixation." Contrasting his findings with our results –in Benvenutus' text– two derivatives are found: *begynnyng* and *sekenes*, one of them bearing prefix:

> The findings made in the study of derivatives suggest interesting possibilities for further research. A corpus of EmodE medical texts, for example, could provide important material for comparison, particularly with regard to the development of prefixation and the use of foreign suffixes. The latter types of word-formation probably become gradually more frequent after 1550. (Norri, 1992: 287)

Although "some foreign suffixes, including *-ance* and *-ity*, were never widely used with native words" (Norri 1992:140), data confirming Norri's results can be added given that after a quick survey of the examples in Benvenutus text, I found no examples of words with the suffix *-ity*, and 23 examples of words with the suffix *-ance*, none of

them of native origin. This may establish a further line of research. Dirckx (1986: 44) also referred to this issue:

> Anyone who is superficially acquainted with modern medical terminology knows that Latin and Greek play a dominant part in its composition. Some words have been taken over from the classical languages without much change in form – for example, *syncope* and *pharynx* from Greek, *axilla* and *delirium* from Latin. Others are compounds or derivatives built up in English from stems and affixes borrowed from Greek *(microaerophillic, pericardiectomy*) or Latin (*radiolucent*, *seroconversion*) or from combinations of the two (*rectosigmoid, neurovascular*), or by mixture of classical material with English (*endartery, hemiblock*)or other languages, including mediaeval German (*antiscorbutic*) and Arabic (*alkalosis*).

Another result obtained in this study concerning morphology is that all the selected words are nouns, mainly because, as Dirckx (1983: 23) pointed out, "technical terminology consists largely of nouns". Moreover, as Webber (1996: 41) observed in her research on medical English abstracts, "The majority of metaphors belong to the nominal group." However, the use of other elements of lexicon as adjectives, verbs, etc., may also be considered in terms of a complete exploration of the vocabulary behaviour in these texts.

The search for metaphors in my study was limited to the most frequently used words in both texts, so the results obtained are not entirely reliable. A few examples of a metaphorical use of a word were found in the first treatise, *De Egrutidinibus Oculorum*. All of them were metaphors by comparison using *like*. No metaphor was found among the most frequently used words in the second text. However, it can be pointed out that some words, such as *cataract* [3] or *corn*,[4] are metaphorical in themselves. This case appears to be quite common:

> The feeling of pain and discomfort associated with a sickness gives rise to several metaphors. The effect could be sudden and piercing (*sti(t)che, schot(h)e*, burning (fire), or gnawing (*frette*). *Schot(h)e* also expresses the idea of elves and other malicious spirits shooting their arrows into the human body. Fire was used either for an inflammation or a rise in temperature. (Norri, 1992: 108)

When Benvenutus is describing the types of cataracts, he distinguishes between two words, one of lay origin and from Gmc stock, and another of a specialised origin and from non-Gmc stock:

> The third is an ungula or pterygium, a tumour-like growth that processes across the eye from one corner. In Middle English it is called a nail (that is, a fingernail) [sic] or a web, and in modern English a pterygium, from the Greek πτερυγιον meaning "wing," perhaps because it was thought to look like an insect's wing. (Eldredge, 1996: 16)

This example reflects a difference between the use of a word from a lay source and another word of a non-Gmc origin used as a technical term, which keeps its

metaphorical meaning. Continuing with the discussion of the metaphorical use of a word, Norri (1992: 109) identified a phenomenon already labelled by Ullman (1977: 155) as "semantic borrowing". Metaphors that follow this pattern were created by copying a Latin model. An example of this was found in Benvenutus text in the following concordance:

> […] and the Arabies clepen it lamesarca, that is in Latyn aqua putrefacta, in Englisshe [[water yroted]] in the ey3e […]

However, no instance of this was found in the second text. As already mentioned, the present study was limited only to the most frequently used words, and a further study is needed to describe possible metaphors used elsewhere in the text.

Concluding remarks

Several conclusions may be drawn from the present study. On the one hand, there is a decrease in the number of simplex words of Gmc origin as we move from the 14th to the 19th century. On the other hand, in the 19th century the percentage of non-Gmc words increases substantially. It can be observed that there is a lack of the words initially denoting procedure. We find a substitution of these words in figure 2 for non-Gmc terms. It has also been shown that there is a corresponding increase in the number of complex words from one period to another. This non-Gmc vocabulary is always associated to less accessible types of text, with a restrictive audience and a more professional and selected academic community:

> The diachronic evolution observed in the use and frequency of reference patterns over the 185 years studied reflects the conceptual shift from a non-professionalised, privately and individually-based medicine to a professionalised and specialised medicine, a technology-oriented medical research and a highly structured scientific community. (Salager-Meyer, 1999: 279)

Parallel to this specialisation in terminology, it is also important to bear in mind that a more popular type of text also appears addressed to the lay public in order to disseminate medical matters of general importance (e.g. *Scientific American*).

As for the methodology of this study, several considerations are worth comment. Results show that corpus linguistics has proved to be useful in my analysis: it has made it possible to obtain a considerable amount of data with a speed and accuracy that would not have been viable otherwise. The fact that the computer programme provides the linguistic context of the word has helped to trace other extra-linguistic factors, and it has been fundamental when identifying a metaphorical use of a word:

> The wealth of corpora surrounding us make it possible to trace linguistic processes and developments much more accurately and from more angles than before, with reference to a number of extralinguistic factors, be they sociolinguistic, regional or genre-based. And best of all; there does not seem to be any end to the expansion, or explosion, of database resources supporting the study of English historical linguistics and philology. (Rissanen, 1999: 142-3)

In this sense, many different corpora are being created for different purposes. Rissanen (2000: 7) strongly argued in favour of the creation and potential of corpora which are specially designed for linguistic research, even more particularly, as applied to historical linguistics evidence in specific contexts:

> Corpora have freed us from months and years of painstaking pencil work and from the straitjacket of worn-out examples appearing in older dictionaries and historical grammars.

He continued by inviting researchers to create corpora:

> I hope it will encourage scholars to avail themselves of the wealth of electronic evidence surrounding them –and to create new corpora for general and specific purposes. (Rissanen, 2000: 14)

The possibility of working with specialised corpora from different periods of history would bring up grounds for comparison between different specialised linguistic contexts and will permit to draw parallel lines in the evolution of scientific language. This would not only apply to lexical studies, but also to genre studies, and many other fields in the humanities.

The use of frequency as the main criterion for obtaining data has proved to be useful to establish a comparison between the first two variables presented, the distinction between simplex or complex, and the variable considering the origin of the word, Gmc or non-Gmc. However, as it has been explained above, the third variable has not benefited much from the application of this criterion. Few or no examples have been found, the initial hypothesis being very optimistic about the metaphorical use of words in medical vocabulary. However, far from considering this a constraint, a methodological reflection shall be undertaken in order to find better methods of dealing with the study of metaphor in medical English from a chronological perspective.

Among several other features to be considered for further research, hedging seems a very relevant one. Although this linguistic device, so much attached to scientific discourse, has been widely studied in contemporary scientific discourse, no diachronic study of this device has been carried out in detail:

> To the best of my knowledge, no LSP study has been undertaken on the diachronic evolution of hedges in academic scientific discourse. It is true that a few recent works;

> such as Bazerman (1988), Atkinson (1992, 1996) and Valle (1993) refer to the hedging phenomenon in 18th and 19th century scientific prose, but they only do so in vague and general terms (i.e. not in a systematic fashion) what is more, their findings are controversial. Bazerman (1988), for instance, argues that hedges did not play a significant role in early scientific writing, and that it is a phenomenon which has developed over the years, particularly in the course of the 20th century. By contrast, Shapin (1984), Skelton (1988), Kubui (1988) and Varantola (1990) share the opinion that hedging is an old skill and has always been an unavoidable problem. (Salager-Meyer, 1999: 136)

There is much more to be done in the field of diachronic studies of languages in specific contexts. Our contribution may provide a starting point in order to establish the grounds for potential research on the topic, which has already awakened the curiosity and interest of many scholars. An example of current related research is found in the so-called "Uppsala project":

> The "Uppsala project" on the historical evolution of Swedish languages for special purposes has been reported in a series of publications, primarily in Swedish but also in English. [...] The Uppsala Group have explicitly distanced themselves from what they call the "American" approach to LSP and scientific discourse, which they see as being overly text-oriented and lacking a "societal" dimension. Their purpose has been to describe changing text structures and the development of specialised terminology, within an overall societal perspective. (Valle, 1999: 47)

Finally, we may conclude that more studies following this same approach are bound to explore scientific discourse from a different angle that may discover linguistic and non-linguistic features of specialised vocabularies. This will assist the understanding of not only the linguistic devices, but also the evolution of genres, as well as the specialised terminologies, among other significant issues.

Acknowledgements

I would like to express my gratitude to the reviewers whose suggestions and advice have greatly improved the final version of this paper; and to the editor, for his patience. I am also indebted to Dr. Santiago Posteguillo, who has always encouraged me to pursue research, and has taught me so many things; to him, my deepest gratitude.

(Revised version received June 2006)

REFERENCES

Atkinson, D. (1996). "*The Philosophical Transactions of the Royal Society of London*, 1675-1975: A sociohistorical discourse analysis." *Language in society* 25: 333-371.

Bauer, L. (1993). *English word-formation*. Cambridge: Cambridge University Press.

Curzan, A. (2000). "English historical corpora in the classroom. The intersection of teaching and research." *Journal of English Linguistics* 28,1: 77-89.

Dirckx, J. H. (1983). *The Language of Medicine: Its Evolution, Structure and Dynamics*. New York: Praeger.

Dirckx, J. H. (1986). "The technical language of medicine." *EMP Newsletter* 3,1: 43-46.

Eldredge, I. E. (ed.) (1995). *The wonderful Art of the Eye. A Critical Edition of the Middlle English Translation of His De Probatissimo Arte Oculorum by Benvenutus Grassus*. Michigan: Michigan State University Press.

McConchie, R. (1997). *Lexicography and Physicke. The Record of Sixteenth-Century English Medical Terminology*. Oxford: Clarendon Press.

Mittendorf, W. F. (1881). *A Manual on Diseases on the Eye and Ear for the use of students and practitioners*. New York: Putnam and Sons.

Norri, J. (1992). *Names of sicknesses in English, 1400-1550: An exploration of the lexical field*. Helsinki: Academia Scientiarum Fennica.

Norri, J. (1998). *Names of Body Parts in English, 1400-1550*. Helsinki: Academia Scientiarum Fennica.

Nwogu, K. N. (1997). "The Medical Research Paper: Structure and Functions." *English for Specific Purposes* 16,2: 119-138

Rissanen, M. (1999) "Early English corpora and the story of standardisation." in A. Bringas, D. González, J. Pérez, E. Rama, & E. Varela (eds), "Woonderous Ænglissce" *SELIM studies in Medieval English Language*, 133-144. Vigo: Universidade de Vigo. Servicio de Publicaciones.

Rissanen, M. (2000). "The world of English corpora. From Caedmon to the computer age." *Journal of English Linguistics* 8,1: 7-20.

Robbins, R. H. (1970). "Medical Manuscripts in Middle English." *Speculum* 45: 393-415.

Salager-Meyer, F. (1996). "From 'Mr Guthrie is profoundly mistaken…' to 'our data do not seem to confirm the results of previous study on…': a diachronic study of polemicity in academic writing (1819-1995)." *Ibérica* 1: 5-28.

Salager-Meyer, F. (1999). "Referential behaviour in scientific writing: a diachronic study (1810-1995)." *English for Specific Purposes* 18,3: 279-305.

Salager Meyer, F. & G. Défives (1998). "From the gentleman's courtesy to the expert's caution: a diachronic analysis of hedges in academic writing (1810-1995)" in I. Fortanet, S. Posteguillo, J. C. Palmer, & J. F. Coll (eds.), *Genre Studies in English for Specific Purposes*, 133-169. Castelló: Universitat Jaume I. Servei de Publicacions.

Singer, C. (1962). *A Short History of Medicine*. Oxford: Clarendon Press.

Sournia, J. C. (1994). "Les phases évolutives du vocabulaire médical français." *Meta* 29,4: 692-700.

Ullmann, S. (1977). *Semantics. An Introduction to the Science of Meaning*. Oxford: Blackwell.

Valero, C. & C. Calle (1997). "Contrastive analysis of finite verb profiles in eight medical abstracts" in R. Marín & A. Romero (eds.), *Lenguas aplicadas a las ciencias y la tecnología: aproximaciones*, 219-223. Cáceres: Universidad de Extremadura.

Valle, E. (1999). *A Collective Intelligence. The Life Sciences in the Royal Society as a Scientific Discourse Community 1665-1965*. Turku: Anglicana Turkuensia no. 17.

Webber, P. (1994). "The function of questions in different medical journal genres." *English for Specific Purposes* 13,3: 257-866.

Webber, P. (1996). "Metaphor in medical English abstracts." *Unesco ALSED-LSP Newsletter* 19,1: 35-52.

Williams, I. (1996). "A contextual study of lexical verbs in two types of medical research report: clinical and experimental." *English for Specific Purposes* 15,3: 175-197.

NOTES

1 "Diachronically speaking, this means that texts produced within a given culture or context will gradually change, i.e. if conditions and frames change within a society, the texts produced will evolve" (Salager-Meyer, 1999: 280).

2 The existence of this author is attested only by his work and not much is known about him; however, further information can be found in articles published by the editor of the text (Eldredge, 1999).

3 "Galen calls a cataract, literally "falling fluid," and the classical Latin *suffusio*, a pouring down, is a claque of the Greek. (Arabic *al ma' al-nazil*, falling water, is also calqued on the Greek). Classical Latin *cataracta*, a rapid, a waterfall, was at some point in the medieval period substituted for *suffussio*, possibly by Constantinus Africanus in the late eleventh or early twelfth century. [...] The substance was thought to be a corrupt fluid, something that originated within the eye itself" (Eldredge, 1996: 13).

4 Norri (1992: 107) explains: "A morbid swelling or growth of roundish shape was known as a *corn* or a *kernel*. The former word was used particularly for a stye on the eyelid (cf. modern hordeolum), or a pustule on the eye."