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From Body to Web

An Introduction
to the Web as Corpus
Contents

Introduction

Acknowledgments

Chapter I. Corpus Linguistics and the Web. Old and new Issues

Chapter II. Challenging Anarchy. The Corpus and the Search
To those who sent me on my way,
those who let me go on my way,
and those who asked me where I was going and why.

(from Michael Hedges, *Breakfast in the Field*)
It is perhaps no exaggeration to maintain that the rise of corpus linguistics in recent years has brought about a revolution in the study of language whose impact is still to be fully acknowledged especially in everyday work with languages. By changing the «unit of currency» (Tognini Bonelli 2001: 1) of linguistic investigation, corpus linguistics has proved not only an invaluable way of exploring language structures and use, but it has also opened up new perspectives in language teaching, in the study of LSP, and in translation studies. More recently, increasing interest in the text/discourse dimension of corpus studies is showing the contribution that corpus research can make to the study of literary texts or to understand the relationship between discourse and society (Hoey et al. 2007).

While the contribution brought by corpus linguistics to «a qualitative change in our understanding of language» (Halliday 1993: 24) cannot be underestimated, it is still a matter of debate whether corpus linguistics should be regarded primarily as a method that can be applied in a variety of fields, or as a theory, «because it is in a position to contribute specifically to other applications» (Tognini Bonelli 2001: 1). To account for the special status of corpus linguistics as a methodology which is nonetheless «in a position to define its own set of rules and pieces of knowledge before they are applied», Tognini Bonelli devised the notion of «pre-application methodology» (2001: 3), thus paving the way for subsequent interest in the theoretical implications of corpus studies. Such focus on the theoretical consequences of corpus findings, which seem to hint at a possible theoretical status of the discipline as a whole, has led to the notion of «corpus linguistics
ident and readily available to any user, providing the linguist with countless instances of repeated social and shared linguistic behaviour. This vast amount of data only requires that appropriate methods are devised to exploit its significance from a corpus linguistic perspective.

It is against this background that the present study aims to deal with the emergence of a research field labelled «web as corpus». By no means itself a new theory or approach, web as corpus is best seen as an umbrella term for a number of methods that look at the web as their main resource to implement the corpus linguistic approach. The methods devised to exploit the web’s potential from a corpus linguistics perspective must not be seen therefore as competing with other more traditional ways for corpus work, but as established a useful complement to more practices in corpus linguistics. Thus, while the notion of the web as corpus apparently questions fundamental issues within corpus linguistics, it in fact contributes to the growth of the research field as a whole, indirectly contributing to reshaping our view of language.

Nonetheless some of the questions raised by the very idea of considering the web as a corpus by virtue of its very nature as a ‘body’ of texts seem to deserve further investigation on both theoretical and applicative grounds, and this is what the present work aims to do. Given such a twofold focus the present work is mainly intended for people who have an interest using the web as a corpus, but also interested in the theoretical implications which the very idea of considering the web as a corpus inevitably raises. This suggests a wide audience including researchers or students of languages and linguistics, as well as language professionals of any kind, especially language teachers and translators.

The twofold focus is also reflected in the structure of the book. A first chapter exploring the theoretical implications of the emerging notion of the web as corpus is followed by four chapters discussing different methods to exploit the web’s potential from a corpus linguistic perspective. The basic assumption is that while apparently only committed to the practical task of devising appropriate methods and tools, research carried out under the label web as corpus may have been contributing to reshaping the way we conceive of corpus linguistics as a whole in the new Millennium. Chapter 1 revisits some key issues in corpus linguistics...
such as «authenticity», «representativeness», «size» and «content» in the light of the web as a «spontaneous», «self-generating» collection of texts. The chapter also explores the new issues such as «dynamism», «reproducibility», «relevance and reliability» that the notion of the web as corpus possibly raises. Chapter 2 focuses on search methods as an issue of major concern when the web is considered as a corpus in its own right with particular reference to the different roles played by the linguist in empirical inductive research based on corpora and on uses of the web for linguistic reference through ordinary web search engines are exemplified. Chapter 3 and Chapter 4 introduce tools devised to exploit the web’s potential from a corpus linguistics perspective showing how different ways of using the web as a corpus do not only help to overcome the obvious limitations of the web as a linguistic resource but also provide linguistic information that is particularly appropriate in specific contexts and for specific tasks. Finally particular attention is given to the creation of several general reference mega-corpora from the web for such languages as Italian, German, English, Spanish, Chinese and Russian, in Chapter 5. These corpora fall into the «mega-Corpus – mini-Web» category in the map drawn by Baroni and Bernardini for Web as/for corpus research (Baroni and Bernardini 2006: 13), and seem to bridge the gap between the corpus linguistics community and those researchers who are fascinated by the promises and possibilities offered by the web as a corpus but are not going to give up high methodological standards.

Without the aim of providing an exhaustive list, the methods and tools discussed in the applicative sections of this work were selected so as to exemplify different ways of using the web as a corpus, drawing on the possible meanings of the umbrella term web as/for corpus suggested by Baroni and Bernardini (2006: 13ff). The steps thus taken chart a process of decreasing dependence on the typical gateway to information on the web (i.e. ordinary search engines), from the web as corpus surrogate, to the web as corpus shop to the mega-corpus mini-web. This final step signifies a Copernican revolution in our way of conceiving of corpora, corpus tools and methods for corpus work under the impact of the web, with the notion of web as corpus apparently giving way to the new horizons of the corpus as web.

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Introduction

This chapter revises some key issues in corpus linguistics in the light of the properties of the web as a spontaneous, self-generating collection of texts, and explores some of the new issues which the emerging notion of the web as corpus seems to raise. The basic assumption is that the challenge of using the World Wide Web in corpus linguistics does not aim to push key questions onto the background, but rather "serves as a magnifying glass for the methodological issues that corpus linguists have discussed all along" (Hundt et al. 2007: 4). Section 1 and Section 2 discuss the relationship between corpus linguistics and the web as a 'body' of texts. Section 3 revisits authenticity, representativeness, size and content, in order to envisage the «changing face» of corpus linguistics under the impact of the World Wide Web, while Section 4 explores some new issues such as dynamism, reproducibility, relevance and reliability.

1. Corpus linguistics and the web

In the opening page of a recent volume on Corpus Linguistics and the Web, the editors wonder «why should anyone want to use other than carefully compiled corpora?» (Hundt et al. 2007: 1). This is indeed a legitimate question which is undoubtedly relevant to the object of the present study. Why should one even consider taking the risk of using a database as anarchic and chaotic as the World Wide Web? Why should linguists, translators, language professionals of any kind, turn their attention to a collection of texts whose content is largely unknown and whose size is hardly
measured? As the editors of the above mentioned volume argue, there are a number of obvious answers to these questions. For some areas of investigation within corpus linguistics, such as lexical innovation or morphological productivity, or for investigations concerning ephemeral points in grammar, one might need a corpus larger than the mega-size corpora of the BNC type. Then there are language varieties for which carefully compiled corpora are not always viable, but which are extensively represented on the web. Finally, the technological development itself has resulted in the emergence of new textualities, such as chat rooms, blogs and home pages, along with the re-mediation of traditional genres, which call for new attention, since they seem to blur old distinctions between written/spoken, formal/informal registers and require new categories of approach. Last, but not least, there is the problem of updating, which requires that profit and loss are carefully balanced in the compilation of a conventional corpus, which obviously runs the risk of being already out of date when it is finished (Hundt et al. 2007: 1-2).

Starting from these considerations, it is self evident that the notion of the web as corpus is, in the first place, nourished by practical and opportunistic reasons, which have resulted in different meanings of the expression Web as Corpus, corresponding to different ways to exploit the web’s potential from a corpus linguistics perspective. In rather general terms, most uses of the web in corpus linguistics research can be summed up under the label «web as/for corpus» (De Schryver 2002; Fletcher 2007), depending on whether the web is accessed directly as a source of online language data or as a source for the compilation of offline corpora. More precisely, in their introduction to the collection of papers resulting from the First International Workshop on the Web as Corpus (Forlì, 14th January 2005), Baroni and Bernardini (2006: 10-14) focus on four basic ways of conceiving of the web as/for corpus:

1. The web as a corpus surrogate: researchers using the web as a corpus surrogate use the web for linguistic purposes either via a standard commercial search engine, mainly for opportunistic reasons (e.g. as a reference tool for translation tasks), or through linguist-oriented metasearch engines (e.g. WebCorp or KwiCFinder);

2. The web as a corpus shop: researchers using the web as a corpus shop, select and download texts retrieved by search engines to create «disposable corpora» either manually or in a semi-automatic way (e.g. using a toolkit which allows crawling and extensively downloading from the web such as BootCaT);

3. The web as corpus proper: researchers using the web as a corpus proper purport to investigate the nature of the web, and more specifically they look at the web as a corpus that represents web English;

4. The mega-Corpus mini-Web: the most radical way of understanding the web as corpus refers to attempts to create a new object (mini-Web/mega-Corpus) adapted to language research and combining Web-derived (large, up-to-date, web-based interface) and Corpus-like features (annotation, sophisticated queries, stability).

This overview shows how rich the relationship between corpus linguistics and the web can be and undoubtedly testifies to the liveliness of this exciting research field. And yet this is probably not the whole story. While the reasons for turning to the web as a corpus were no doubt mainly practical (size, open access, low cost) at the outset, there appear to have been also other less obvious reasons for taking the patently risky direction of using the web as a resource for linguistic research. It can be argued, indeed, that if the web has been considered as the corpus of the new Millennium (Kilgarriff 2001), this must also be due to qualitative considerations concerning the nature of the web itself, so that there may have been deeper reasons for turning it into an object of linguistic investigation. We stand no longer «at the brink of a new age», as Nelson foresaw over 25 years ago (Nelson 1981), but deeply immersed in it. And in this new age, it is perhaps the web that presents «the most provocative questions about the nature of language» (Kilgarriff 2001). Language is indeed «at the heart of the Internet» (Crystal 2006: 271) and as a «social fact», rather than simply a «technological fact», where «the chief stock-in-trade is language» (Crystal 2006: 271), the web may paradoxically have been brought to the attention of many linguists as the largest text collection in the world almost against their will. Hence the convergence between a social phenomenon existing independently from linguistic investigation (the web) and the corpus linguistics approach, where the web is seen as a huge amount of texts
in electronic format which both «tantalize and challenge linguists and other language professionals» (Fletcher 2007: 27).

With advent of the web in the new Millennium, the relationship between (corpus) linguistics and information technology seems thus to have entered an exciting stage which can be envisaged in terms of a role reversal between ‘giving’ and ‘taking’. While web technologies in the past drew extensively on language research through computational linguistics and natural language processing, it seems today the relationship has been reversed in a sort of «homecoming» of web technologies, with the web now feeding one of the hands that fostered it». (Kilgarriff and Grefenstette 2003: 336-7). In this context, it is to be expected that such characteristics as multilinguality and multimedia, dynamic content and distributed architecture, seen as very likely to become standards for linguistic resources in the 21st century (Wynne 2002: 1204), and which are all clearly linked to the emergence of the web as a key phenomenon of our times, should affect the way we conceive of a linguistic corpus. Even more crucially, perhaps, such changes can be seen from a wider perspective as signifying a deeper «measure of convergence of technologies and standards in several related fields having in common the goal of delivering linguistic content through electronic means» (Wynne 2002: 1207), and possibly mirror also changes taking place in society at large under the impact of the new technologies.

It is against this background that the web’s nature as a body of texts, which provides the material basis for its controversial and intriguing status as a corpus, deserves some further investigation from the perspective of corpus linguistics as a whole.

2. The web as corpus: a «body» of texts?

The very idea of exploring the possibilities of treating the web as a linguistic corpus presupposes a view of what a corpus is, and possibly entails a redefinition of what a corpus can be. If we start from the Latin etymology of the word, virtually any collection of more than one text can be called a corpus, but the term has acquired more specific connotations in modern linguistics than this simple definition implies (McEnery and Wilson 2006: 29). Indeed, even though some branches of linguistics have always been to some extent corpus-based (i.e. based on the study of a number of authentic texts), and concepts such as corpus and concordance have been for many years the daily bread of scholars studying the Bible or Shakespeare’s works (Kennedy 1998: 14), corpus linguistics as a distinct research field is a fairly recent phenomenon which rests on certain basic assumptions about what a corpus is, and also, perhaps more crucially for the purpose of the present study, of what a corpus is not. «A corpus», according to Sinclair’s seminal definition «as a collection of naturally-occurring language chosen to characterize a state or variety of a language» (Sinclair 1991: 171). In modern linguistics this also entails such basic standards as machine readable format, finite size, sampling and representativeness (McEnery and Wilson 2006: 29). Thus, Francis observes, an anthology such as The Oxford Book of English Verse cannot be properly considered a corpus, neither can, despite its name, the Corpus Iuris Civilis instigated by the Emperor Justinian in the 6th century (1992: 17). And while it is doubtful whether a collection of proverbs can be considered a corpus in its own right (Tognini Bonelli 2001: 53), it may eventually be considered as such if it is the object of linguistic research carried out using corpus linguistics tools. The notion of «corpus-hood» seems therefore to defy simple definitions based on the corpus-as-object alone and is best approached from a wider perspective including considerations on both form and purpose (Hunston 2002: 2), the latter being a fundamental criterion in discriminating between a linguistic corpus and other collections of language texts (Francis 1992: 17).

Nonetheless, owing to the growing popularity, or rather «remarkable renaissance» (McEnery and Wilson 2001: 1), of corpus linguistics in the last decades of the 20th century, there has been in recent years greater and greater pressure to identify explicit criteria for corpus creation and corpus investigation and to define «good practice» in corpus work. Thus, each new study in corpus linguistics rests – implicitly or explicitly – on a definition of corpus that is based on fundamental criteria and standards. There is obvious consensus that «authenticity» of language data and «electronic format» are the basic sine qua non of a corpus in the modern linguistics sense of the word, while differences may emerge concerning other aspects. Regardless, however, of the definition
chosen as a starting point, issues such as representativeness, size, sampling, balance, design and purpose always enter the debate at different levels whenever the notion of corpus is at stake. Accordingly, the idea of considering the World Wide Web as a ready-made corpus by virtue of its very nature as a collection of authentic texts in machine readable format is called into question by the rigorous standards of corpus design. It is not surprising therefore that in a publication aimed at clarifying and spreading the «good practice» of corpus work, Sinclair explicitly declares that «[a] corpus is a remarkable thing, not so much because it is a collection of language text, but because of the properties that it acquires if it is well-designed and carefully-constructed», consistently denying corpus dignity to the web:

The World Wide Web is not a corpus, because its dimensions are unknown and constantly changing, and because it has not been designed from a linguistic perspective (Sinclair 2005).

Notwithstanding doubts concerning the hypothesis of using the web as a corpus, made explicit by one of the founding fathers of contemporary corpus linguistics, linguists from all over the world have been increasingly turning their attention to the web not only as a source of language text for the creation of conventional (well designed and carefully constructed) corpora, but also as a corpus in its own right. The relationship between corpus linguistics and the web seems thus to have become all but marginal, to the extent that this could well be envisaged as a new stage in the penetration of the new technologies in corpus linguistics. According to Tognini Bonelli, the computer was, at first, only a tool for speeding up processes and systematising data; then it offered a methodological frame by providing evidence of patterns of regularity which would never have been noticed or could not have been elicited by mere introspection; finally, information technology immensely contributed to the creation of new corpora, simplifying the work of corpus builders and potentially turning corpus linguistics from an area of investigation for specialists only to a research field virtually open to all (Tognini Bonelli 2001: 43ff.). Today, the web itself seems to claim the right of being considered as a corpus by virtue of its very nature as a collection of machine readable and searchable authentic texts, thus opening up new perspectives and offering new challenges.

Acknowledging the undisputable role that the web can play, and has actually been playing so far in corpus linguistics, and acknowledging its potential as a ready-made corpus can however by no means obliterate the difference between the textual *mare magnum* which constitutes the web and a corpus where texts are gathered «according to explicit design criteria, with a specific purpose in mind, and with a claim to represent larger chunks of language selected according to a specific typology and with a specific typology» (Tognini Bonelli 2001: 2). While taking for granted the qualitative difference between the web and a corpus designed and compiled as an object of language study, it seems nonetheless still possible to break this *impasse* by pointing out the fundamental difference between attempts at answering the «ontological» question relating to what a corpus is – which implicitly points to a «deontological» notion of what a corpus should be – and more empirical, yet legitimate, attempts to test the web’s potential as a corpus by answering the practical question «Is corpus *x* good for task *y*?». As Kilgarriff and Grefenstette have argued in their influential editorial for the 2003 special issue of *Computational Linguistics* on *The Web as Corpus*:

We wish to avoid the smuggling of values into the criterion of corpus-hood. McEnery and Wilson [following others before them] mix the question «What is a corpus?» with «What is a good corpus [for certain kinds of linguistic study]?», muddying the simple question «Is corpus *x* good for task *y*?» with the semantic question «Is *x* a corpus at all?». The semantic question then becomes a distraction, all too likely to absorb energies that would otherwise be addressed to the practical one. So that the semantic question may be set aside, the definition of corpus should be broad. We define a corpus simply as a «collection of texts». If that seems too broad, the one qualification we allow relates to the domain and contexts in which the word is used, rather than its denotation: A corpus is a collection of texts when considered as an object of language or literary study (2003: 334).

Going for a «broad definition of corpus» as «a collection of texts when considered as an object of language or literary study», implicitly shifting the notion of «corpus-hood» to the intention of the researcher rather than seeing it as intrinsic to the text collection
3. The corpus and the web: key issues

While the emerging notion of the web as corpus apparently questions some basic standards in corpus linguistics, it provides in fact an opportunity to further explore some of the theoretical and methodological issues on which the good practice of corpus work rests. Such issues can be profitably revisited from the perspective of the web in order to envisage, if possible, the «changing face» of corpus linguistics under the impact of the World Wide Web. The most relevant for the purpose of the present study are authenticity, representativeness, size and content and will be discussed in the following pages.

3.1. Authenticity

It is a basic assumption of corpus linguistics that all the language included in a corpus is authentic, and certainly the most prominent feature of the web to have attracted the linguists’ attention is its undisputable nature as a reservoir of authentic «purposeful language behaviour»: a collection of authentic texts produced in authentic human interactions by people whose aim «is not to display their language competence, but rather to achieve some objective through language» (Baroni and Bernardini 2006: 9). However easily available as a collection of texts in machine readable format, there would have been no reason for turning to the web as an object of linguistic study had it not been comprised of authentic texts, which are the result of genuine communicative events, produced by people going about their normal business. Attention to the web as a source of linguistic information must therefore be seen as deeply rooted in the context of that «growing respect for real examples» (Sinclair 1991: 5), namely the revival of attention paid by linguists to authentic language in use, which can be well considered as a resurgence in popularity of early 20th century, ante-litteram, corpus-based methodologies (such as those by American structuralism and field linguistics) regaining prominence also owing to the new possibilities offered by computer data storage (Mc Enery...
reason for being cautious. Owing to its nature as an unplanned un-supervised unedited collection of texts, authenticity in the web is of-ten related to problems of «authoritativeness». Everyday experi-ence suggests that authentic in the web often means inaccurate (mis-spelt words, grammar mistakes, improper usage by non-native speakers), i.e. not reliable from the linguistic point of view. As a con-sequence it is of crucial importance that linguists purporting to look at the web form a corpus linguistics perspective become familiar with some of its basic features so that they can profit from its po-tential without running the risk of being tangled in the web itself.

3.2. Representativeness

Closely related to authenticity is the «vexed question» (Tognini Bonelli 2001: 57) of representativeness, which can be considered – on the basis of the most widely accepted definitions of a corpus – as being perhaps even more important than authenticity in corpus design. Reference to some of the most frequently quoted defini-tions such as those by Francis, Biber or McEnery and Wilson, shows that representativeness is almost invariably mentioned as the key issue. According to Francis, for instance, a corpus is «a collection of texts assumed to be representative of a given language, dialect, or other subset of a language, to be used for linguistic analysis» (Francis 1992: 17, my emphasis), whereas Biber et al. state that:

A corpus is not simply a collection of texts. Rather a corpus seeks to represent a language or some part of a language. The appropriate design for a corpus therefore depends upon what it is meant to represent. The representativeness of the corpus, in turn, determines the kinds of research questions that can be addressed and the generalizability of the results of the research (Biber et al. 1998: 246, my emphasis).

Similarly, McEnery and Wilson see sampling and representa-tiveness as the goal to which the four main characteristics of the modern corpus are subordinate:

A corpus in modern linguistics, in contrast to being simply any body of text, might more accurately be described as a finite-sized body of machine-readable text, sampled in order to be maximally representa-tive of the language variety under consideration (McEnery and Wilson 2001: 32, my emphasis).
A crucial issue in determining the value of a corpus as an object of linguistic study, the notion of representativeness concerns «the kind of texts included, the number of texts, the selection of particular texts, the selection of text sample from within texts, and the length of text samples» (Biber 1992: 174). It also entails careful considerations concerning the users of the language which a corpus aims to represent, a task which Sinclair aptly considered «hardly a job for linguists at all, but more appropriate for the sociology of culture» (Sinclair 1991: 13). More recently, Sinclair himself has stressed again the same point by stating that «the contents of a corpus should be selected [...] according to their communicative function in the community within which they arise». Putting it more simply, he has voiced these concerns through the following questions:

What sort of documents do they write and read, and what sort of spoken encounters do they have? How can we allow for the relative popularity of some publications over others, and the difference in attention given to different publications? How do we allow for the unavoidable influence of practicalities such as the relative ease of acquiring public printed language, e-mails and web pages as compared with the labour and expense of recording and transcribing private conversations or acquiring and keying personal handwritten correspondence? How do we identify the instances of language that are influential as models for the population, and therefore might be weighted more heavily than the rest?» (Sinclair 2005).

Such detailing of criteria for representativeness seems however to have paradoxically also fostered greater awareness of the utopian and almost mystical nature of representativeness in corpus design, which is reflected in metaphors such as Kilgariff’s «Pandora’s box» (2003: 333) or Leech’s most recent «Holy Grail» (2007: 134-136). Undoubtedly a thorny issue, if it is not to be regarded, «as an act of faith» (Leech 1991: 27), representativeness must at least be seen as a work-in-progress. As Biber’s concept of «cyclical fashion» (1993: 243) suggests, linguists should become aware of its «scalar» nature, i.e. of the possibility of reaching, and the necessity of aiming at, a certain degree of representativeness of data, even when it is clear that absolute representativeness is definitely out of reach (Leech 2007: 140).

As in the case of authenticity, the issue of representativeness in corpus linguistics is not devoid of implications in terms of linguistic theory as a whole. As Tognini Bonelli argues, «representativeness is the natural correlate of the language model upheld by Firth, Halliday and Sinclair» (Tognini Bonelli 2001: 57). According to these scholars, repeated events noticed in language samples at the level of individual performance are an essential element in the formulation of generalization about language, relating to what could be defined in Saussure’s words as langue or in Chomsky’s words as I-language. This is what makes representativeness so crucial. It is on the representativeness of the corpus that the value of generalizations about language informed by the corpus linguistic approach ultimately rest. This is also why early criticism of corpus linguistics by Chomsky was focused precisely on the issue of representativeness. The typical charge against corpus linguistics was precisely that, however large a corpus, the data would only be a small sample of a potentially infinite population, and that any corpus would be intrinsically unrepresentative and «skewed»:

Any natural corpus will be skewed. Some sentences won’t occur because they are obvious, others because they are false, still others because they are impolite. The corpus, if natural, will be so wildly skewed that the description would be no more than a mere list (Chomsky 1962: 159; quoted in Aijmer and Altenberg 2004: 8).

While Chomsky’s much quoted criticism of early corpus linguistics – which might be equally applied to any other type of scientific investigation based on sampling – was to some extent valid criticism, it can also be considered as a ‘child of its times’, and therefore ‘more true’ at the time of early corpora than today. Where Chomsky sees irreducible qualitative difference between limited performance and potentially unlimited competence, so that performance could never yield significant insight into competence, corpus linguistics has made us see how the two things are rather found on a continuum, with E-language representing a crucial, indispensable manifestation of I-language» (Leech 2007: 139), and I-language made somehow discernible as a summation of E-language events tending to infinity. As Halliday has persuasively argued through his powerful weather/climate metaphor,
the relationship between «visible» instances of language use and the «invisible» system can be compared to the relationship between the weather, relating to the next few hours or days, and the climate as the summation of each day’s weather (Halliday 1991: 41-42). With the possibility of handling many millions of words (or weather reports, to keep Halliday’s metaphor), modern computerized corpora have greater possibilities than in the past of allowing insight into the language system (the climate), or at least into the social, public, shared features of that system, as pluralist positions such as those recently put forward by Stubbs suggest (Stubbs 2002; Stubbs 2007).

As to how these concerns are related to the web as corpus, this remains nonetheless a difficult question. Certainly the standard of representativeness is the one that most puzzles those who claim corpus dignity for the web. As Leech has recently argued, it seems that «the web as corpus makes the notion of a representative corpus redundant» (Leech 2007: 144), and indeed early research in the field, mainly within computational linguistics, seemed to dispense altogether with the notion of representativeness on the grounds that the researcher’s effort could be more profitably devoted to the solution of practical problems (Kilgarriff and Grefenstette 2003: 343).

Exploring the web’s potential for representativeness remains therefore the most crucial concern for scholar interested in investigating the value of the web as a corpus-like collection of texts. The real problem is that the notion of representativeness is the issue more closely bound up with the organic metaphor of the corpus-as-body, based as it is on the assumption that each part of a body can be representative of the whole. As a consequence, while the enormous size of the web and its inclusiveness apparently make it a gateway to a potentially representative heterogeneous amount of language events, its imbalances and potential unrepresentativeness impair its value as a language resource. While it is true that the web gives access to a wide range of genres, some of which are undeniably well-established in the written medium, such as academic writing, and others are newly evolving and closer to speech, such as blogs, it is also true that it gives little access to private discourse, such as everyday conversation, telephone dialogues, and the like (Leech 2007: 144-5). Furthermore, there are other major areas of language use which are underrepresented, while certain varieties are definitely overrepresented. As a consequence, even if the web’s textual universe, at least as far as the English language is concerned, largely overlaps with the non-electronic textual universe of the English language, its status as a «representative sample» is in Leech’s opinion non-existent:

It is a textual universe of unfathomed extent and variety, but it can in no way be considered a representative sample of language use in general (Leech 2007: 145).

As Leech’s most recent contribution on the issue shows, it is clear that the notion of representativeness as it is generally conceived of in corpus linguistics can only pertain to corpora which have been designed and created out of selection from carefully chosen material. This is not the case with the web which already exists, independently of the linguist’s intentions, as the result of a wide range of (but not all) everyday activities which imply knowledge exchange, communication, interaction, and for which the web is proving more and more a privileged mode. Paradoxically, however, this is where its real potential for representativeness also lies. The web is not constructed by a human mind, but is the direct result of a number of human interactions taking place – significantly from a linguist’s perspective – mainly through written texts which in the very act of their production are made available worldwide as authentic machine readable texts. Accordingly, the web’s textual content inevitably reflects – if not actually represents – the international community at large in real time. In some way it could be argued, as recent research has, that the web can be considered as «an increasingly representative and unprecedented in scale machine-readable sample of interests and activity in the world» (Henzinger and Lawrence 2004: 5186). Even though such a view of representativeness is not necessarily significant from the point of view of language, it cannot be dismissed as altogether irrelevant. The increasing prominence of the web in contemporary culture, the very fact that it is «directly jacked into the culture’s nervous system» (Battelle 2005: 2), along with its evident ability to mirror changes in real time thanks to its intrinsic dynamism, seems on the contrary to mitigate the problems arising from lack of representativeness in
the corpus linguistics sense of the word. Certainly the web cannot be considered a representative sample of language use in general, but its scope, variety, and above all its immense size seem to legitimize the opinion that these characteristics can counterbalance the limits of representativeness, so that the web’s impossibility of being representative of nothing else but itself does not altogether destroy its value as a source of linguistic information from a corpus linguistics perspective.

3.3. Size

Intrinsically related to representativeness, the issue of size is equally fundamental in determining the value of a corpus as an object of language study and affects the kind of generalizations that can be made out of corpus data.

While enormous size and virtually endless growth are the most notable characteristics of the web when compared to traditional corpora, this is precisely where its limitations as an object of scientific enquiry lie, if it is to be considered as a source of data for quantitative studies. As McEnery and Wilson suggest, the notion of corpus should by default imply «a body of text of a finite size» (2006: 30), whereas the web is by its very nature bound to perpetual expansion. This may have gained the web a reputation as «the ultimate monitor corpus» (Bergh 2005: 26), i.e. a corpus which – according to Sinclair’s definition – «has no final extent because, like language itself, it keeps on developing» (Sinclair 1991: 25). As such, a monitor corpus can be a more opportunistic and less balanced corpus, one where «quantity of data replaces planning of sampling as the main compilation criterion» (Kennedy 1998: 61).

The main problems with the web as a corpus are thus related precisely to its being non-finite. The impossibility of estimating its size exactly results in uncertainties and doubts concerning its value as an object of scientific study, which in turn reflect more general anxiety about the impossibility of knowing the web as such in a satisfactory way. Unsurprisingly, indeed, one of the earliest attempts at establishing the exact size of the web, an effort which entails, as the author acknowledged, «difficult qualitative questions concerning the Web, and attempts to provide some partial quantitative answers to them» (Bray 1996) opened with a famous quote from mathematician and physicist Lord Kelvin (1824-1907) on the poverty of knowledge which is not based on exact measures:

When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of science (Lord Kelvin, quoted in Bray 1996: 993).

Puzzled with the qualitative implications of the quantitative questions at hand, scholars and Internet research groups have nonetheless long been engaged with the intrinsically frustrating task of «measuring the web». Even though it is self evident that all results are of a particularly ephemeral nature, an overview of research in the field can be useful to give us at least a sense of scope of the «colossal» corpus – as a now famous article in the *Economist* (20th January 2005) dubbed the web.

When it comes to the web’s size, the basic question both from the perspective of information technology and from the perspective of linguistics, is simple and extremely complex at the same time. What is the current size of the web? And, more specifically, how many running words does the web contain when considered as a text corpus? Any answer to the above questions is by necessity approximate and ephemeral, owing to the intrinsically dynamic nature of the web. It is not surprising therefore that the difficulties faced by people engaged in the task of answering such questions have been compared from the outset to those of the cartographers of centuries past, struggling with the impossibility of mapping territories that were still largely unknown (Bray 1996: 993).

In a much quoted pioneering study published in *Nature*, Lawrence and Giles (1999) estimated that in the World Wide Web there were at least 800 million publicly accessible pages, amounting to 6 Tb of text (mark-up and white space excluded), which, according to calculation by Meyer et al. (2003), meant over 800 billion words. In 2000 a study conducted by Inktomi & Nec Research Institute verified that the web had grown to at least 1 billion unique documents (Inktomi 2000), while in 2002 Google claimed to index 3 billion pages. In 2003, on the basis of Google’s
texts which can be literally overwhelming in terms of running words, and hence potentially useless. Thus, while Sinclair could safely suggest, in the early 90s, that “a corpus should be as large as possible, and should keep on growing” (Sinclair 1991: 18), looking at the web as a corpus in its own right makes linguists revise such slogans as “the larger the better”. That bigger is better is a truth that cannot hold when big actually means gargantuan and uncontrollable as is the case with the World Wide Web. This is the case not only from a corpus linguistics perspective. Also from the point of view of information retrieval it has been explicitly argued that with the exponential growth of the Internet it is becoming disputable whether “bigger is better”, even though it is undeniable that a large quantity of data accessible through the web can be of great help when seeking unusual or hard-to-find information (Sullivan 2005). The same applies to linguistics where “sheer quantity of linguistic information can be overwhelming for the observer” (Hunston 2002: 25). Nonetheless, there is also ample evidence, especially from Natural Language Processing research carried out using the web as a corpus, that probabilistic models of language based on very large quantities of data, even if very “noisy”, are better than ones based on estimates from smaller and cleaner datasets (Keller and Lapata 2003; Nakov and Hearst 2005). Moreover research on the web as corpus has proved particularly useful in cases where other resources only provided sparse data (Keller and Lapata 2003). It is on the basis of such evidence that further research on the web as corpus has been encouraged, leading to the creation of specific tools and methods to fully exploit the web’s real potential.

3.4. Content

The exponential growth of the web since its inception in the early 90s has also had a great impact on its content, another key issue to be explored when determining the web’s value as a corpus.

A natural correlate of representativeness, which depends on decisions concerning what should go in and what should be left out of a corpus, the issue of content in corpus linguistics is often related, unfortunately, also to practical considerations such as text availability, copyright issues, technical problems (Hunston 2002: 27) which more often than not affect choice in designing corpora. Nonetheless the content of a corpus is what ultimately

Regardless of the temporary nature of these figures, they are nonetheless indicative of the steady dramatic growth of the web as a repository not only of information but, more crucially for the linguist, of language text. Taking as a new starting point more recent estimates of the web’s size amounting to at least 11.5 billion pages as of the end of January 2005 (Gulli and Signorini 2005), it could be calculated that the World Wide Web contains nearly 80 Tb of text, which amounts to a multilingual collection of texts of over eight trillion (8,000 billion) words. Assuming that out of this huge collection of texts nearly one third were written in English, (see estimates for language distribution in 3.4.1.), there could be something in the range of over 2,500-3,000 billion words of English on the web, “a virtual English supercorpus ready for use by enterprising linguists in all manner of language research” (Bergh 2005: 26). A more conservative but up-to-date and fairly reliable estimate, as far as English language only is concerned, is about 1 trillion words, i.e. the size of the training corpus used by Google when releasing their Web1IT data set in September 2006 (Official Google Research Blog 2006).

Whatever its exact size, it is clear that the web presents linguists with a collection of texts definitely larger than any other existing corpus and certainly larger than they need, which alters altogether the meaning of size as a basic corpus issue. In the early days of corpus linguistics, anyone could testify to what extent size mattered. It was a pain-taking task to reach the minimum size required for a corpus to yield significant evidence. Even today, when corpora are enriched by extensively downloading from the web, the “Shandian paradox” of creating something which seems to be getting old at a faster pace than it grows is still everyday experience for corpus linguists, leaving corpus compilers with the strange feeling of working at something which could be deemed old or inadequate by the time it is released. When it comes to the web as corpus, however, the role played by size seems to be reversed. If early corpus linguists had to strive for size, with the dimension of the corpus being of prime concern to researchers constantly asking themselves “is the corpus we are building large enough?”, the web as corpus revolution seems to push the problem to the other extreme by providing a collection of

determines the scope of generalizations that can be made out of corpus data. As Lee (2001: 37) argues, [it] is impossible to make any useful generalizations about «the English language» or «general English» since these are abstract constructions. Instead it is far easier and theoretically more sound to talk about the language of different genres of text, or the language(s) used in different domains.

Texts in traditional corpora are generally classified at least in terms of topic/domain and genre, an approach which is difficult to reproduce with the web, even though there seems to be no more universally accepted typology for classifying texts in traditional corpora than there is for the Internet (Sharoff 2007: 84). As far as the web as corpus is concerned, however, this issue becomes more indigestibile given the intrinsic difficulties of characterizing the web in any of its aspects. As pointed out by Chakrabati already in the late 90s, «the Web has evolved into a global mess of previously unimagined proportions. Web pages can be written in any language, dialect or style, by individuals with any background, education, culture, interest and motivation» (Chakrabati 1999: 54). And in the past few decades the World Wide Web has grown so big and in such an anarchic fashion, that it is virtually impossible to describe it in terms of its content (Grefenstette and Nioche 2000: 1).

Notwithstanding the patent impossibility of reaching any conclusive result, researchers have been trying to characterize the web through a number of parameters such as size, content and structure (O’Neill 2002). It is hardly surprising, however, that this remains a frustrating task bound to end up in failure. One might even conclude that the content of the web can only be envisaged via negativa, through what one possibly searches there and fails to find, rather than positively scanning all of its content. Moreover, when seen from a corpus linguistics perspective, a major flaw of the web seems to be its intrinsic irreducible anarchism, which does not only make the 100 million words British National Corpus comparatively resemble «an English country garden», but, more importantly, seems to put an end to any hope of relying on the web as an object of scientific enquiry. Nothing possibly voices better the puzzlement and bewilderment of the (corpus) linguist when confronted with the web, than the words of one of the most influential supporters of the web as corpus:

First, not all documents contain text, and many of those that do are not only text. Second, it changes all the time. Third, like Borges’s Library of Babel, it contains duplicates, near duplicates, documents pointing to duplicates that may not be there, and documents that claim to be duplicates but are not. Next, the language has to be identified (and documents may contain mixes of language). Then comes the question of text type: to gain any perspective on the language we have at our disposal in the web, we must classify some of the millions of web pages, and we shall never do so manually, so corpus linguists, and also web search engines, need ways of telling what sort of text a document contains: chat or hate-mail; learned article or bus timetable (Kilgarriff 2001).

While these may sound like arguments against the web as corpus, for Kilgarriff this is precisely where the challenge really lies: «For the web to be useful for language study, we must address its anarchy» (Kilgarriff 2001). Anarchy is thus the original sin of a virtual space which, as its very name reveals, is global more than anything else on earth. In the World Wide Web anyone, regardless of country or language, is free to make information and services available, and this is achieved — significantly from a linguist’s perspective — mainly through written texts produced and made available, often in real time, as authentic machine readable format texts. Despite therefore the limitations of any attempt to confront the anarchy of the web, and with no pretense at exhaustiveness, in the following pages the issue of content has been conveniently split into three basic components: language, topic, registers and genres. With reference to such issues current attempts at characterizing the web have been reported, with the only aim of giving an idea of scope of the web as a corpus from the point of view of content.

3.4.1. Language When confronted with the idea of the web as a linguistic corpus, most people would think of it mainly as a monolingual English language corpus, since English has established itself as the lingua franca of the Internet. On the contrary, one of the most interesting characteristics of the web is its multilinguality, which, from a corpus linguistics perspective, means that the
web contains virtually endless corpora in almost any language on earth. In Crystal’s words,

The Web is an eclectic medium, and this is seen also in its multilingualistic inclusiveness. Not only does it offer a home to all linguistic styles within a language; it offers a home to all languages – once their communities have a functioning computer technology (Crystal 2006: 229).

In the past few years several techniques have been implemented for estimating the number of words available through web browsers for given languages by applying to the web common techniques used to estimate the size of a language-specific corpus based on the frequency of commonly occurring words in the corpus itself. In their much quoted article published in 2000, Grefenstette and Nioche estimated English and non-English language use on the World Wide Web, thus providing the basis for further exploitation of the web as a multilingual corpus. Though clearly faced with a predominantly English language corpus, with over two-thirds of the pages written in English (Grefenstette and Nioche 2000: 2), the authors could already notice that non-English languages were growing at a faster pace than English. More recent estimates by Internet World Stats (2005), reported in a special issue of UNESCO The New Courier, clearly show that the World Wide Web is no longer going to be the predominantly English speaking world it used to be at the outset, since other languages are increasingly and significantly represented.

The exponential growth of non-English languages may be surprising but is easily explained with the growth of websites providing news in different languages (such as newspaper websites), of governmental official websites, and even of collaborative enter-

prises such as Wikipedia, together with the growing number of personal or corporative homepages or blogs. Nonetheless, the relative growth of languages other than English does not necessarily imply that access to the benefits of the Internet are more evenly distributed around the world, and the persistence of differences in the «weight» of individual languages on the web points to more general problems concerning the so called digital divide between rich and poor countries. The Internet seems to have rather disappointed all hopes for a «global village» where even «the poor countries would be able to benefit, with unprecedented ease, from a myriad of databases, from training, from online courses, all of which would provide access to the knowledge society and allow these countries to catch up progressively with the pack of prosperous nations» (Mouhobi 2005). The digital divide between first and third worlds is an issue, which is made even worse by the technical problems relating to the encoding of non-Latin alphabet using a system (ASCII codes) devised for Latin alphabets only (Crystal 2006). But while the problem of non-Latin alphabets on the Internet still calls for a solution to redress imbalances in access to the Internet, the web has paradoxically proved a language resource precisely for some «minor» or «endangered» languages (Ghani R. et al. 2001; De Schryver 2002; Scannel 2007; Zuraw 2006).

As Fraser Gupta argues:

> There are some imbalances in access to the web (for example, Africa is especially underrepresented), but every day participation is extended, and, in any case, the web has given opportunities to writers all over the world who would previously never have had the opportunity to see their writing in print. Because of its wide reach, the web has also put writers and readers in touch with each other who would not otherwise have been able to share their writing. If we regard the investigation of written language as worthy of attention, we must accommodate the huge resources of written language that we have access to on the web (Gupta 2005).

As far as the present distribution of languages used on the web is concerned, the most recent estimates of the top ten languages report that (as of June 2008) English and Chinese were shown at 430 and 276 million Internet users respectively, as the most widely used languages, followed by Spanish, Japanese, French, German, Arabic, Portuguese, Korean, and Italian:

While interesting, these data are obviously not significant in
Taking the presence of Arabic on the Internet as an example, these estimates suggest that as of June 2008 there were 59,833,630 Arabic speaking people using the Internet, who represented 5.4% of all Internet users. This means that out of an estimated 357,271,398 world population that speaks Arabic, 16.8% use the Internet. Thus the number of Arabic speaking Internet users has grown by 2,063.7% in the last eight years (2000-2008). Even allowing for errors in these figures, they clearly portray an ever-changing scenario. A significant comparison can be drawn with estimates dating back to 2000:

Tab. 1.1. Web pages by language (Pastore 2000)

<table>
<thead>
<tr>
<th>Language</th>
<th>Web Pages</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>214,250,996</td>
<td>68.39</td>
</tr>
<tr>
<td>Japanese</td>
<td>18,333,739</td>
<td>5.85</td>
</tr>
<tr>
<td>German</td>
<td>18,069,744</td>
<td>5.77</td>
</tr>
<tr>
<td>Chinese</td>
<td>12,113,803</td>
<td>3.87</td>
</tr>
<tr>
<td>French</td>
<td>9,262,663</td>
<td>2.96</td>
</tr>
<tr>
<td>Spanish</td>
<td>7,573,064</td>
<td>2.42</td>
</tr>
<tr>
<td>Russian</td>
<td>5,900,996</td>
<td>1.88</td>
</tr>
<tr>
<td>Italian</td>
<td>4,883,497</td>
<td>1.56</td>
</tr>
<tr>
<td>Portuguese</td>
<td>4,291,237</td>
<td>1.37</td>
</tr>
<tr>
<td>Korean</td>
<td>4,046,530</td>
<td>1.29</td>
</tr>
<tr>
<td>Swedish</td>
<td>3,929,241</td>
<td>0.93</td>
</tr>
<tr>
<td>Danish</td>
<td>3,174,886</td>
<td>0.44</td>
</tr>
<tr>
<td>Norwegian</td>
<td>1,259,189</td>
<td>0.40</td>
</tr>
<tr>
<td>Finnish</td>
<td>1,198,956</td>
<td>0.38</td>
</tr>
<tr>
<td>Czech</td>
<td>991,073</td>
<td>0.32</td>
</tr>
<tr>
<td>Polish</td>
<td>848,672</td>
<td>0.27</td>
</tr>
<tr>
<td>Hungarian</td>
<td>498,625</td>
<td>0.16</td>
</tr>
<tr>
<td>Catalan</td>
<td>443,301</td>
<td>0.14</td>
</tr>
<tr>
<td>Turkish</td>
<td>430,996</td>
<td>0.14</td>
</tr>
<tr>
<td>Greek</td>
<td>287,980</td>
<td>0.09</td>
</tr>
<tr>
<td>Hebrew</td>
<td>198,030</td>
<td>0.06</td>
</tr>
<tr>
<td>Estonian</td>
<td>173,265</td>
<td>0.06</td>
</tr>
<tr>
<td>Romanian</td>
<td>141,587</td>
<td>0.05</td>
</tr>
<tr>
<td>Icelandic</td>
<td>136,788</td>
<td>0.04</td>
</tr>
<tr>
<td>Slovenian</td>
<td>134,454</td>
<td>0.04</td>
</tr>
<tr>
<td>Arabic</td>
<td>127,565</td>
<td>0.04</td>
</tr>
<tr>
<td>Lithuanian</td>
<td>82,829</td>
<td>0.03</td>
</tr>
<tr>
<td>Latvian</td>
<td>60,959</td>
<td>0.02</td>
</tr>
<tr>
<td>Bulgarian</td>
<td>51,336</td>
<td>0.02</td>
</tr>
<tr>
<td>Basque</td>
<td>36,321</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Fig. 1.2. Top 10 Internet languages (Internet World Stats).

Fig. 1.3. Internet users by language (Internet World Stats).
content that can be considered of great value (academic papers, literary texts, governmental documents) coexists with content which is of low quality, or worse (Day 2003: 6).

While diversity of web content implies that each page may range from a few characters to thousands of words «containing truth, falsehood, wisdom, propaganda, or sheer nonsense» (Chakrabarti et al. 1999: 54), several attempts have been made to implement some principles of classification based on topic. This is generally performed through directories, which group web pages on the basis of content into a number of categories. An apparently trivial task, the classification of web pages in directories relating to their content is something which ordinary search engines have trouble coping with, given the intrinsic nature of the web as a democratic, or rather anarchic, space, apparently free of any form of organization and planning.

The earliest attempt at organizing the content of the web from the point of view of topics was made in the mid-90s by two Ph.D. students at Stanford University, Jerry Yang and David Filo, who created the Yahoo directory to help their friends locate useful web sites. In a matter of months their initially informal project was incorporated as a fully-fledged company. As Chakrabarti argues, the success of this enterprise was due to the attempt at «reviving the ancient art of organizing knowledge into ontologies» – an art which «descends from epistemology and philosophy and relates to the possibility of creating a tree like hierarchy as an organizing principle for topics» (Chakrabarti 2003: 7). The paradigm of browsing topics arranged in a tree is a pervasive one and the average computer user is generally familiar with hierarchies of this kind through directories and files. This familiarity, Chakrabarti suggests, carries over rather naturally to topic taxonomies.

If not entirely reliable in terms of coverage, directories are from the linguist’s point of view a simple way to envisage the web’s content in terms of topics. Even though the content of the World Wide Web can by no means be reduced to the web pages indexed by even the largest search engine, the wide range of topics can be easily seen at a glance through a survey of the «directories» listed by a search engine. Here are, for instance, the topics covered by Yahoo!:

These estimates published at the Millennium by Global Reach give us an idea of how the presence of each single language is subject to change. One cannot help noticing, for instance, the macroscopic growth of Chinese as a language for Internet communication, moving up from 4th position in these 2000 estimates to 2nd position in the more recent 2008 estimates, perhaps mirroring the country’s economic growth. Other languages that have significantly changed position are Portuguese and Korean (9th and 10th position in 2000), which have now overtaken Italian, and Spanish (6th position in 2000 and now immediately following Chinese as the third language for Internet communication). Finally, and most significantly perhaps, one should notice the growth of Arabic, leaving its 27th position in 2000 to become the 7th language in the recent 2008 estimates – possibly a further consequence of the events surrounding September 2001.

The astonishing variety of languages on the web, and the impressive growth of non-English and also non-Western languages, show the importance of the web as a multilingual environment which is ready to reflect changes taking place in society at large. While variety should not make us forget the problems relating to the «digital divide», it is hardly questionable that from a linguistic point of view the web can be considered as a vast, dynamic, easy to access, multilingual language resource, whose significance is further enhanced by the astonishing diversity of the topics covered.

3.4.2. Topics The web has become such a pervasive communication medium that there seems to be no field of human activity that is not some way or other covered by it. This has probably made us forget that the web has its origins in the world of US defence and that only subsequently has it developed as a way to share knowledge and research within the academic world. Today it continues to play a major role in governmental and scientific communication, but its relative ease of use has meant that it did not take long before people outside research and political institutions began to develop other uses for the web, thus turning it into a major facilitator of personal communication, electronic commerce, publishing, marketing and much else (Day 2003: 12). The web has thus become a not only more inclusive, but also more chaotic, environment, in which
projected into a new set of topics, which are in turn open doors to other topics:

And here are the directories listed by Google:

From the categories listed above it is self-evident that the role directories can play in identifying subsets of web pages focussing on one topic cannot be underestimated. Each directory could – theoretically at least – be considered as a «virtual» corpus including texts all dealing with the same topic, so that to find evidence of usage for a certain phrase in a specific domain (e.g. Health) one could restrict search to the relevant directory instead of searching the whole web. On the other hand, however, it should be stressed that «topic» or «domain» are themselves controversial categories in corpus linguistics. As the EAGLES (1996) report argues, texts cannot be safely categorized on the basis of a limited list of topics, i.e. inevitably in terms of text-external criteria. Topic/domain classification should rather be based on text-internal evidence (such as vocabulary clustering), and this is certainly not the case with web topic categorization through directories. Recent studies are in fact questioning existing Internet classifications and working at new methods for establishing suitable categories for classifying web texts into domain and genre (Sharoff 2007).
Despite their attractiveness, web directories cannot therefore answer the linguist’s need but partially. As recent research by Biber and Kurjian has shown, the categorization provided by search engine directories, while considered as indicative in terms of reference to general topical domain, still remains well behind the minimum standards required for linguistic research (Biber and Kurjian 2007). It is of crucial importance in fact for (corpus) linguists to identify texts on situational/linguistic grounds, i.e. to know what kind of texts are included in a corpus (even in a «virtual» one such as a search engine directory) in terms of register, genre, text type. A label generically referring only to topic or domain is not enough for a linguist to discriminate web content, and as the web grows in size and anarchy, classification of web pages by topic only seems to be insufficient to maintain acceptable standards of effectiveness even from the point of view of general purpose information retrieval. For this reason greater and greater interest is being paid to web categorization by genre as a complement to topic classification, and it is precisely on this issue that research under way in the field of information retrieval and the interests of the corpus linguistics community seem to have finally converged.

With the growth of the web as «a massive loosely organized library of information» (Boase 2005: 1), it has in fact become more and more evident that topic alone is insufficient for text categorization and that new forms of «representation» of information, including genre, are needed (Crowston-Kwasnik 2004). Information on the web now so vastly exceeds users’ needs, that even a common search runs the risk of being frustrating just on the ground of genre/text-type. What are we looking for, for instance, when we ask a search engine to return results for San Francisco? Information on the city? Accommodation? Flights? People searching for information (whether general or specifically linguistic) do not simply look for a topic but also have implicit generic (i.e. genre-related) requirements (Kessler et al. 1997: 32). The problem of matching a user’s query with the relevant answers in terms of text types and genres is anyway bound to remain an issue unless more information is integrated by web designers in their web pages, or unless users are taught to formulate more explicit and complex queries, or unless – and this is a crucial point – web information retrieval applications (i.e search engines) themselves are modified so that they can focus not only on topic and content but also on features of form and style as a gateway to genres and text-types (Boase 2005: 3-4). As a category «orthogonal to topic» (Boase 2005: 6) genre would thus make it possible to find documents that match the user’s search terms from the point of view of topic, including (or excluding) documents of a given genre or genre cluster.

3.4.3 Registers and genres While the wide variety of languages and the extreme inclusiveness of topics which characterize the web have been of paramount importance in making it an object worthy of the corpus linguistics community’s attention, it is self-evident that languages and topics can only partially represent the web’s content in a way that is meaningful from the linguist’s point of view. In order to take stock of the web as a textual corpus greater attention must therefore be paid to the issue of register and genre.

From a corpus linguistics perspective, discriminating texts in terms of genre, register and text-type is a fundamental concern (Lee 2001), and identifying web genres/registers would certainly pave the way towards a more methodologically sound use of the web as a corpus. Indeed, the very impossibility of getting to know anything about the web in this respect is one of the reasons why its representativeness from a corpus perspective has been radically questioned. While the linear organization of most paper documents and the apparent fixity of most traditional genres can still be reflected in traditional electronic corpora such as the BNC, a similar approach would be hardly applicable to a corpus of web documents, which are more complex and unpredictable than paper documents, and where the very notion of genre seem to be undergoing a process of democratization (Yates and Sumner 1997: 3; Santini 2005: 1). Furthermore, it could be argued, genre and register, along with related concepts of text-type, domain and style are themselves «somewhat confusing terms» (Lee 2001: 37). This makes it even more difficult to thoroughly map the web from this point of view.

Apart from the intrinsic difficulty of sorting out the truly amazing plethora of highly individualized documents which make up the web, when dealing with the web in terms of genres and registers some basic prejudices also need to be addressed. It
has for instance become something of a commonplace to think of the web as a writing space that is characterized mainly by ephemeral writing, while in fact diversity is the only keyword. Certainly many texts are created in real time and do not undergo any kind of editing, but others are faithful reproductions of historical or literary texts. Some of the writing on the web can give the impression that this is a place where traditional genres and text-types have been superseded by the new genres of electronically mediated communication, but there are still also many traditional genres which have been adapted to the new electronic environment, without losing their basic properties as genres (e.g. newspapers, academic articles...). Variation of register is thought to be set permanently at the informal end on the web, but web texts actually range from the most formal legal documents to quite informal blogs and chatrooms. Even though, as has been argued, all attention is drawn to the new – or not-yet-standard – text types and styles that have clearly emerged in recent years in computer mediated communication, these are in fact only a part of all the text available on the web (Crystal 2006: 84). From the point of view of registers and genres, the problem with the web is therefore not so much what it actually contains, but rather how to discriminate and take advantage of its sprawling content. In a world where «the dream of creating an information-rich society has become a nightmare of information overload» because information has exceeded the limits of our ability to process it and the advantages of a huge store of information as the World Wide Web seem to be outweighed by the difficulties of accessing them (Kwasnik-Crowston 2000), the problem of categorizing web content in terms of genre, register and text type as a complement to topical principles of classification has become a common priority for information retrieval, computational linguistics, and also corpus linguistics. However, methods for achieving this have not yet been fully established. Researchers involved in web genre analysis have long recognized the need for new categories of approach, based on the awareness that the web, as a dynamic environment, is more prone to centripetal forces which result in constant genre evolution (Santini 2007). On the one hand it is clear that the web hosts a number of traditional genres which have simply changed medium (from paper to electronic) without any further modification of their intrinsic features (reproduced genres), on the other hand there are text-types and genres that are undergoing processes of remediation which make them either hybrid genres (adapted novel genres), or completely new genres (emerging genres). On the basis of this evolutionary pattern, and drawing on earlier classifications (Shepherd and Watters 1998; Crowston and Williams 2000), Santini (2007) proposes a list of five recognizable genres typologies:

1. reproduced/replicated genres,
2. adapted/variant genres,
3. emergent/novel genres,
4. spontaneous genres,
5. unclassified web pages.

In this new and varied context the notion of genre is clearly undergoing a process of transformation so that traditional criteria for text categorization and genre identification cannot hold. Previous clear-cut distinctions between spoken/written, formal/informal seem for example inappropriate ways to address the registers used in most instances of computer mediated communication, whose complexity rather requires multidimensional approaches. A recent trend within this research field is a definition of genre based on the notion of «bundle of facets» (Kessler et al. 1997: 32f). This means that rather than identifying genres and text-types on the web in terms of their adherence to a priori determined genres, automatic genre detection systems identify recurring patterns and generic cues in terms of facets (i.e basic attributes). Each genre label can thus be determined a posteriori as a post-coordination of facets, corresponding to a bundle of co-occurring features, such as first/third person, specialized vocabulary, domain. (Crowston-Kwasnik 2004: 6-7). It goes without saying that these methods for detecting web genres are proving more flexible and hospitable to the many hybrid genres which characterize the web as a new medium, and make research hope for a real possibility to implement genre categorization within web search systems, from which both information retrieval and corpus linguistics would greatly benefit.
4. From «body» to «web»: new issues

The attempt at analyzing the web as a linguistic corpus has already highlighted some characteristics such as constant change, non-finite size, anarchism, which in turn indicate the necessity of addressing some radically new issues if the hypothesis of treating the web as a corpus is to be pursued on sound methodological bases. It is worth stressing, however, that some of these new issues are to some extent to be considered as not specifically related to the web as corpus but rather as a natural consequence of the impact of the new technologies on linguistic resources as a whole. Some of these issues can in fact be related to the changes envisaged by Wynne (2002: 1204) as likely to occur in the way we conceive of language resources in the 21st century: multilinguality and multimodality, dynamic content, distributed architecture, connection with web searching. While it is clear that a corpus is by no means the same as a text archive, for which Wynne envisaged the above mentioned changes, these new characteristics of language resources are clearly linked to the shift from real to virtual and with the emergence of the web as a key phenomenon in contemporary society, thus inevitably relating also to the web as corpus. More specifically, Wynne’s idea of an inescapable shift towards virtual corpora is enlightening. The old scenario of the researcher «who downloads the corpus to his machine, installs a program to analyse it, then tweaks the program and/or the corpus mark-up to get the program and the corpus to work together, and finally performs the analysis» (Wynne 2002: 1205) seems likely to be replaced by a new model where replicating digital data in a local copy and installing the software to analyse the data becomes redundant, as all the processing can be done over the network. This is also changing notions of permanence/stability for corpora. As Wynne, again, argues:

In the traditional model a corpus is carefully prepared, by taking a sample of the population of texts of which it aims to be representative, and possibly encoded and annotated in ways which make it amenable for linguistic research. The value and the reusability of the resource are therefore dependent on a bundle of factors, such as the validity of the design criteria, the quality and availability of the documentation, the quality of the metadata and the validity and generalisability of the research goals of the corpus creator (Wynne 2002: 1205).

In the new scenario the relative importance of design criteria may well change, as it might become the norm to create a collection of texts (the corpus) on an ad hoc basis - such as «all 17th century English fiction» or all «Bulgarian newspaper texts» – by simply choosing from within larger existing text archives (Wynne 2002: 1205).

These emerging issues seem to affect the very notion of corpus in radical ways, prompting a shift away from the somewhat reassuring conventional features subsumed by the corpus-as-body metaphor itself, to a new corpus-as-web metaphor. While the notion of linguistic corpus as a body of texts rests on some correlate issues such as finite size, balance, part-whole relationship, stability, the very idea of a web of texts brings about notions of non-finiteness, flexibility, de-centering and re-centering, provisionality. This calls into question, on methodological grounds, issues which could be instead taken for granted when working on conventional corpora, such as the stability of the data, the reproducibility of the research, and the reliability of the results. Some of these new issues will be briefly explored in the following pages.

4.1. Dynamism

An important characteristic of the web that has implications for its supposed nature as a corpus is its inherently dynamic nature. Firstly, the web is characterized by exponential growth, with new pages and sites appearing at a significantly high rate. Secondly, the content of existing documents is continually updated, so that sites and pages do not only frequently appear but also as frequently disappear. Thirdly, the very structure of the web is in constant flux, with new links between documents being continually established and removed (Risvik and Michelsen 2002). These factors have largely contributed to making the web the largest and most accessible information resource in contemporary society, but have also gained it a reputation for volatility. No doubt everybody has experienced such volatility through the so called «broken-link» problem – the most evident sign of the ever-changing nature of the web – symbolised by the well known HTTP Error 404 Page not found message.

With a large fraction of existing pages changing over time, and a significant fraction of «changes» due to new pages that are cre-
ated over time, the web as a whole is constantly changing, and precise estimates are not only difficult to produce but also, perhaps, useless. As Fletcher argues «studies of the nature of the web echo the story of the blind man and the elephant: each one extrapolates from its own samples of this ever evolving entity taken at different times and by divergent means» (Fletcher 2007: 25). It goes without saying, then, that existing studies of the web’s fluidity can only give us a faint idea of what we really mean when we say that the web is «dynamic». A study carried out in 2004 on a selection of commercial, academic, governmental and media US sites, estimated for instance how many new pages were created every week calculating a «weekly birth rate» for web pages of 8%. Then the authors addressed the issue of «new content», finding that on average each week around 5% of the page content was really new, coming to the conclusion that nearly 62% of the content of new URLs introduced each week was actually new. Finally they estimated the life of individual web pages on the web, by combining their findings with results from a study by the Online Computer Library Center (OCLC 2002) to get a picture of the rate of change for the entire web. On the basis of the two sets of data the authors could speculate that only 20% web pages is still accessible after one year (Ntoulas et al. 2004).

While this low rate of «survival» of web pages has made historical archiving and long term access to web content a crucial concern, prompting the work of institutions such as the Internet Archive or initiatives such as the Wayback machine, it is also worth considering how such dynamism affects the web’s potential as a reservoir of attested usage from the linguist’s point of view. Web texts certainly change over time but there is no reason to assume that this perpetual change in content altogether alters the nature and composition of the whole. If the web is a huge collection of authentic texts which are the result of genuine human interactions, the source of each single «utterance» or «lexical item» may vary, but if these are to be considered as evidence of usage, it may not be of crucial importance whether the source is one or other document. On the contrary, evidence of attested usage found in different web pages at different times would testify to the social dimension of usage, providing evidence of the autopoietic and diachronic nature of discourse (Teubert 2007: 67) and contributing to a richer notion of intertextuality (Kristeva 1986: 39), by making visible how (each) new text repeats to a considerable extent things that have already been said. Text segments, collocations, complex and simple lexical items which were already in use, are being recombined, permuted, embedded in new contexts and paraphrased in new ways (Teubert 2007: 78).

Thus, while the fluid nature of the web is often invoked as one of the main arguments against using the web as a corpus because a result computed today may not be exactly reproducible tomorrow, one is tempted to revive on the other hand a powerful analogy with water, as Kilgarriff (2001) does in his seminal 2001 Web as Corpus, arguing that nobody would demand that the chemical composition of water in a river is exactly the same at each experiment. Nonetheless river water is undoubtedly a legitimate object of scientific enquiry, and so is the web. As Volk suggests, we only have to learn how «to fish in the waters of the web» (Volk 2002: 9).

4.2. Reproducibility

One of the most obvious practical consequences for linguistic research of the web’s dynamic nature is the impossibility to reproduce any experiment – a really serious problem since it is one of the basic requirements of scientific research that an experiment can be replicated/reproduced so that it can also be validated or, perhaps more crucially for the scientific method, invalidated. This also applies to corpus linguistics research which aims to be scientific. Accordingly, it is an implicit requirement of a corpus that it should be stable, so that «the results of a study can be validated by direct replication of the experiment» (Lüdeling et al. 2007: 10). While for traditional corpora this is, at least in principle, irrelevant, the problem of reproducibility and validation of experiments becomes a crucial issue when using the web as a corpus, especially when accessing it through ordinary commercial search engines. As Lüdeling again argues:

[…] the web is constantly in flux, and so are the databases of all commercial search engines. Therefore, it is impossible to replicate an ex-
periment in an exact way at a later time. Some pages will have been added, some updated, and some deleted since the original experiment. In addition, the indexing and search strategies of a commercial engine may be modified at any time without notice (Lüdeling et al. 2007: 11).

Furthermore, the wild inconsistencies and fluctuations discovered in the result counts even for common English words via common search engines (e.g. Veronis 2005) make us understand that any linguistic study based on the web as corpus necessarily calls for some form of validation. This has made the issue of reproducibility become one of the new key concerns, prompting research on the web as corpus particularly in terms of a reconsideration of tools and methods. Thus, while some researchers using the web as corpus via ordinary search engines simply validate their results by repeating the same search at distant intervals in time (Lüdeling et al. 2007: 11), others have opted for different methods of using the web as a corpus, i.e. by downloading the results of the queries submitted to a search engine so as to create a more stable, and hence verifiable, object.

4.3. Relevance and reliability
The dynamic and fluid nature of the web makes it an apparently unreliable environment for corpus-based research also from the point of view of relevance and reliability (Fletcher 2004), which have also become key concerns for corpus research based on the web, especially when web data are to be used as a basis of both quantitative and qualitative evidence (Rosenbach 2007: 168). In this context relevance and reliability can be seen in terms of «precision» and «recall», two issues pertaining to information retrieval which are often mentioned as worth some consideration in studies concerning the web as corpus (Baroni and Bernardini 2004; Fletcher 2007; Lüdeling et al. 2007).

The importance of precision and recall even in the most basic use of the web as corpus is easily explained. While any linguistic search carried out by means of specific software tools on any traditional stable corpus of finite size (such as the BNC) will certainly report only (precision) results exactly matching the query, and all (recall) the results matching the query, this is obviously not the case with the web, where recall is impaired by its unstable nature as a dynamic non-linguistically oriented collection of text, whereas precision is impaired by the intrinsic limitations, from the linguist’s perspective, of search tools such as ordinary search engines. If locating an item in a corpus makes sense only assuming a minimum qualitative and quantitative accuracy in the search, a web search for linguistics purposes would make sense only assuming that the search should not return too many «wrong» hits, called false positives (precision), and should not miss too many correct items, called false negatives (recall). This is precisely what makes using search engine hits as a source of linguistic information, i.e. using frequency data from a search engine (the so-called «Google frequencies») as indicative of frequency of a given item in the web as corpus, more problematic than it might seem at first glance. To assume a fairly high number of hits for a query as evidence of usage, is not – as we will see later – something which can be taken for granted. For one thing, reliability and recall are made problematic by the huge number of duplicates and near-duplicates found by search engines which ultimately depends on the very dynamic nature of the web. The presence of duplicates on the web, an issue generally alien to carefully compiled corpora, dramatically inflates frequency counts and makes numeric data obtained from hit counts on the web virtually useless from the point of view of statistics. Thus, while using page hits counts as indicative of the frequency of a given lexical item seems intuitively to be a cheap, quick and convenient way for researchers to obtain frequency data, the reliability of such data is seriously impaired by the instability of the web itself.

As to relevance and precision, these are impaired by the very strategies that enhance the power of search engines as tools for retrieving information (not specifically linguistic) from the web. In order to retrieve as many documents as possible matching a user’s query, search engines usually perform some sort of normalization: searches are usually insensitive to capitalization, automatically recognize variants («white-space» finds «white space», «white-space» and «whitespace»), implement stemming for certain languages (as in «lawyer fees» vs. «lawyer’s fees» vs. «lawyers’ fees»), ignore punctuation characters and prevent querying directly for terms containing hyphens or possessive markers (Lüdeling et al. 2007; Rosenbach 2007). While such features are undoubtedly
helpful when searching for information on the web, they certainly affect the search possibilities in terms of precision and relevance, and accordingly distort frequency data (Nakov and Hearst 2005). Indeed it is out of the necessity to counteract the limits in terms of relevance and reliability of any use of the web as corpus based on access via ordinary search engines that the most important tools for the creation of web corpora were born.

Conclusion

In this chapter some theoretical aspects relating to the emerging notion of the web as corpus have been explored by revising key issues in corpus linguistics in the light of the characteristics of the web as a spontaneous, self-generating collection of texts, and by hinting at some of the new issues which the very possibility of using the web as a corpus seems to rise. While the notion of a linguistic corpus as a «body» of texts rests on some correlate issues such as finite size, balance, part-whole relationship, stability, the very idea of the web as corpus introduces notions of non-finiteness, flexibility, de-centering and re-centering, provisionality, which do not only seem to be calling into question the «good practice» of corpus work, but may also be affecting the very notion of a linguistic corpus in more radical ways. All these issues will be further explored on applicative grounds in the following chapters.

Note

1 In the present work both «web as corpus» and «web-as-corpus» have been used with reference to the research field as a whole. The hyphenated form «web-as-corpus» has been generally opted for as a noun modifier.
2 The term «corpus-ness» is a neologism first used by Kilgarriff (2003: 334).
3 It should be noted that Teubert (2007) makes explicit use of Google search to support his views.
4 This calculation is based on an average page length of 7.3 Kb and on an average of 10 bytes per word (see Meyer et al. 2003; Kilgarriff and Grefenstette 2003).
5 The problem of size is related to the so called Zipfian properties of language, according to which nearly 50% of the words in a corpus occur only once. This requires that a corpus is large enough to contain enough occurrences of 50% of its running words (Sinclair 2005, referring to Zipf 1935).

6 The word topic is here used as a synonym for domain in the sense of subject field. Preference for the word topic was suggested to avoid confusion with the notion of «domain» in Internet technology, where the term refers to part of the URL used to identify a website.
7 Precision and recall are defined as «measures of effectiveness of search systems». More specifically, «precision» is the ratio of the number of relevant documents retrieved to the total number of documents retrieved, and «recall» is the ratio of the number of relevant documents retrieved to the total number of relevant documents» (Van Rijsbergen 1979).
Introduction

In this chapter the potential and limitations of accessing the web as a ready-made corpus via ordinary search engines are introduced and discussed. In Section 1 some basic issues concerning web search are surveyed, before providing an overview of how search engines work in Section 2. In Section 3 some techniques for exploiting search engines for linguistic purposes are shown. In this Section the role and meaning which search engine advanced options can perform from the linguist’s point of view are briefly discussed before introducing the use of complex queries for linguistic purposes in Section 4.

1. The corpus and the search

Despite an undisputedly controversial status as a linguistic corpus, the web has often been used as a corpus in recent years, especially in the field of computational linguistics. As a text collection of unprecedented size and scope, freely and ubiquitously accessible, the web was in most cases the obvious source to go to for the solution of typical Natural Language Processing tasks, soon gaining a reputation as «the largest data set that is available for Natural Language Processing» (Keller and Lapata 2003: 459). While using the web as a training and testing corpus has undoubtedly become common practice in computational linguistics, with an increasing body of studies showing that simple algorithms using web-based evidence can even outperform sophisticated methods based on smaller but more controlled data sources (Lüdeling et al. 2007: 7), awareness of problems and limitations of using such a
huge, anarchic and unstable database as a source of linguistic information remains. The first and most obvious problem is the total lack of control over the source of the texts, both from the point of view of their production and from the point of view of their content, which makes it very hard to assess the «authoritativeness» of a web page in terms of accuracy of content and representativeness of form (Fletcher 2004a: 275). Moreover, the content of the web, as a heterogeneous and non-sampled body of text is so varied that not only «unpolished ephemera abound along with rare treasures» (Fletcher 2004a: 275), but online documents often consist of mere fragments, stock phrases, hot lists, and come in a myriad of duplicates and near-duplicates which are not of use from a linguist’s perspective. Then there is the already discussed problem of size. While working with a huge amount of data greatly enhances the chances of finding enough information for any item, this advantage is counterbalanced by the fact that dealing with too much data requires an enormous amount of processing power. Last, but not least, there are the thorny issues of representativeness, the impossibility of relying on any form of linguistically oriented utilities or linguistic metadata, and the notorious «volatility» of the «webscape» (Fletcher 2007). These are no doubt limitations which make the web a very inhospitable place for serious linguistic research.

While all these drawbacks are clearly acknowledged, it can nonetheless be argued that a certain feeling of excitement has been nourished in recent years by the extremely interesting results obtained at a practical level, so that skepticism and willingness to profit from the «promises and possibilities» offered by the web as a corpus seem to coexist in the linguistic community. As Christian Mair has recently argued, «attitudes towards the web as a corpus span the whole range from enthusiasm to distinct reserve», a stance clearly reflected in technical papers which generally focus «as much on the potential as on the hazards of using the web as a corpus» (Mair 2007: 235). In a time when «working styles in corpus-linguistic research are changing fast», and the traditional view of «close(d) communities of researchers forming around a specific corpus or set of corpora [...] is becoming increasingly problematical» (Mair 2007: 233), the web seems to have entered the scene as an unexpected novelty, providing (if nothing else) solutions to specific problems. It remains, however, an «accidental» corpus (Renouf 2004), which has imposed itself to the linguists’ attention almost against their will. Perhaps nothing better than the recently coined phrase «unwanted corpus» (Mair 2007: 235) can capture the ambiguous mood of reluctant acceptance which in most cases surrounds research on the web as a corpus. As Mair again suggests, «the web will have to be used because it is there, but clearly it is not the corpus that linguists would have compiled» (Mair 2007: 236).

Reservations are even more crucial when it comes to the apparently widespread practice of using the web as a source of corpus-like linguistic information through an ordinary search engine. Such concern has recently found expression in a powerful caveat googlator:

[W]e seem to be witnessing [...] a shift in the way some linguists find and utilize data – many papers now use corpora as their primary data, and many use internet data. These are clearly changes that are technologically induced, and in an era in which google is now a common verb, why not? I feel compelled to add, though, caveat googlator! In the culling of data from Medieval Greek texts for my dissertation, [...] I ran across some examples that I felt were best treated as having been altered [...]. Thus I considered them to be attested but ungrammatical – some examples obtained on the Internet in papers I read now strike me as quite the same, that is possibly produced by non-native speakers, or typed quickly and thus reflecting performance errors, and so on. I have no doubt that we will learn how to deal with this new data source effectively [...] (Joseph 2004: 382, quoted in Rosenbach 2007: 167).

The pun «googlator» is an overt allusion to the most popular web search engine, Google. Indeed, there are good reasons to be cautious when accessing the web as a linguistic resource via commercial search engines, beyond those listed by Joseph. While the quantity, diversity and topicality of web documents literally «tantalize» language professionals (Fletcher 2004a: 271), the problem of locating information that is linguistically both reliable and relevant by accessing the web through a search engine represents a real challenge which seems to outweigh all advantages. Firstly, search engines are not designed for use by linguists, since they impose a limit to the number of results that can
be displayed, and the results themselves are displayed in a format which is not suitable for linguistic analysis and are ranked according to algorithms which escape the user’s control. Secondly, the very strategies that enhance the effectiveness of search engines for general purposes, such as normalization of spelling and lemmatization, clearly limit the effectiveness of web search for linguistic purposes, which of necessity requires greater precision.

So many obvious drawbacks, however, have not been enough to stop interest in the use of web data both as a source for the creation of conventional corpora and as a source of data readily amenable to linguistic analysis, at least as a complement to more controlled data sources. Interest in the web for linguistic reference is on the increase, however, also among language professionals outside the corpus linguistics community. Besides typical uses of the web as a source of multilingual encyclopaedic information, and as the platform for distribution of resources such as online glossaries and dictionaries, new uses seem to be emerging which under the disguise of a casual «let me see how many hits I find for this in Google» may be bearing the fruits of a linguistically aware use of the web. It is precisely against the background of this apparent intersection between web search as a common non-linguistically oriented practice and linguistic research informed by the corpus linguistics approach that it is perhaps useful at this stage to survey some basic concepts concerning web search itself, before exploring its meaning from the linguist’s perspective.

Even at first glance, the act of searching for information through a digital database via an ordinary search engine and reading vertically through the results, which is what typically happens in the simplest web search, seems to be strikingly similar to what also happens when searching a corpus through a concordancer. Indeed the so called SERP (Search Engine Results Page) vaguely resembles a concordance list where the search item is highlighted within a small amount of co-text, even though this is by no means the same format as the KeyWordinContext typical of linguistically oriented tools. It is as if reading «vertically», «fragmented», and looking for «repeated events», which Tognini Bonelli sees among the features that set apart the act of reading through a corpus from the common act of reading a text (2001: 3), is becoming everyday experience for more people beyond the corpus linguistics community. This superficial similarity cannot conceal, however, the fundamental difference between searching a deliberately collected static corpus using specific tools, and searching texts found on the Internet only by means of a commercial search engine. In this case the linguist has not only very scarce control over the corpus itself but also over the search, since web search tools are designed to address a variety of needs for which the linguistic form is only a means to an end, and not – as in the case of the linguist – the end itself. As pointed out by Bergh, «whereas standard corpora typically come with software specialized for searches for different linguistic forms, search engines on the web are designed to find contents, using the linguistic form only as a means to achieve that goal» (2005: 27, my emphasis). It would be an oversimplification, however, to think that the problem posed by search engines is simply that they are geared towards the retrieval of general information from the web rather than towards the extraction of specific linguistic information. The real problem is that the very needs which search engines address are evolving. It can no longer be assumed for instance that search engines are built so as to answer straightforwardly informational needs. On the contrary, as has been argued, in the web context the need behind the query is often not so much «informational» in nature, but rather «navigational» or «transactional» (Broder 2002). Accordingly, web search tools are evolving in the same direction, blending data from different sources and clustering results in the attempt to guess what the user is really looking for. This is what makes the web undoubtedly more useful for the average user, but rather less reliable for linguistic research. The latter could in fact be labelled – according to Broder’s taxonomy – as exclusively and quintessentially «informational» and does not profit from strategies aimed at enhancing the ability of web search tool to meet other needs. It is therefore advisable that linguists determined to exploit its potential as a source of linguistic information via ordinary search engines become aware of some technical and theoretical aspects of web search, starting with the tools themselves.
algorithm which takes a number of factors into account, such as the popularity of the page (measured by the number of other pages linking to it), the number of times the search term occurs in the page, the relative proximity of search terms in the page, the location of search terms (for example, pages where the search terms occur in the title page get higher ranking), and even the geographical provenance of the query (which may prompt a bias to ranking higher those web sites which are closer to the user).

It goes without saying that the usefulness of a search engine ultimately depends on the relevance of the result set it gives back, even though relevant can mean something different to the linguist and to the average user. In such a huge text collection as the web there may be millions of web pages that include a particular word or phrase, and obviously some pages may be more popular or authoritative than others. It is precisely the method employed to rank the results, which varies widely from one engine to another, that determines the quality of the response. At the moment the most popular, and to some extent effective, ranking method seems to be Google’s PageRank which is based on a computation of website popularity based on a criterion similar to the impact factor in scientific publications. As the Google technology page explains,

An ingenious system for arranging search results, PageRank may be «slightly problematic from the point of view of corpus linguistics», since «the ranking of Web pages is likely to favour linguistic constructions which happen to occur on more popular pages, thereby risking a certain bias in studies based on language data mined by Google.» (Bergh 2005: 33) On the other hand, Google’s ranking system, aimed as it is at weighing the «impor-
generally typing in a few words and expecting the engine to bring back perfect results, ignoring that it is only the act of offering more data in the query that often dramatically improves the results (Battelle 2005: 23-25). The way most users generally approach the act of searching the web through ordinary search engines is thus often naïve, and this may account not only for much of the frustration experienced by web searchers, but also for the risk of misusing the web as a linguistic resource. In the following pages therefore some useful techniques for exploiting search engines for linguistic reference will be discussed.


In spite of its intrinsic limitations, the web is often searched as a corpus via ordinary search engines, particularly as a source of evidence of attested usage. More specifically, as pointed out by Rosenbach, any other corpus the web can be used for ascertaining two types of evidence, i.e. qualitative evidence and quantitative evidence. Qualitative evidence is used to show that a certain form or construction is similar to «normal» corpus data, though there are some problems that are specific to web data (Rosenbach 2007: 168).

While there is no doubt that accessing the web via ordinary search engines as a source of attested usage is not the best way of using the web in corpus linguistics, and that it is one that forces the linguist to develop «workarounds» (Kilgarriff 2007: 147), this remains the most widespread method of using the web as a corpus. Yet it cannot be denied that «the argument that the commercial search engines provide low-cost access to the web fades, as we realise how much of our time is devoted to working with and against the constraints that the search engine imposes» (Kilgarriff 2007: 147-8). One really runs the risk of wasting time in becoming expert in the volatile syntax of search engines, or — as Kilgarriff suggests — of becoming a «gooleologist». Nonetheless a better knowledge of search engines and of the options they pro-
vide can not only help the linguist profit as much as possible from the most immediate way of access to linguistic information on the web, but can also contribute to a deeper understanding of the role each search option can play in helping the linguist elicit qualitative and quantitative evidence from the web, thus yielding further insight into the relationship between corpus linguistics and the web in more general terms. This is the reason why web search deserves some attention in the present work.

3.1. An overview of web search options

Even though apparently trivial, the task of searching the web for evidence of usage poses specific problems for the researcher, and requires that cautionary procedures are adopted both in submitting the query to the search engine and in interpreting the results. The user needs to take into account basic issues which are related to the peculiar nature of the web as a huge, dynamic, multilingual corpus, as well as other problems specific to our gateway to information on the web, the search engines. As to the latter point, the first step towards a competent use of search engines to access linguistic information is a deeper understanding of the search options they provide.

A use of the web as a source for attested usage is to some extent implicit in the query language of most search engines, which basically allows the user to look for web pages that contain (or do not contain) specified words and phrases, together with a rough indication of how many web pages satisfy these conditions. As Chakrabarti (2003: 45) explains, the simplest kind of query essentially involves a relationship between terms and documents such as:

- documents containing the word X
- documents containing the words X and Y
- documents containing the word X but not the word Y
- documents containing the word X or the word Y

These conditions represent what is generally known as a Boolean search, which, in the context of web search, refers to the process of identifying those web pages that contain a particular combination of words. More specifically, Boolean search is used to indicate that a particular group of words must all be present (the Boolean AND operator) in the web pages retrieved by the search engine; or that any word of a group is accepted (the Boolean OR operator); or that if a particular word is present in a web page that page is to be rejected (the Boolean NOT operator). While the explicit use of the Boolean operators AND, OR and NOT has been progressively downplayed in most search engines, and searchers may not even be familiar with them, Boolean search has been partially replaced in some engines by the use of menus in the advanced search mode or by a specific query syntax:

Thus, by selecting «with all the words» from the pull down menu of a search engine you are implicitly using a Boolean AND; by selecting «at least one of the words» you are using a Boolean OR; by selecting «without the words» you are expressing the Boolean NOT. It is perhaps also useful to remember that the Boolean AND is by now a default in most search engines, so that whenever more terms are entered in the query box these are implicitly linked by an AND operator. Turning our attention more specifically to Google, one can also input the following symbols directly in the main query box:

+ (for the Boolean AND)
OR (for the Boolean OR)
- (for the Boolean NOT)

As the advanced search menu shows, Google, like most search engines today, also provides further search options: search for an
exact phrase, search for pages in a given language, or within a single domain (e.g., .uk or .it or .org), or within a specific time-span, and even restricted to a specific file type. As pointed out by Bergh, it is the very existence of these «slicing possibilities» that «accentuates Google’s potential as a versatile tool for various forms of empirical language research» (2005: 34). From the linguist’s point of view all these «conditions» can in fact be seen as a form of selection from among the wealth of texts that constitute the web and can to some extent be compared to the creation of a temporary sub-corpus relating to a specific language environment. This is the reason why understanding what is the effect of each single operator upon the web-corpus itself does not simply result in familiarity with the working of web search engines, or in a more effective exploitation of their potential, but can also give an indirect insight into the web-as-corpus question at a theoretical level.

3.2. Simple search and the limits of «webidence»

The evidence of attested usage that the web can provide has been labelled by Fletcher as «webidence» (2007: 36). In its most basic form this could entail a simple web search for a single word. A patently «low-tech» use of the web for linguistic purposes, a simple search for a single word is not however devoid of interesting implications, and provides a good starting point for exploring potential and limitations of the web as a source of quantitative and qualitative evidence. A case in point is spell-checking (Kilgarriff 2003: 332): by alternatively searching the web for two competing spelling forms, one can for instance come to the conclusion that the word hitting more matches is very likely to be the one spelled correctly, thus blending qualitative and quantitative evidence. An already widespread use of the web for linguistic reference, even if not directly connected with the corpus linguistics approach, using the web as a spellchecker can nevertheless highlight some typical problems arising when resorting to web search engines for linguistic purposes. The first problem obviously relates to the unknown size of the web, which makes it very difficult to interpret the relative «weight» of frequency of occurrence on the web. See for instance what happens if we input the word «himmunotherapy», half-guessing its spelling:

![Fig. 2.2.](image1)

The misspelt word «himmunotherapy» finds only one match, while the search engine automatically suggests the correct spelling «immunotherapy», which in fact finds over 5 million matches:

![Fig. 2.3.](image2)

In this case, the significantly low number of matches for «himmunotherapy» could trigger doubts in the user’s mind, and prompt checking strategies. In other cases, however, results yield no such evidence of unreliability of results, since the number of matches itself can be misleading. See for instance what happens with a search for the word «accomodation».
new *ipse dixit* from the linguistic point of view. Showing that a certain form is attested in a corpus – the web in this case – is one thing, but showing that it is linguistically acceptable is another. As far as the web as a corpus is concerned it is not the mere fact of «being there» that means something. This fact needs to be interpreted through an analysis of a number of other factors, such as the number of matches, the provenance of the results, the co-occurrence with other words, and the «authoritativeness» of each web page, as we will see in the following paragraphs.

3.3. Advanced search as a solution to specific language questions

Unlike searching the web-corpus for one single word, which does not seem to promise much to the linguist, searching for «phrases» is one of the most interesting possibilities offered by ordinary search engines. This is a very useful option because it can help the linguist exploit the web as a huge reservoir of attested usage especially for collocations and testing translation candidates.

3.3.1. Collocation

The most common way to use phrase search for linguistic reference is to check whether a certain sequence of words actually occurs in a given language, as an indirect way to explore collocation. Defined by Firth as the tendency of some words to keep each other’s company (Firth 1957: 11), collocation is one of the language phenomena more typically related to the use of language, and therefore one of the areas which even the most fluent speakers of a foreign language have difficulty in mastering completely.

As an area of language study which can profit from the possibility of testing stretches of language for attestation of usage, collocation is one of the most rewarding fields of application of the web as a corpus via ordinary search engines. A case in point is the example of «suggestive» as a potential collocate of «landscapes» in the phrase «suggestive landscapes». This phrase comes from an English tourism text written by an Italian speaker of English as a foreign language, and can be seen as representative of the «open choice» principle (Sinclair 1991: 109-110), according to which a language user may fall into the trap of considering any word virtually entitled to fill a slot in a text, provided that morpho-syn-
tactic constraints are observed. More specifically, this use of «suggestive» as a collocate for landscapes seems to be grounded on a common case of interference, or «shining through» of the source language into the target language (Teich 2003). While «suggestive» is not even mentioned in Italian-English bilingual dictionaries as a translation candidate for suggestivo, the latter is such a common collocate of the word paesaggi (meaning landscapes) in Italian, particularly in the context of tourism, that the English cognate word «suggestive» is very often mistakenly used as its direct equivalent. A web search for the phrase «suggestive landscapes» using Google’s exact phrase match option would seem to provide evidence of this:

![Google search results for «suggestive landscapes»](image)

Fig. 2.5.

The problem then becomes how to interpret these results. In this case, 356 matches for «suggestive landscapes» could either be mistakenly considered as evidence of attested usage, especially if the user does not consider that 356 is quite a low number when compared with the size of the web in English, or instead provide support to claims about the unreliability of the web as a source of linguistic information. At closer inspection, the reliability of these results is called into question by their very provenance, almost invariably Italy, which suggests that the phrase is here very likely the result of a mistranslation from the Italian «paesaggi suggestivi». This could easily be checked by restricting the search to .uk only pages by means of the domain restriction option provided by the search engine (see later in this chapter) which tellingly leads to the reported below results (Fig. 2.6).

By slightly modifying the query the number of matches has dramatically fallen to three, two of which are again linked to Italy, thus providing clearer evidence of the inappropriateness of «suggestive» as a collocate for «landscapes».

![Google search results for «suggestive landscapes»](image)

Fig. 2.6.

3.3.2. Testing translation candidates

In recent years, translation has increasingly become an «ideal field» (Bernardini 2006) for corpus application, and indeed this is one of the most interesting areas for exploring uses of the web as corpus via ordinary search engines. If, as it has been argued, «browsing» monolingual target language corpora throughout the translation process can help reduce the amount of shining through of the source language into the target language (Bernardini 2006), browsing the web for instances of attested usage could be a simple – yet not simplistic – way to test translation candidates on the basis of evidence provided from web.

A very interesting use of advanced search for linguistic purposes can be the evaluation of competing alternatives in terms of syntax within the noun phrase. A case from the point of view of translation is the choice between premodification and postmodification, a potentially difficult one for a non-native speaker. The example discussed below, for instance, relates to the choice between «onset site» and «site of onset», as a translation candidate...
for sede di insorgenza, in the context of a medical text about cancer. The preference for premodification or postmodification can of course be dependent on the register or genre of the whole text, a factor which could not be easily taken into consideration using the web as a corpus; nonetheless a preliminary exploration simply concerning frequency of usage can be carried out on the basis of data from the web. In this case mere figures (13,100 matches for «site of onset» vs. 836 matches for «onset site») would seem to favour postmodification:

These results for «site of onset» do not give however clear evidence of the relevance of this phrase to the general topic of the text, i.e. cancer. Therefore Boolean search can be used heuristically to refine the query and enhance the possibility of hitting more relevant matches before jumping to conclusions concerning postmodification as the preferred mode to express this concept. By adding the word «cancers» to the search string it should be more likely that the results the engines gives back are from texts some way addressing this topic, and the new results seem indeed to confirm the hypothesis and prove to be definitely more relevant, providing new, clearer evidence of attested usage for «site of onset» in the context of «cancer»:

As to the alternative «onset site», the results for the search string cancer “onset site” are reported below:

The low number of matches (213) seems to suggest that premodification may not be the preferred way to combine the two words. Moreover, it is of crucial importance to realize that in most of the occurrences reported the two nouns «onset» and «site» are separated by some punctuation marks, generally a comma. By quickly browsing through more result pages it becomes evident
that the majority of hits are for «onset, site» rather than for the noun phrase «onset site», thus further invalidating any assumption concerning attestation of usage for «onset site».

This last example provides a new opportunity to stress the importance of interpreting the results. Not only are the number of matches or the provenance of results of key importance, but also their relevance to the required context of use, and their reliability, i.e. the degree of precision with which they correspond to the user’s query. It is equally important that the user remembers that not all tasks can be equally performed by search engines, which generally ignore punctuation and consider several variants as one (either by stemming or by ignoring special characters). This is what makes, for instance, an apparently similar use of web search engines aimed at discriminating between noun+noun constructions and noun+’s+noun constructions virtually impossible (Lüdeling 2007; Rosenbach 2007) and calls for the necessity of tailor-made web search engines. Also worth mentioning is that the web has from time to time proved totally unreliable even with Boolean search. As shown by Véronis (2005: online), Boolean logic is often defeated by totally absurd results for search strings including more than one item.7

A further example concerns the evaluation of translation candidates for the Italian phrase «paesaggi aspri»8. In this case our starting point is the dictionary entry for the Italian «aspri» from one of the most prestigious and reliable bilingual dictionaries, which reveals at a glance the problem faced by the translator, even in an apparently trivial case such as this:

\[\text{\textit{aspro}}, \text{a. 1 (di sapore) sour; tart, bitter [...]; 2 (di suono) harsh; rasping; grating. 3 (fig. duro) harsh; hard; bitter; 4 (ruvido) rough; rugged [...]; 5 (scosceso) steep; 6 (di clima) severe; raw; harsh. • (ling.) [...]} \text{ (Il Ragazzini 2006)}\]

A first selection of translation candidates can be done on intuitive grounds, which makes it quite easy to exclude that the Italian word \textit{aspri} could in this case be translated with «sour, tart» (relating to taste), or with «rasping» or «grating» (relating to sound). Among the translation equivalents offered by the bilingual dictionary the only sensible translation candidate would seem to be those relating to points 3, 4 and 5 in the entry. More specifically, «harsh», «hard», «rough» and «rugged» seem to be the most plausible candidates. A fifth candidate can instead be obtained by introspection: searching for equivalence of effect the Italian «aspri» can in this case be replaced with another adjective (e.g. «forti») thus obtaining «strong» as a new translation candidate for «aspri». Choosing «landscape» and «scenery» as equivalents of «paesaggi», an evaluation of translation candidates for «paesaggi aspri» should therefore consider at least ten competing phrases, resulting from all possible combinations of «hard», «harsh», «rough», «rugged» and «strong» with both «landscape» and «scenery». While all formally possible, the ten combinations may in fact not be all actually used, and evidence for this can be drawn the web.

The following table reports results for the 10 competing alternatives. In order to improve chances of obtaining results both relevant and reliable, the query was progressively refined using both Boolean search and domain restriction. Thus the ten competing options were searched first through the whole web, and then by choosing only results from UK; finally, the words «travel OR tourism» were added to the query in order to enhance the possibility of retrieving pages related to the tourism sector. The table also reports data from the BNC as a contribution to an evaluation of web results:

<table>
<thead>
<tr>
<th>Tab. 2.1.</th>
<th>Web</th>
<th>Uk only</th>
<th>travel OR tourism</th>
<th>BNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>hard landscapes</td>
<td>2180</td>
<td>1440</td>
<td>116</td>
<td>0</td>
</tr>
<tr>
<td>hard scenery</td>
<td>485</td>
<td>43</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>harsh landscapes</td>
<td>826</td>
<td>441</td>
<td>193</td>
<td>1</td>
</tr>
<tr>
<td>harsh scenery</td>
<td>468</td>
<td>30</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>strong landscapes</td>
<td>507</td>
<td>173</td>
<td>18</td>
<td>1</td>
</tr>
<tr>
<td>strong scenery</td>
<td>138</td>
<td>6</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>rugged landscapes</td>
<td>66.300</td>
<td>10900</td>
<td>640</td>
<td>3</td>
</tr>
<tr>
<td>rugged scenery</td>
<td>51.700</td>
<td>12900</td>
<td>751</td>
<td>1</td>
</tr>
<tr>
<td>rough landscapes</td>
<td>1400</td>
<td>121</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>rough scenery</td>
<td>660</td>
<td>32</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>
As the figures clearly show, web results outnumber results for the seven collocations which are not found in the BNC. By refining the query however there is a significant reduction of occurrences which seems to bring web data closer to BNC values. The only exception is for «rugged landscapes» and «rugged scenery» which are actually used in contemporary tourism discourse with increasing frequency despite low frequency in a general reference corpus such as the BNC. This seems to provide evidence of the capability of the web to capture changes in language use in – as the phrase goes – real time. In terms of the authoritativeness and reliability of the results, a quick glance at some of the web pages ranked higher in the results page shows that there are many edited sources, such as pages from the travel section of popular magazines (e.g. travel.guardian.co.uk) or published travel guides. These results also suggest that evidence of language use obtained by progressively refining the query towards greater complexity can be – despite all caveats – considered qualitatively reliable and quantitatively significant.

3.4. Towards query complexity: other options

3.4.1. Language and domain Among the opportunities offered by search engines to refine the user’s query, the one most obviously related to a more specific use of the web for linguistic purposes is restriction by language. For most search engines results can be limited to one of over 40 languages, ranging from Arabic to Vietnamese, including Esperanto and Belarusian (see Google advanced search: online). This may not be however enough to boost the quality of the results, especially in the case of English, which is used by many non native speakers on the web. A different, and perhaps more useful, option is the provenance utility recently implemented by Google under the main query box:

Fig. 2.10.

While «the rough and ready regionally differentiated Google advanced mode search» has already started to provide the basis for research on change and variation in present-day English, as can be seen in studies by Christian Mair (2007: 233-247), the usefulness of domain restriction is not limited to national/regional domains. Also very useful is for instance searching only within academic domains in English speaking countries (such as .ac.uk and .edu), or within well known portals for the distribution of scientific journals, as an indirect way to control register. Thus in the search for «site of onset» and «onset site» carried out in the previous paragraph, further domain restriction to Elsevier, a well known portal for scientific publications, would have immediately

Fig. 2.11.
confirmed the unappropriateness of «onset site» (only one hit featuring, again, «onset, site» rather than «onset site»):

The alternative search for «site of onset» based on similar criteria produces 8 matches, all to be considered relevant and reliable because of the co-occurrence with cancer and of the «controlled» provenance of the results.

3.4.2. Wildcards
Another meaningful option that can be exploited from a linguistic perspective is the search for an unspecified word in a certain position within a phrase. The unspecified word is represented by an asterisk «*», otherwise called a wildcard, in the search string. Unfortunately this option, referred to as «fill in the blank» in the advanced search tips provided by Google, is not fully supported by most search engines, including Google itself. Typically, one wildcard in the string should match one word only, so that multiple asterisks could be used as a sort of «proximity» search option. Google however has recently changed the processing so that one single asterisk does not necessarily match a single word. Despite lack of precision, however, the use of wildcards can be helpful not only for such tasks as checking phraseology and idioms (e.g. «a little neglect may * mischief») could be the string to submit to elicit «breed» if one is not certain about the last but one word, but also for highlighting areas of co-text which users may wish to explore. This is particularly useful, for instance, when testing longer stretches of a text, or patterns, for evidence of attested usage. See what happens with the following translation of a medical text from Italian into English:

La frequenza del carcinoma a cellule squamose della mucosa orale è in rapido aumento; inoltre, il suo comportamento clinico è difficilmente prevedibile basandosi solo sui classici parametri istologici9.

The apparently straightforward opening sentence of the source text poses some problems which cannot be solved only by reference to a specialized dictionary, and would rather benefit from access to a specialized corpus. The first clause, for instance, can be literally translated as «The frequency of squamous cell oral cancer is rapidly increasing», but a translator may have doubts relating to the phraseology. Do people really say that «the frequency of something is increasing»? Would people say this when talking about cancer?

To test this using the web as a corpus, the first step is to see whether the search string «The frequency of * is increasing» finds any matches. Almost 50,000 matches for such a long string seem indeed to be encouraging results, though it would be useful to refine the query by adding the word «cancer», to boost relevance, and by selecting known sites, e.g. .ac.uk sites, for reliability. The new results seem to be only partially confirmatory: 9,000 hits for the search string cancer «The frequency of * is increasing» seem to suggest that the pattern is used in pages also containing the word cancer, but domain restriction to British academic sites still seem to provide evidence of attested usage:

cancer «The frequency of * is increasing” site: .ac.uk (4 matches)
cancer «The frequency of * is increasing” site: .edu (561 matches)

A further checking procedure is to change the position of the word «cancer» in the string, allowing for one word preceding it, given the high probability of cancer being referred to as a specific form
(breast cancer, lung cancer, etc.). The 3680 matches for the string “the frequency of * cancer is increasing” would seem again a confirmatory result, but restriction to pages from .ac.uk and .edu sites, as well as to reliable sources such as portals for the distribution of scientific publications (e.g. Elsevier or Pubmed) provides only 2 hits in both cases, which seems to suggest the opportunity of new checking procedures.

At this stage one could for instance test the pattern for an alternative to either frequency or increasing. A search for the string “The * of * cancer is increasing”, for instance, seems to suggest «incidence» as an alternative for frequency.

In fact “The incidence of * cancer is increasing” finds 22,900 hits in the whole web, 111 in sites ac.uk and 61 hits from one of the specific reliable websites (site: pubmedcentral). This finally suggests that «The incidence of oral squamous cell cancer is increasing» as a suitable opening sentence for the target text.

Similarly one could try to solve problems in the rest of the passage by checking other phrases for attestation of usage, such as «clinical behaviour», also testing its co-occurrence with the verb «predict» and «only on the basis of * parameters», along with a test for the phrase «histological parameters», and so on. By shifting a wildcard back and forth within the search string, by including and excluding dubious items, and by refining the query in terms of domain, one can thus turn the web into a useful reservoir of attested usage for longer stretches of text and patterns.

4. Query complexity: web search from a corpus perspective

As the examples provided have hopefully shown, mastering the advanced search options offered by most search engines can really contribute to making the «webscape» a less anarchic and less inhospitable space for linguistic research. There seems in fact to be evidence that, in spite of its limitations, the web can be considered as a reliable source of quantitative and qualitative evidence of usage, provided that a few cautionary procedures are adopted in submitting the query and interpreting the results.

It remains doubtful, however, whether as web searchers linguists have actually learnt how to profit from the opportunities offered by more complex queries to enhance the relevance and reliability of their results. While at a theoretical level the World Wide Web has turned the search into a pervasive paradigm in our society, a «universally understood method of navigating our information universe» (Battelle 2005: 4), it seems that, at a more practical level, search by most Internet users – and linguists may be no exception – is still extremely naive. Underestimating the role played by the query is to reduce the possibility of success. As Battelle suggests, «the query is the loadstone of search, the runes we toss in our ongoing pursuit of the perfect results» (2005: 27). And to the linguist the query can really be the place where the practice of web search and the linguist’s theoretical approach to the web as a corpus can fruitfully interact.

The practical use that can be made of search engines’ advanced options for linguistic purposes has been illustrated in the previous pages. A further step can now be taken by revising the role and meaning which web search can play from a linguistic perspective. Originally designed to enhance the power of search engines from the point of view of information retrieval, most options can in fact be seen as performing specific tasks that can be interpreted from the point of view of corpus linguistics. Even the very basic act of searching the web for a single word can be regarded as the instantaneous creation of a temporary finite subcorpus out of the virtually endless and incommensurable web-corpus. Push-
A user, driven by an information need, constructs a query in some query language. The query is submitted to a system that selects from a collection of documents (corpus) those documents that match the query as indicated by certain matching rules. When this classic model is adapted for the web, the matching rules are provided by a search engine.

As Broder’s model makes clear, the starting point is always an information need, which is generally associated with some task to be performed, and this need is verbalized and translated into a query. For example, the user might need to find information about «paesaggi aspri» («stony landscapes») and want to create new queries. When this classic model is adapted for the web, the matching rules are provided by a search engine.

A user, driven by an information need, constructs a query in some query language. The query is submitted to a system that selects from a collection of documents (corpus) those documents that match the query as indicated by certain matching rules. A query refinement process might then be used to create new queries. When this classic model is adapted for the web, the matching rules are provided by a search engine.

As Broder’s model makes clear, the starting point is always an information need, which is generally associated with some task to be performed, and this need is verbalized and translated into a query posed to a search engine. By way of example, this basic algorithm will be now used to represent the procedure previously adopted to perform a specific task, i.e. the evaluation of translation candidates for the phrase «paesaggi aspri». In this case the user started from a
working hypothesis, in the form of a number of translation candidates, which in the query language of the search engine were expressed by the use of double quotes (“harsh landscapes”, “hard landscapes”) and so on. The query was submitted to the web corpus and produced a different number of matches for each phrase. The user then proceeded to a refinement of the query by suggesting a co-occurrence with travel OR tourism and by restricting the search to .uk only sites, which got sharply different results for each phrase, thus giving indication of potentially more reliable translation candidates. A similar procedure was used to test «onset site» as a translation candidate for «sede di insorgenza» in the context of «cancer».

A less obvious use of query refinement can be aimed at devising complex queries capable of eliciting answers to a specific linguistic problem from the web as a corpus. Starting again from the already discussed example of «paesaggi aspri», we can see how a very interesting collocate for landscapes, as a translation candidate for «aspri», could be elicited by means of a single complex query that translates the linguist’s need into the language of ordinary search engines.

In the case of «paesaggi aspri», the phrase was taken from a tourism website dedicated to Sardinia. The first step to be taken is therefore to recreate the context for this phrase in the search string, by asking the web search engine to give back pages containing the words travel or tourism (travel OR tourism). Then we can go on assuming «landscapes» as a prima facie translation for «paesaggi»: since our translation problem relates to the search of a collocate for landscapes in the English language, the search string will include the phrase “* landscape” (with a wildcard in the place of the adjective). Finally, given that the source text is about Sardinia, the query will search for pages also containing the words Sardinia OR Sardegna. A further step is to filter out linguistically unreliable pages by selecting only pages registered as .uk, which are more likely than others written by native speakers. The resulting search string is the following:

google.com/au; Books; Lonely Planet Sardinia (Travel Guides) - [Travel guides page] Lonely Planet Sardinia (Travel Guides); Darren Simmons, Lonely Planet Publications ... - Google cache - Page size

Travel to Sardinia with Essential Travel Insurance - [Travel guides page] Sardinia travel information, information on Sardinia with travel ... Featuring rugged landscapes, historical ports and ancient report rivers, Sardinia is a

Unified - [Travel guides page]

Guardian Unlimited Travel | Reader offers | Beautiful Sardinia - [Travel guides page]

A quick glance at the results reveals a very interesting collocate for landscape in the phrase «rugged landscapes», which is a good translation equivalent for the source text’s «paesaggi aspri», and a stunning result for more than one reason. Firstly «rugged» is a very appropriate adjective in this context and it is one that would not come naturally to the mind of a non-native speaker; evidence for this can be sought for again from the web by checking the frequency of «rugged landscapes» or «rugged scenery» in .it sites:

* rugged sceneries + tourism site: .it (7 matches)
* rugged landscapes + tourism site: .it (4 matches)

Secondly, this specific case has also provided interesting results in terms of reproducibility. By submitting the same search string to a search engine twice more at a year interval similar results have been found, which seem to reinforce the idea that «rugged» is an adjective typically used by English native speakers.
in a description of the Sardinian landscape somehow connected with tourism discourse. It is worth pointing out that the results obtained in subsequent searches for the same string all feature «rugged landscapes» among the results ranked higher by the search engine, but these are by no means in the same web pages. In fig. 2.17 are the results from a more recent search (September 2007), where, apart from a couple of irrelevant results (Cuba and Costa del Sol), Sardinian landscapes are almost invariably referred to as «rugged» and «mountainous», especially in the phrase «mountainous rugged landscapes»:

![Fig. 2.17.](image)

Comparable results were obtained by submitting the same query to another search engine (www.alltheweb.com):

This seems to provide evidence of the fact that, in English, when thinking of the Sardinian landscapes one of the adjectives most likely to come to the speaker’s mind is «rugged». While it is obvious that replicating the same search at fixed interval (or using different engines) is a dubious way to claim standards of «reproducibility» and «verifiability» for research carried on the web as corpus, the value of such results in term of a confirmation of the methodology adopted cannot be altogether dismissed.

The examples reported still represent however a very limited use of the web for corpus research, and should rather be seen as special cases representing the many opportunities offered by the web as a source of linguistic information, which can be seen as only partially connected with the corpus linguistics approach as a whole. «Google linguistics», or rather «Googleology», as Kilgarriff has recently dubbed the practice of using web search engines for linguistic purposes, still remains «bad science» (2007). For specific corpus linguistics oriented tasks the web is an unsuitable and inhospitable corpus, if accessed through ordinary search engines only. To exploit its potential, the best thing to do is to turn to linguistically oriented tools, as we will do ourselves in the following chapters.

**Conclusion**

The issues discussed and the examples reported in this chapter suggest that the web can be used as a «quick-and-dirty» source of linguistic information, at least for specific tasks, provided that one is well-equipped to face the challenge posed by the web’s «anarchy», and by the limits of ordinary search engines. It is indeed of crucial importance, when accessing the web as a corpus via ordinary search engines, that cautionary procedures are adopted not only in interpreting the results, but also in submitting the query. The complex web thus becomes the place where the corpus linguistics approach – as a way to conceive of language and not only as a method for investigating it – and the common practice of web search can significantly interact. It could be argued that it is by virtue of such interaction, and not so much in its own right, that the web can claim a status as a corpus despite so many obvious shortcomings.

**Note**

1 Particularly for Machine Translation, Word Sense Disambiguation, Prepositional Phrase Attachment, the idea of using large text collections as an alternative (or complement) to sophisticated algorithms has become increasingly popular. A pioneer study by Grefenstette tested the possibility of using the web as a corpus to improve the performance of example-based machine translation and set up a model for further research (Grefenstette 1999). More recently, studies by Keller and Lapata have found a high correlation between the number of page hits found by a search engine (web frequency) for a given group of words and the frequency of the same group in a standard reference corpus like the BNC, as well as between web frequency and human plausibility judgments. This supports the hypothesis that web frequency can be used as a baseline for many Natural Language Processing tasks including machine translation.
Chapter III
Webcorp: the Web as Corpus

Introduction

This chapter introduces WebCorp, one of the tools devised to make the web more useful for linguistic research. Thanks to a linguist-friendly user interface, WebCorp makes it easier to formulate linguistically useful queries to search engines (Lüdeling et al. 2007: 16) and returns results which are already tailored for linguistic analysis. Despite some limitations, depending primarily on the system’s exclusive reliance on ordinary search engines and a rather limited storage/processing performance, WebCorp has already proved an excellent tool to obtain data for linguistic purposes, especially in a teaching context (Kübler 2003), and in the context of research on neologisms, rare or obsolete terms, and phrasal creativity (Renouf et al. 2007).

Section 1 and 2 provide background information on the tool and briefly comment on its technical features. Section 3 reports classroom activities based on the use of WebCorp that show how the tool can be used not only to obtain information otherwise requiring longer and more complex research activities, but also to offer students thought-provoking data to prompt classroom discussion and shift their attention from language to society and culture.

1. Beyond ordinary search engines

Ordinary search engines provide immediate but admittedly limited access to the enormous potential of the web as a ready-made corpus, and it is precisely such limitations that have prompted increasing interest in the development of specific tools and methods aimed at making the web a more hospitable place for linguistic research. A
number of projects facing the challenge posed by the anarchism of the web and by the limits of search engines as a gateway to linguistic information on the other are thus in progress. Such projects interpret in different ways the umbrella phrase «web as for corpus», depending on the kind of access they provide to web data, the degree of dependence on existing commercial search engines, the stability and verifiability of results, and the flexibility and variety of the linguistically oriented processing options offered. In this context, a useful distinction has more specifically been drawn between those tools which work as «intermediaries» between the linguists’ needs and the information retrieval services already available on the web (pre-/post-processing systems), and tools which try to dispense with ordinary search engines completely, by autonomously crawling the web in order to build and index their own corpora (Lüdeling et al. 2007: 16). One of the most remarkable achievements in the former category is WebCorp (Kehoe and Renouf 2002), to which the present chapter is specifically devoted 1.

2. **WebCorp: using the web as a corpus**

Designed by the Research and Development Unit of English Studies (formerly at the University of Liverpool, now at the University of Birmingham) and available as a free service on the Internet, the WebCorp project (www.webcorp.org.uk) was established in the late 90s to test the hypothesis that the web could be used as a large ‘corpus’ of text for linguistic study (Morley 2006: 283). Today it is perhaps the most famous web concordancer, i.e. a suite of tools which provides contextualized examples of language usage from the web in a form tailored for linguistic analysis.

Searching a word or phrase using WebCorp is not in principle different from searching the web through an ordinary search engine, and the system’s user interface is in fact very similar to the interfaces provided by standard web search tools. (Fig. 3.1.) Strikingly different, however, is the format of the result page, which is presented to the user in the so-called Key-Word-In-Context (KWIC) format familiar to linguists, with the chosen word aligned and highlighted as «node word» within a context of between 1 and 50 words to the left and to the right. Neither the content of the web nor the search engine functions are modified, but only the output format, so that the result page of an ordinary search engine like Altavista or Google is transformed into a concordance table that can be immediately used to explore web data from a corpus linguistics perspective as in the table reported below:

<table>
<thead>
<tr>
<th>Tab. 3.1. A sample from Webcorp concordances for «landscape»</th>
</tr>
</thead>
<tbody>
<tr>
<td>ac.uk/ Sapling: architecture, planning information gateway Web sites are landscape. landscape. landscape. landscape. The voting system broke down appears to have little direct design. ENVI SB477 M6 K57</td>
</tr>
</tbody>
</table>

Such a result is achieved through the simple architecture represented in fig. 3.2.

As the graph clearly shows, the starting point is the WebCorp user interface, which receives the request for linguistic information. The linguist’s query is then converted into a format acceptable to the selected search engine, which finds the term through
Fig. 3.2. Diagram of current WebCorp architecture (Renouf et al. 2007).

its index and provides a URL for the relevant text. The system temporarily downloads the text, extracts the search term and the appropriate linguistic context, collates it, and presents it to the user in the desired format (Renouf 2003; Renouf et al. 2005).

WebCorp can thus be seen as doing no more than adding «a layer of refinement to standard web search» (Kehoe and Renouf 2002), by framing some of the advanced options of commercial search engines into a new linguist-friendly environment, pre-processing the user’s query before it is submitted to the search engine, and finally post-processing the results. The advantage of WebCorp lies therefore in the possibility it offers for a deeper linguistically-oriented exploitation of ordinary web search, which becomes particularly evident when turning to the system’s Advanced Search Option interface. (Fig. 3.3.)

While some of the system’s options clearly match the corresponding options offered by ordinary search engines (e.g. domain restriction, directory search), it is evident how WebCorp «makes it easier for linguists to formulate linguistically useful queries to search engines» (Lüdeling 2007: 16). Thanks to specific pre-processing functionalities the linguist’s requests are in fact translated into complex queries (e.g. the search for a pattern is translated into a query containing wildcards), while post-processing functionalities of specific interest to linguists (e.g. KWIC format, computation of collocates, exclusion of stopwords, case sensitiveness)
transform the results into data similar to data obtained through a concordancer from conventional off-line corpora.

It is certainly beyond the scope of the present work to go into further technical details and to survey all the options offered by WebCorp – information that can be easily obtained from the tool’s guide and in the growing body of research articles published in the past few years. By way of example, here is a short list of its most important features, based on recent publications describing the system (Renouf et al. 2005; Morley 2006; Renouf et al. 2007). Key features include:

– the possibility of preselecting a site domain as an indirect way to specify language variety;
– a choice of 4 newspaper site groups (UK broadsheet, UK tabloid, French news, US news), to allow specification of register;
– a choice of textual domain based on the Open Directory categorisation, to control language register and probable topic range;
– a selection of data-subset according to last date of modification;
– restriction of the number of instances of an item to one per site, to avoid domination and skewing of results by one author or source;
– concordance filtering, so that the user can control which concordance lines will be processed by removing irrelevant concordances or duplicates;
– sorting left and right co-text;
– keyword extraction;
– removal of non-linguistic content, such as URLs, isolated hyperlinks, e-mail addresses and other distracters;
– use of a word filter, to improve recall or precision in search results, by allowing or suppressing particular words occurring in the same text as the main search term.

Despite such an extensive range of functions, WebCorp is nonetheless also characterized by some limitations. While ordinary search engines are able to process millions of search string matches, WebCorp is limited to treating results from a limited number of pages for reasons of processing speed (Bergh 2005: 28). This means that the proportion of potentially relevant web texts that is actually searched can be too low, and that recall can accordingly be rather poor (Renouf et al. 2007: 57). Moreover the system lacks the degree of processing and storage performance which is required to meet the needs of its prospective users (Renouf et al. 2005), especially in the case of simultaneous use by more people, a condition which is to be considered a default for online tools. Finally, as a system subject to the technology of commercial search engines, WebCorp also suffers from typical limitations of web search such as ranking according to algorithms which the user cannot control; presence of duplicates in results, which need to be discarded manually; unreliable word count statistics; limited and/or inconsistent support for wildcard search.

Notwithstanding the above limitations, the WebCorp system has already proved an excellent tool to process web data for linguistic analysis, especially in the teaching context, where its user-friendliness and ease of access have made it a valuable resource from the start (Kübler 2004). Moreover, specific case studies concerning neologisms and coinages, rare or possibly obsolete terms and constructions, as well as phrasal variability and creativity, have also shown that in many cases the web can be a unique source of linguistic information which a tool like WebCorp can exploit to the full (Renouf et al. 2005; 2007).

By way of example an analysis of linguistic information obtained through classroom activities is reported below to demonstrate how using the web as a ready-made corpus through WebCorp can immediately improve students’ language awareness, and also provide the basis for further explorations.

3. WebCorp in the classroom: the case of English for tourism

In recent years increasing emphasis has been placed on corpus linguistics approaches to language teaching, especially with reference to translation and LSP discourse (Tognini Bonelli 2001; Bowker-Pearson 2002; Laviosa 2002; Zanettin et al. 2003; Sinclair 2004). Drawing on such seminal notions as «data-driven learning» and «discovery learning» (Johns 1991; Bernardini 2002), it can be argued that also using the web as a ready-made corpus through a simple tool like WebCorp can result in an extremely rewarding learning experience, which can be easily reproduced outside the classroom context.
The following pages report classroom activities carried out with undergraduate students of English for Tourism in the A.Y. 2004-5 at the University of Bari. Although largely dependent on the teaching context, the choice of language for tourism proved a good starting point for more than one reason. This variety seems indeed to be one of the fields of enquiry where the web can be profitably used as a corpus – or where, at least, its uses as a corpus can be easily tested. The tourism industry has actually been a leader in the field of e-commerce for several years (Werthner – Klein 1999), with figures constantly on the increase, so that many acts of communication and economic transactions take place over the Internet. This suggests that the language of tourism available on the web can be considered reasonably «representative» for this specific domain.

3.1. From «scenery» to «some of the most spectacular scenery»: exploring collocation and colligation

This case study starts from an investigation of the collocational profile of the word «scenery» in the context of tourism discourse. To help the students appreciate the specific kind of linguistic evidence offered by WebCorp in this case, the warming-up phase for the activity consisted in the analysis of information on the word «scenery» derived from dictionaries with which the students were already familiar, such as the *Oxford English Dictionary* and the *Collins Cobuild English Dictionary*. Students observed that dictionary definitions perfectly explain the meaning of the word but provide limited information in terms of usage, even though, as a corpus-based dictionary, the *Collins Cobuild* suggests some typical phraseology and common collocates. Then the students were introduced to some basic corpus linguistics principles, before being shown the collocates for «scenery» provided by the *Oxford Collocations Dictionary*.

After commenting on the list of collocates provided by the dictionary, students were invited to use WebCorp as an alternative or complementary source of linguistic information. Before turning specifically to the tool, however, they were given the opportunity to consider what general information could be retrieved from the web through ordinary search engines such as Google and Altavista. Even using advanced search options and by specifying not only language (English), but also provenance (UK) pages, and imposing co-occurrence with the words «travel OR tourism», results obtained from Google were not particularly encouraging, pointing instead to the shortcomings of the web as such for linguistic purposes:
to provide a basis of manageable size for further considerations on the linguistic behaviour of the word «scenery». The concordance table is only a mouse-click away from the original web page, since each node word is a hypertextual link to the page itself, and reports such useful information as URL, date and even a link to a word list for each page. This makes it very easy for students to check the original webpage for relevance and reliability, and to discard irrelevant/unreliable results. Finally, the concordances produced can easily be re-sorted according to left/right co-text by means of a special button at the end of the page, to provide evidence of different patterns (See Appendix 1).

Beyond mere concordancing, however, the most important property of WebCorp is the possibility of producing a collocational profile for the node word, which is reported immediately after the concordance table. In this case it is crystal-clear to students that in texts including the words «travel OR tourism», taken – for the sake of greater, although by no means absolute, reliability – only from .uk sites, the word «scenery» is often accompanied by such words as beautiful (23), spectacular (22), stunning (19), breathtaking (13), dramatic (10), magnificent (7), as the table below clearly shows:

Fig. 3.6. A sample from WebCorp output for «scenery».

As the reported sample shows, students were this time presented with results displayed in clear KWIC format. A number of interesting collocates can be identified at a glance (e.g. fabulous, superb, breathtaking...) while the number of matches (258) seem

Fig. 3.7. Webcorp table of collocates for the word «scenery».
These results were considered by students as immediately useful, in so far as they provided them with a wide range of adjectives typically used in the description of scenery which they could compare with data gained from introspection, and with the data from the Oxford Collocations Dictionary previously considered. As to the reliability of these results, it is even more striking to consider the similarity that these data obtained from the web in a few minutes through WebCorp bear with the results from the BNC for the collocates of «scenery» in the subcorpus of Miscellaneous writing:

Tab. 3.2. Collocates for scenery from the BNC and from WebCorp output

<table>
<thead>
<tr>
<th>BNC</th>
<th>WebCorp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjectives in the immediate co-text (+5/-5 words) of «scenery» in the sub-corpus Miscellaneous</td>
<td>Search for: «scenery» filter: travel OR tourism domain: uk excluding stopwords</td>
</tr>
<tr>
<td>Beautiful</td>
<td>Beautiful</td>
</tr>
<tr>
<td>Spectacular</td>
<td>Spectacular</td>
</tr>
<tr>
<td>Dramatic</td>
<td>Stunning</td>
</tr>
<tr>
<td>Breathtaking</td>
<td>Coastal</td>
</tr>
<tr>
<td>Magnificent</td>
<td>Breathtaking</td>
</tr>
<tr>
<td>Stunning</td>
<td>Dramatic</td>
</tr>
<tr>
<td>Coastal</td>
<td>Magnificent</td>
</tr>
</tbody>
</table>

This seems to suggest that however chaotic and anarchic, the web can provide, at least in specific situations, linguistic evidence which is comparable to evidence obtained from a conventional reference corpus. This finding could enhance confidence about the possibility of moving a further step towards the exploration of the different modifiers accompanying the word scenery. When for instance is «dramatic scenery» more suitable than «breathtaking scenery» or «stunning scenery»? How are these phrases used in the discourse of tourism? How can phraseology be further explored starting from such data?

Taking as an example «spectacular scenery», quite a common phrase in the language of tourist promotion, it is easy to see how much students could learn by simply exploring the concordance lines produced for this phrase (for which one would find only 20 occurrences in the BNC). With nearly 180 concordances out of 200 pages, WebCorp in fact provides in fact enough data for a rewarding exploration. Here is an overview of the kind of linguistic information retrieved for this phrase in classroom activities by the students:

1. verbs most frequently accompanying the phrase «spectacular scenery» are «boast» (8) and «enjoy» (10), pointing to phraseology of this kind:

   - as well as boasting of coastal walks, towns, beaches
   - and a rich historical heritage
   - and few places can compare
   - is now on offer
to

   - breathtaking views,
   - golden beaches, majestic
   - you can enjoy walking, climbing

2. a «spectacular scenery» is something you appreciate best by walking rather than by driving (walk* 12; driv* 4);

3. it relates both to the coastal areas (coast* 10, island 4, cliff 4, beach 15, sand 3, sea*4), and to mountain or countryside areas (rock* 3, mountain* 10, valley 4, lake 3, river 1, loch 3, park 4);

4. it has less to do with cities (0) than with towns (5) and villages (5)

5. it relates to a world of unspoilt natural life (wildlife 9, unspoilt 4, natur* 5)

6. it also comprises histor* (6) and heritage (5)

7. it evokes variety: varied (4), divers* (3)

This is obviously only a fraction of the insight into usage that a detailed analysis of web concordances for «spectacular scenery» yields. Information of this kind could be complemented with exploration of the colligational profile of this phrase, obtained again with the help of the WebCorp system. By including function words (or «stopwords») in the count of collocates, for instance, the students could get a quite clear picture of what happens in the immediate co-text of our phrase in terms of colligation:
In this specific case, exploring colligation proved to be of crucial importance. Unlike collocation, which students quite easily understand and whose immediate utility they readily acknowledge, colligation seemed at first a less appealing concept to them. As however it turned out, the table quickly produced using Web-Corp could really help the students see to what extent lexis and grammar constitute a unified whole, so that words and grammatical structures tend to co-select each other, and this indirectly contributed to their language competence in more general terms.

3.2. «Dramatic landscapes» and «paesaggi suggestivi»: from collocation to semantic preference and beyond

In this second example the starting point for the classroom activity was the comparison between the phrase «dramatic landscapes», a recurring phrase in English for tourism which is not always confidently used by learners, and the Italian phrase «paesaggi suggestivi». Both phrases are widely used, but none seems to have a direct equivalent in the other language, since neither «dramatic landscapes» nor «suggestive landscapes» as an equivalent for «paesaggi suggestivi» would sound as fluent to a native speaker. On intuitive grounds, however, the hypothesis was put forward that the two phrases could be used in similar contexts. It was therefore one of the aims of the comparison to see if, and to what extent, «dramatic landscapes» and «paesaggi suggestivi» could be considered as functionally equivalent.

As far as «dramatic landscapes» (for which one finds only 3 occurrences in the BNC) is concerned, the list of collocates produced by WebCorp seems to point to a marked preference for co-occurrence with words relating to historical and cultural heritage, such as «history», «architecture», «past», «ancient».

Here is an overview of further linguistic information retrieved by students for this phrase exploring all the concordance lines produced by the system:

- the phrase «dramatic landscapes» is related both to nature (nature 7, coast* 6, beach 5, mountain 9), and to culture and history (history 10, culture 8, architectur* 6, heritage 5)
tratturi che consentono di ammirare paesaggi suggestivi senza causerne inquinamento atmosferico ed e concede tranquille passeggiate. Vicino come il lago di Bolsena e incontaminati, di gustare invitanti

Europa, che permette di ammirare appuntamenti che consentiranno di apprezzare paesaggi suggestivi

On the basis of their analysis the students concluded that certain similarities, especially concerning semantic preference (e.g. a tendency to co-occur with words relating to tradition, history and heritage), could support a relation of equivalence between the two phrases. Nonetheless the two items still displayed languagespecific phraseology which suggest only partial coincidence. More specifically, the students noticed, «paesaggi suggestivi» seems to cover a wider spectrum, including features more typically associated with the phrase «spectacular scenery» or «breath-taking scenery». The task thus triggered further questions in the students, who decided to compare/contrast the Italian «paesaggi suggestivi» with such English phrases as «spectacular scenery/landscapes», «breath-taking scenery/landscapes», «dramatic scenery/landscapes», via further WebCorp searches.

In more general terms, it could be pointed out that apart from the learning outcomes outlined above, most students acknowledged the benefits of direct exposure to a large number of instances of authentic language use in a relatively short time, and in a learning context which could be easily replicated at home. This had indirectly resulted, in their opinion, in a feeling of greater familiarity with some aspects of this specific language variety. Moreover, as the students again acknowledged, the feeling of having taken part in the process of retrieving data from the web, rather
than being simply presented with off-line concordances, had significantly contributed to their involvement in the learning process, and accordingly, to its actual results.

3.3. Not only scenery: the experience of tourists with disabilities

As seen in the examples reported so far, WebCorp definitely represents a step forward in the attempt of exploiting the web’s potential for linguistic ends, in so far as it is capable of transforming web data into an object amenable to analysis informed by the corpus linguistics approach. In many cases the results provided are however not only immediately useful but also, as has been argued, «thought-provoking» (Bergh 2005: 38). This was the case of the evidence provided by the concordance lines and collocational profile produced to prompt classroom discussion on the specific question of accessible tourism².

The starting point was WebCorp’s collocational profile for the phrase «disabled tourists», as a specific group of people within the more general category of «disabled people»:

![Top external collocates of “disabled tourists”](image)

In this case, students could appreciate how the collocational profile provides evidence which is not only linguistically relevant but also indicative in more general terms of all that is crucial to the holiday experience of the disabled. A key word in this respect is obviously «needs», which actually ranks first in the list of collocates. Other words which significantly occur very often in the immediate co-text of the phrase are «access/accessible», undeniably a key concept in the discourse of mobility for people with disabilities; and then «facilities»; «difficulties»; «service/services», «special» and «group», all words which triggered students’ reflections concerning the actual experience of the people involved. Interestingly, the second most frequent word immediately following «needs» is «information». It is indeed quite often the case that a specific need for people with disabilities in general, and for travellers/tourists with disabilities in particular, is obtaining precise information concerning facilities, options and services available in their holiday destination. Also significantly frequent in the immediate co-text of the phrase is the word «improving», which seems to point to a reality of work-in-progress in the field of accessible tourism.

As to the data revealed by a more detailed exploration of the concordance lines, it is also worth mentioning the recurring relation established between disabled tourists and other categories of citizens (elderly, older, senior unemployed, pensioners, working mothers, small children). As shown by the language data these are all people that share in some way or other the «special needs» of disabled tourists:

- accessible for the older and
  economic impact of senior and
disabled toursits
disabled tourists

to give you a better
and

- wanting to get the most
disabled tourists
disabled tourists
disabled tourists

to give you a better
disabled tourists
disabled tourists
disabled tourists

- even that information was
disabled tourists
disabled tourists
disabled tourists

As to the colligational profile students noticed the occurrence of prepositional phrases introduced by «for» in patterns such as «access/information/service for disabled tourists», which represents «disabled tourists» mainly as beneficiaries/recipients rather than actors. Also frequent was the occurrence of prepositional phrases introduced by «of», almost invariably in phrases such as «the needs of disabled tourists».
Finally the data offered by the concordances also allowed some considerations about semantic prosody, closely related to an "unsatisfactory situation". This was made evident by a number of phrases containing negatives, such as:

| Unfriendly and discriminating against | disabled tourists |
| offered less than nothing for         | disabled tourists |
| serious lack of information for       | disabled tourists |
| was still largely inaccessible to     | disabled tourists |
| It is unavailable to the              | disabled tourists |

In other cases, reference was simply to a situation of improve-ments and/or work-in-progress:

| Scotland «can do more» for            | disabled tourists |
| constantly improving its facilities   | disabled tourists |
| project to improve access for         | disabled tourists |
| aim to improve facilities for         | disabled tourists |
| strides in improving access for       | disabled tourists |

Having analysed the data for «disabled tourists», students were invited to consider the alternative «tourists with disabilities», a phrase which, on the basis of corresponding «people with disabilities», has a wide currency in the discourse of accessible tourism. By examining the collocational profile of the corresponding phrase «tourists with disabilities», they noticed that apart from words such as accommodation, access, attract, inform provide, co-occurring with comparable frequency, in the immediate co-text of both «disabled tourists» and «tourists with disabilities», the most interesting differences in the collocational profile seemed to be related to the absence of other categories such as senior citizens, families, elderly people, and to an increased frequency of terms relating to the provision of services/holidays for these travellers, no longer seen as members of a wider category sharing similar problems, but rather as specific customers, i.e. stakeholders in a specific economic activity:

Tourism that aims to attract tourists with disabilities from the major world markets serve the market segment of tourists with disabilities. They operate basically in Cusco for the niche market of tourists with disabilities, but his broadened market allowed

Thus, rather than providing the students only with answers, the activity had again triggered more questions. Why this difference in the collocational profile of apparently equivalent terms? What about issues of politically correct language in this field? Or, more specifically, when do people refer to «tourist with disabilities» and when is «disabled tourists» to be preferred? in which context? under which pragmatic constraints? These questions prompted further research by the students who, taking advantage of all the options provided by the system, went on refining their queries in an endless discovery journey.

Conclusion

The examples reported show that linguistic data obtained from WebCorp are tailored enough to meet specific needs on the linguist’s part, thus confirming the hypothesis that web data can be a very useful resource for linguistic analysis. As a tool which requires no specific computer skills, which is extremely flexible and relatively quick in providing results, WebCorp proves particularly good in promoting classroom discussion on specific lexical items and in providing the starting point for data-driven and discovery learning activities. Although not exhaustive, the information obtained from web data in the context of the suggested classroom activities, does seem indeed to provide evidence that using WebCorp to produce quick ad hoc concordance lines can really contribute to students’ awareness of specific language issues, and constitute the basis for a rewarding learning experience which they can easily repeat on their own.

In other respects, however, WebCorp remains a rather limited tool, which does no more than allow better exploitation of commercial search engines without removing their intrinsic short-comings. It is precisely out of awareness of such limitations and «with an eye to the long-term sustainability of the WebCorp sys-
Chapter IV

Bootcat: Building Corpora from the Web

Introduction

The present chapter introduces one of the most interesting tools devised in the attempt at making the web more useful as a corpus linguistics resource. Created as a suite of Perl programs freely available for download and further developed as a web service, BootCaT is a system capable of «bootstrapping», i.e. creating virtually ex-nihilo, specialized corpora and term lists from the web in a few minutes (Baroni and Bernardini 2004; Baroni et al. 2006). Section 1 introduces the tool as the natural development of the widespread practice of building Do-It-Yourself, «quick-and-dirty», disposable corpora (Zanettin et al.: 58), that the Research and Development Unit of English Studies team at the University of Birmingham has been working in the past few years on the ambitious project of designing and assembling an independent linguistically-tailored search engine. Progress on this project can be followed at the following address: www.webcorp.org.uk/webcorp_linguistic_search_engine.html

Note

1 Other renowned pre-/post-processing systems are KWICFinder and WebKwic (Fletcher 2001) and the Linguist’s Search Engine (Elkiss and Resnik 2004).

2 The link «Publications» in WebCorp website is regularly updated with new publications.

3 These results were obtained by accessing BNC through BYU-BNC interface (http://corpus.byu.edu/bnc). See Appendix 2 for a complete list of BNC results for this search.

4 See Appendix 1 for the complete output produced by WebCorp.

5 «Accessible tourism» refers here to the specific market segment in the tourism industry addressing the tourism needs of people with disabilities.
1. BootCaT: the web as corpus «shop»

While uses of the web as a corpus «surrogate» (Baroni and Bernardini 2006: 10) through a pre/post-processing tool like WebCorp undoubtedly represent a step forward in terms of exploitation of the web’s potential from a corpus linguistics perspective, the system still displays some limitations typical of tools which mainly work on the output format of ordinary search engines and virtually download a temporary corpus for each searched item. It is therefore self-evident that using a tool like WebCorp to assist a language professional in a specific task requiring constant reference to one or more corpora becomes frustrating maybe when the task at hand requires repeated searches for several items.

A remarkable achievement in the attempt at making the web more useful as a corpus linguistics resource is BootCaT, which keeps the advantages of speed, size and topicality typical of the web while limiting some of its shortcomings. As its name promises, allying to a well-known metaphor in the language of information technology1, BootCaT is a suite of programs capable of creating virtually ex-nihilo specialized corpora and term lists from the web in a very short time. In its underlying «philosophy», the tool can be seen as the natural development of the widespread practice of building Do-It-Yourself, «quick-and-dirty» disposable corpora (Zanettin 2002; Varantola 2003), i.e. corpora created ad hoc from the web for a specific purpose, such as assisting a language professional in some translation task or in the compilation of a terminological database. As the creators of BootCaT have observed, such short-life corpora have indeed become basic resources for language professionals who routinely work with specialized languages (Baroni and Bernardini 2004). It is in fact often very difficult to find ready-made resources for highly specialized domains, and the very rate at which specific language domains grow, with new terms introduced virtually on a daily basis, seem to make standard reference corpora useless tools for tasks which must definitely rely on more focused and up-to-date text collections. On the other hand, the compilation of a web-based corpus through manual queries and downloads is notoriously an extremely time-consuming process and time investment of this kind, Baroni and Bernardini (2004) argue, is «particularly unjustified when the corpus which is the final result of such effort is meant to be a single-use corpus», as is often the case with corpora created for a specific translation task, and not for a wider research project.

When creating a corpus from the web for a specific task, linguists generally query an ordinary search engine for a combination of search terms which are deemed relevant to the task at hand. In this case they take advantage of the options offered by the engine to focus the query, such as language or domain specification, selection of URLs, Boolean search, etc. (Pearson 2000; Zanettin 2002), and download the texts to create a small highly focused corpus to be explored with a concordancer. With BootCaT, rather than having the linguist manually querying the web, choosing relevant results to be included in the corpus, and finally performing the necessary format changes and archiving procedures, the whole process is automated by means of a suite of tools performing all these tasks together in a few minutes. It could be said, therefore, that the system has a bias towards customization, in the sense that it is primarily conceived as a tool helping language professionals build the corpus they need, whenever they need and as quickly as possible. It is this intrinsic feature that has perhaps suggested categorization of BootCaT under the label «web as corpus shop» (Baroni and Bernardini 2006: 11) by its creators. Certainly this is a very interesting feature from the point of view of its contribution to the changing face of corpus linguistics: by making the creation of ad hoc temporary corpora an easily achievable goal, BootCaT brings the reality of the web as a sort of virtual multilingual multipurpose corpus on demand a bit closer.

2. WebBootCat and Medical English: the ORAL CANCER corpus

Created by Baroni and Bernardini, BootCaT was born as a suite of Perl programs freely available for download at the Scuola Superiore di Lingue Moderne per Interpreti e Traduttori, University of Bologna website (http://ssmit.unibo.it/~baroni/bootcat.html). Despite extensive use for corpus creation, research on terminology and to assist translation tasks (Baroni and Bernardini 2004; Baroni and Ueyama. 2004; Sharoff 2006; Castagnoli 2006; Fantinuoli
In the present case study the compilation of a corpus on «oral squamous cell cancer» started from the four terms «oral», «squamous», «cell», and «cancer», which were used as seeds assuming that each term could to some extent be considered as a keyword for this specific domain:

The words chosen to start the process are called «seeds» (Baroni and Bernardini 2004) and are transformed by the system into a set of automated queries submitted to an ordinary search engine. The search engine then retrieves and downloads relevant pages, post-processes them, and finally produces a corpus from which a new word list is extracted containing new terms to be used as seeds to build a larger corpus, and so forth.

As the user interface of WebBootCaT shows, all the linguist has to do is to key in the chosen seed terms, which are then randomly combined by the system and turned into Google query strings. The system automatically downloads as text (i.e. in .txt format) the top pages returned for each query (ten by default), to make up the first nucleus of the corpus. From this nucleus, a wordlist is created and a list of keyword terms is extracted, by comparing the frequency of occurrence of each word in the list with its frequency of occurrence in a reference corpus. The keywords extracted are then turned into new seeds to be used in random combinations to build a larger corpus via more automated queries. This recursive procedure can be repeated several times, i.e. until the corpus reaches the desired size, though, as the system’s creators suggest, two or three times is generally enough (Baroni and Bernardini 2004).
A key feature of BootCaT is that, although mainly automated, the process of corpus creation and term list extraction is clearly divided into different phases, allowing the user to interact with the system throughout the process. At each phase the user can in fact control several important parameters, such as the number of queries issued for each iteration, the number of seeds used in a single query, the number of pages to be retrieved. It is also possible to pre-view web pages that are going to be included in the corpus, and so exclude undesired pages before they are further processed. The latter is a particularly important option because it can really contribute to enhancing the relevance/reliability of the pages which finally make up the corpus. As the sample reported below shows, in the case of our ORAL CANCER corpus many of the pages selected in the first run came from .org or .gov sites, with some .com sites leading to web pages devoted to health information, and from portals dedicated to specialized journals such as PubMed (www.ncbi.nlm.nih.gov). These pages were considered as fairly reliable/relevant, while other pages required further inspection:

In the case of dubious or suspect pages, checking for relevance/reliability is quite easy because the original page is only one mouse-click away, so the user can have a quick look at it before deciding whether it should be included or excluded from the corpus. This was the case, for instance, with a number of results from the site http://cat.inist.fr which appeared at first non-convincing since their relevance to the topic and reliability in terms of language usage could not be easily guessed from the website address alone. By simply clicking on the link, however, it turned out that the address was that of a French portal for scientific information (Institut de l’Information Scientifique et Technique) leading to a specific journal article, which was both reliable and relevant, as the following example clearly reveals:
the pre/post-processing work «going on behind the scenes». It is perhaps useful, though, to consider at least the following key features (Baroni et al. 2006):

– the system uses the seeds to send a number of queries (ten by default) to Google, each containing a randomly selected triple of the seed terms;
– each query returns up to 100 hits, the top ten of which are taken by the system;
– the system also filters out very short (less than 5 kB) and very long (over 2MB) web pages on the assumption that these rarely contain useful samples of language;
– duplicate and near-duplicate web pages are deleted, while the remaining pages are further processed to filter out the so called boiler-plate (HTML markup, javascript, navigation bars, etc.).

The decisive importance of the post-processing performed by the system can hardly be overemphasized, and will be readily acknowledged by anyone who has attempted to use the web as a corpus either through ordinary search engines or through a simpler tool like WebCorp. By filtering out duplicates and near duplicates and by excluding pages which, on the basis of size alone, can be assumed to contain little genuine text (Fletcher 2004b), the system does perhaps more, if not better, than the linguist manually can do, and all this in a shorter time. The result is a clean enough text collection which comes to the user in a few minutes as a basis for the iterative process:

The table above reports information relating to the first run. The corpus compiled by the system can be downloaded or directly accessed through the Sketch Engine website. Clearly visible is the «Extract keywords» option: by clicking on the link the user is provided with a set of key terms that can be turned into new seeds, if considered appropriate. Here is a sample of single-word key terms extracted by the system from the provisional 78.000 tokens ORAL CANCER corpus after the first run:

![Fig. 4.5. A sample from the list of single-word terms from the provisional 78.000 token ORAL CANCER corpus.](image)

As the sample clearly shows, there are almost no terms which seem to be irrelevant or that could seriously impair the value of results in the following phases. On the contrary, most terms seem to be definitely relevant and suitable as new seed terms. Some were nonetheless deselected before running the process a second time, such as Roman numerals referring to stages of the disease, and the name of a specific portal for life sciences and biomedical bibliographic information.

With nearly one hundred new seeds, the system was ready to run again and produce a second corpus of 238,000 tokens, obtained in 4 minutes. This in turn provided interesting new key terms:
As the sample reported shows, key terms that were considered irrelevant or that could falsify the results were again deselected before running the process for the third time. This was the case, for instance, of such words as «study» or «abstract». While confirming that the corpus included a fair number of relevant texts such as scientific/academic articles, these terms were crossed out as no longer necessary to boost reliability/relevance in the following phases.

Besides extracting single-word terms, BootCaT is also designed for extracting multi-word terms. For the system’s purposes multi-word terms are specifically defined by Baroni and Bernardini (2004) as sequences of words that:

– contain at least one of the terms extracted in the first phase;
– do not contain stop words; may contain connectors, (such as of, of the, and... but never at the edges nor adjacent to each other; have frequency above a certain threshold (dependent on length);
– cannot be part of longer multi-word terms or contain shorter multi-word terms having similar frequency.

Here is a sample of the list of multi-word terms retrieved by the system in its second run:

The multi-word terms extracted appear not only relevant to the domain but also mostly well-formed, thus providing further evidence of the system’s reliability. The list includes specific two- or three-word terms such as «bone marrow», «skin cancer», «breast cancer», «cell lines», «blood cells» and «sentinel lymph node» as well as easily recognizable collocations such as «risk factors» and clusters that point to distinct phraseology (as in the case of «cancer has spread» or «cancer is found»).

As in the previous phase, some terms were excluded before running the process again, for the third time, such as «et al.», another clue of the presence of texts belonging to the specific genre of the scientific article, «cancer Cancer» (an ill formed compound), «stage II» (which could result in unnecessary focus on one specific stage of the disease) and «Medical Rantal» (the name of a blog). All the single- and the multi-word terms selected by the user were then turned into new automated Google queries in order to complete the process.

Using the procedure described, a corpus of 444,231 tokens was built following a cyclical process, in three phases, taking less than 10 minutes in all. This was considered a large enough corpus.
2.2. The ORAL CANCER corpus and translation practice

Having explored the process of corpus compilation using Web-BootCaT, we can now see to what extent the data obtained contribute to the solution of specific translation problems. To this end, the corpus was downloaded in .txt format for analysis offline with the Wordsmith Tools (Scott anno). It should be reminded however, that the corpus could have been also explored online using the Sketch Engine, the corpus query tool installed on the SketchEngine website, which currently hosts WebBootCaT.

The importance of using corpora for translation hardly needs to be explained, and virtually any aspect of translation theory and practice can benefit from the use corpora. More specifically, as far as specialized translation is concerned, corpora can be extremely useful for checking terms and collocations and identifying text-type specific forms (Ohlan 2004: 172). It is with reference to such tasks that our corpus was tested in the present work.

The basis for the case study was the translation of an International Ph.D. thesis in Clinical Dentistry. Here is a sample passage from the Italian text:

Il carcinoma squamoso (SSC) presenta una tendenza all’infiltrazione loco-regionale con l’interruzione della membrana basale e l’invasione del tessuto stromale sottostante fino al raggiungimento delle reti linfatiche ed ematiche.

In the excerpt reported above, some multi-word terms such as «infiltrazione loco-regionale», «membrana basale», «tessuto stromale» e «reti linfatiche ed ematiche», seemed at first to pose translation problems which could not be solved only on the basis of information provided by medical bilingual dictionaries, or by the many glossaries available on the Internet. A solution was therefore sought for in our ORAL CANCER corpus.

The first problem which reference to the corpus helped solve rather quickly was related to the term «membrana basale». The Italian adjective «basale» is generally translated as «basal» in English (Garzanti 1987; Multilingual Glossary of technical and popular medical term, online). The bilingual dictionary also reports the term «basilemma» for the compound «membrana basale». This suggests that the
only translation candidates for the term «membrana basale» are «basal membrane» and «basilemma». However, no instance of «basilemma» was found in our ORAL CANCER corpus and, out of the 146 occurrences for the word «basal», no instance was found for «basal membrane», «basal» being mainly used as a modifier for the word «cell», especially in «basal cell carcinoma» (see Appendix 3). By looking instead at concordances for «membrane», our corpus suggested «basement membrane» as a plausible equivalent for «membrana basale», including the phrases «infiltrate/invade/breaking through/spread through the basement membrane», which could all be considered as suitable equivalents for the Italian «con l’interruzione della membrana basale»:

![Fig. 4.10. A sample of concordances for «membrane» (L1-L2).](image)

The very fact that such a large number of occurrences come from a corpus meant to be domain-specific suggests that we are faced in this case with specific terminology in the context of a specific topic. As to further evidence of attestation of usage, it was very useful to double-check the bilingual dictionary, which actually reported «basement membrane» in the English into Italian section, suggesting «membrane basale» as its Italian equivalent. It could be argued therefore that useful information was already there in traditional resources, but the translator could retrieve it only via further research through a corpus.

Reference to the corpus was also helpful in the search for translation equivalent for «tessuto stromale» and «reti linfatiche ed ematiche», which resulted in translation with «stromal cells» and «lymphatic and blood vessels», rather than «stromal tissue» «lymphatic and blood networks» on the basis of corpus evidence.

Less straightforward was finding a solution for the problems posed by «infiltrazione loco-regionale». The only instance of loco-regional found in our corpus was in fact not enough to support «loco-regional infiltration» as a translation candidate for «infiltrazione loco-regionale», nor was significant evidence for a different wording provided by the concordance lines for «infiltration».

Analysis of the immediate right co-text of both «regional» and «local», however, highlighted the presence of words which could be considered as synonyms of infiltration (such as «invasion», «spread» and «metastasis»). The concordance of «local» in particular seemed to suggest «local spread» and «local invasion» as suitable translation candidates.

The English ORAL CANCER corpus was also used as a resource to improve the target text in more general terms. In the opening sentence of the quoted paragraph, for instance, the Italian «presenta una tendenza» is a typical example of phraseology which might lead the translator into the trap set up by false-friends. The word «presenta» displays in fact patterns of usage, in our ORAL CANCER corpus, which only partially coincide with the Italian «presenta».

![Fig. 4.11.](image)
A solution was found therefore by exploring the left co-text of the word «tendency». In this case evidence from the corpus suggests «has» as a good translation equivalent for «presenta».

Thus, on the basis of information obtained from our ORAL CANCER corpus, a first draft translation was revised into a more fluent and accurate target text:

Source Text:
Il carcinoma squamoso (SSC) presenta una tendenza all’infiltrazione loco-regionale con l’interruzione della membrana basale e l’invasione del tessuto stromale sottostante fino al raggiungimento delle reti linfatiche ed ematiche.

Target Text 1 (draft)
Squamous cell cancer (SSC) presents a tendency to loco-regional infiltration with the interruption of the basal membrane and invasion of the underlying stromal tissue, until reaching the lymphatic and blood networks.

Target Text 2 (revised)
Squamous cell cancer (SSC) has a tendency for local spread, breaking through the basement membrane and invading the underlying stromal cells, thus reaching the lymphatic and blood vessels.

Referring to the corpus was also extremely useful to find equivalents for specific terms pertaining to methods discussed in the Ph.D under translation. The phrase «colorazione con immunoistochemica», for instance, occurring 7 times in the source text, could be considered as highly specific terminology for which an equivalent could not be found in common references such as dictionaries and glossaries. As a term not necessary relating to the domain of «oral cancer», finding an English equivalent for it on the basis of evidence provided by our ORAL CANCER corpus could not be taken for granted.

Elsewhere in the source text, the translator was faced with the need to solve problems related to genre specific phraseology. This is the case for instance of the sentence beginning with «Da una attenta disamina della letteratura emerge...». Using the ORAL CANCER corpus as a resource, a first draft literal and clumsy translation with «'From an attentive review of the literature...» was in fact replaced with the plainer «Review of the literature indicates...», thus resulting in a more fluent target text.

With no pretence at exhaustiveness, the examples reported seem to suggest that our ORAL CANCER corpus proved more than useful, both as a source of evidence of attested usage to test translation candidates and to elicit solutions to translation problems. It goes without saying, however, that what these examples aim to prove is not the usefulness of corpus data for the solution of translation problems in general, which – as already suggested – hardly needs to be demonstrated; they rather aim to test the «performance» of a corpus quickly and easily obtained through the automated process described in the first part of this chapter, whose real usefulness for a specific translation task could not be taken a priori for granted.

3. Comparing corpora: «diagnos»* in English and Italian

To further assess the value of the corpora compiled using Web-BootCat, a second comparable corpus on «oral squamous cell cancer», this time composed of Italian texts, was created following the
same criteria as those followed for the English ORAL CANCER corpus. The two corpora were then used to explore phraseology in the two languages. The basic idea was that the two data sets obtained could provide a good basis for the creation of a glossary to be used throughout a translation task similar to the one referred to in the previous paragraph, without requiring a prohibitive investment in time.

The Italian CANCRO ORALE corpus is a 260,460 token corpus obtained using the words «cancro», «orale», «cellule» e «squamosa» as seed terms. It was compiled in four phases, going through the same steps described for the creation of the English corpus, including single-word and multi-word terms extraction. In the process, many similarities between the two corpora emerged, especially concerning key terms. If we compare, for instance, the list of key terms automatically extracted by the system in the second run of the process for the compilation of the English ORAL CANCER corpus (see fig. 4.9, p. 112) and the list of key terms extracted in the second run of the process for the compilation of the Italian corpus, similarities seem to be self-evident:

![Fig. 4.14.](image)

The similarities were confirmed at the end of the process when wordlists obtained from the two corpora using the Wordsmith Tools were compared. By way of example here are the first 45 content words in each list (numbers to left and right refer to the position in the frequency list and to the number of occurrences respectively):

<table>
<thead>
<tr>
<th>English</th>
<th>Italian</th>
</tr>
</thead>
<tbody>
<tr>
<td>cancer 4605</td>
<td>tumore 1014</td>
</tr>
<tr>
<td>may 1833</td>
<td>cellule 986</td>
</tr>
<tr>
<td>oral 1795</td>
<td>può 799</td>
</tr>
<tr>
<td>radiation 1746</td>
<td>trattamento 720</td>
</tr>
<tr>
<td>cell 1642</td>
<td>pazienti 684</td>
</tr>
<tr>
<td>treatment 1528</td>
<td>rischio 588</td>
</tr>
<tr>
<td>patients 1379</td>
<td>tumori 537</td>
</tr>
<tr>
<td>cells 1346</td>
<td>malattia 531</td>
</tr>
<tr>
<td>therapy 1289</td>
<td>cancro 512</td>
</tr>
<tr>
<td>lung 1247</td>
<td>terapia 505</td>
</tr>
<tr>
<td>carcinoma 1211</td>
<td>anni 483</td>
</tr>
<tr>
<td>can 1155</td>
<td>orale 472</td>
</tr>
<tr>
<td>surgery 705</td>
<td>casi 464</td>
</tr>
<tr>
<td>cancers 684</td>
<td>radioterapia 327</td>
</tr>
<tr>
<td>head 682</td>
<td>dolore 314</td>
</tr>
<tr>
<td>used 681</td>
<td>chirurgia 309</td>
</tr>
<tr>
<td>disease 464</td>
<td>tessuto 309</td>
</tr>
<tr>
<td>tumors 637</td>
<td>farmaci 304</td>
</tr>
<tr>
<td>lymph 539</td>
<td>tipo 302</td>
</tr>
<tr>
<td>use 539</td>
<td>caso 295</td>
</tr>
<tr>
<td>mouth 531</td>
<td>medico 292</td>
</tr>
<tr>
<td>blood 505</td>
<td>due 290</td>
</tr>
<tr>
<td>survival 497</td>
<td>prima 275</td>
</tr>
<tr>
<td>chemotherapy 494</td>
<td>lesioni 274</td>
</tr>
<tr>
<td>information 472</td>
<td>sintomi 270</td>
</tr>
<tr>
<td>body 458</td>
<td>fattori 256</td>
</tr>
<tr>
<td>clinical 452</td>
<td>linfonodi 247</td>
</tr>
<tr>
<td>should 446</td>
<td>possibile 242</td>
</tr>
<tr>
<td>nodes 441</td>
<td>collo 239</td>
</tr>
<tr>
<td>tobacco 422</td>
<td>modo 231</td>
</tr>
<tr>
<td>patient 417</td>
<td>cavo 230</td>
</tr>
<tr>
<td>called 415</td>
<td>grado 225</td>
</tr>
<tr>
<td>small 391</td>
<td>effetti 220</td>
</tr>
<tr>
<td>stage 390</td>
<td>tempo 220</td>
</tr>
<tr>
<td>type 389</td>
<td>chemioterapia 219</td>
</tr>
<tr>
<td>lesions 377</td>
<td>donne 205</td>
</tr>
<tr>
<td>tissue 370</td>
<td>sopravvivenza 203</td>
</tr>
<tr>
<td>common 365</td>
<td>test 202</td>
</tr>
</tbody>
</table>
As anybody with a knowledge of the two languages can immediately appreciate, most words in one list have their equivalent in the other list (e.g.: cancer/cancro; may/può-possono; oral/orale; treatment/trattamento; surgery/chirurgia and so on). Closer inspection of the complete word lists in both languages reveals that they are fairly consistent with each other, even though equivalent words occupy different positions in the two lists, depending on their relative frequency, and assuming that equivalence needs to be postulated also between words with different grammar functions; e.g. lung = polmone (noun)/polmonare (adjective); cell=cellula (noun)/cellulare (adjective), and so on (see Appendix 4 for a longer sample of the two word lists). Comparing the two wordlists seems to suggest, therefore, that the two corpora could well provide a basis for the creation of a specific glossary and/or phraseological dictionary. It is of course not the purpose of the present study to discuss methods for glossary creation and term extraction based on corpora, which are discussed elsewhere in detail (e.g. Pearson and Bowker 2002), and have been dealt with also with specific reference to the use of BootCaT (Castagnoli 2006; Fantinuoli 2006). By way of example, however, the following pages report information retrieved from the English and Italian corpora for DIAGNOS*, to illustrate the kind of linguistic information that can be derived from the two data sets.

3.1. DIAGNOS* in the English ORAL CANCER corpus

A search for DIAGNOS* in the English ORAL CANCER corpus yields in the first place evidence of a number of different realizations:
- diagnosis (290)
- diagnosed (126)
- diagnostic (47)
- diagnose (27)
- diagnoses (12)

By way of example, here is some insights into usage of the two most frequent forms «diagnosis» and «diagnosed», as suggested from an analysis of concordance lines. It goes without saying, again, that it is not the purpose of this work to provide an exhaustive analysis of the data reported but rather to show how consistent they are.

3.1.1. DIAGNOSING

In the ORAL CANCER corpus, the noun «diagnosis»:
- is often premodified by such words as definitive/delayed/differential/definitive (L1):

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>effects 342</td>
</tr>
<tr>
<td>112</td>
<td>smoking 341</td>
</tr>
<tr>
<td>113</td>
<td>include 327</td>
</tr>
<tr>
<td>114</td>
<td>health 326</td>
</tr>
<tr>
<td>115</td>
<td>medical 326</td>
</tr>
<tr>
<td>117</td>
<td>node 323</td>
</tr>
<tr>
<td>118</td>
<td>cavity 322</td>
</tr>
<tr>
<td>120</td>
<td>node 323</td>
</tr>
<tr>
<td>121</td>
<td>effects 342</td>
</tr>
<tr>
<td>122</td>
<td>tumorali 199</td>
</tr>
<tr>
<td>124</td>
<td>meno 192</td>
</tr>
<tr>
<td>125</td>
<td>mammella 190</td>
</tr>
<tr>
<td>127</td>
<td>forma 186</td>
</tr>
<tr>
<td>128</td>
<td>tessuti 186</td>
</tr>
<tr>
<td>129</td>
<td>numero 184</td>
</tr>
<tr>
<td>130</td>
<td>secondo 184</td>
</tr>
</tbody>
</table>

- has a tendency to co-occur with time references (years, weeks, time), especially in L2 position;
- is often accompanied by such verbs as «confirm» and «establish»;
in the first pattern and to the disease (tumour, cancer, cases...) in the second pattern:

- N (BE) diagnosed with:

As the body's immune system is to be diagnosed with, and one almost like a resident of California and was diagnosed with melomals call th

in the second pattern:

- N (BE) diagnosed in:

I and my dad and mom were diagnosed in 2003. What causes h

3.1.2. DIAGNOSE In our corpus, the verb, «diagnose» appears a

where N is a noun referring to human beings (patients, people...)

in the past participle (see Appendix X for the complete concordance table), and often occurs in the pat-

3.1.2. DIAGNOSE In our corpus, the verb, «diagnose» appears a

as almost invariably used in the past participle (see Appendix X for the complete concordance table), and often occurs in the pat-

in the first pattern and to the disease (tumour, cancer, cases...) in the second pattern:

- N (BE) diagnosed with:

As the body's immune system is to be diagnosed with, and one almost like a resident of California and was diagnosed with melomals call th

in the second pattern:

- N (BE) diagnosed in:

I and my dad and mom were diagnosed in 2003. What causes h

3.1.2. DIAGNOSE In our corpus, the verb, «diagnose» appears a

as almost invariably used in the past participle (see Appendix X for the complete concordance table), and often occurs in the pat-

3.1.2. DIAGNOSE In our corpus, the verb, «diagnose» appears a
The base form of the verb is mainly used, instead, in the infinitive form «to diagnose», in such phrases as «BE used to diagnose» or «failure to diagnose»:

In the left co-text (L2-L1), one notices a fair number of occurrences for the patterns «della diagnosi», «nella diagnosi», «alla diagnosi», «dalla diagnosi» e «per la diagnosi».

The base form of the verb is mainly used, instead, in the infinitive form «to diagnose», in such phrases as «BE used to diagnose» or «failure to diagnose»:

Fig. 4.22.

3.2. DIAGNOSI in the Italian CANCRO ORALE corpus

Occurrences of «diagnos*» from the Italian CANCRO ORALE corpus provide evidence, again, of several different forms:

Diagnosi (382)

Diagnostico /Diagnostici/ Diagnostiche (89)

Diagnosticato / Diagnosticata/ Diagnosticati/Diagnosticate (50)

Diagnosticare (23)

Diagnostica (40)

On the basis of frequency data, it seems that the most frequent form is the noun «diagnosi», which is comparatively more frequent in the Italian corpus than in the English one. Bearing in mind that the Italian corpus is smaller, this is a datum which could be accounted for with a preference for nominal style in Italian, leaving room for further investigations.

3.2.1. DIAGNOSI

Analysis of the immediate right co-text (R1) of the word «diagnosi» reveals frequent co-occurrence with such adjectives as «precoce», «definitiva», «accurata», «precisa». Here is a sample of concordances for «diagnosi precoce», «precoces» being the first collocate of «diagnosi» in our corpus.

In the left co-text (L2-L1), one notices a fair number of occurrences for the patterns «della diagnosi», «nella diagnosi», «alla diagnosi», «dalla diagnosi» e «per la diagnosi».
As to the infinitive form «diagnosticare», it tends to occur in final clauses such as «a/per diagnosticare» (e.g. «serve a/si usa per diagnosticare»).

The concordances provided also reveal some shortcomings of our Italian corpus. This is the case of the sentence reported among the concordances for «diagnostocat*» (Fig. 4.26): «circa 15-25% di tutti i pazienti diagnosticati con il cancro» (nearly 15-25% of all the patients diagnosed with lung cancer), probably the results of a machine translation.

**Conclusion**

On the basis of the examples reported so far it can be argued that, despite some obvious limitations, WebBootCaT performs well for several tasks, especially when the time spent in creating the corpora and the usefulness of the information that can be retrieved are considered. Furthermore, the fact that the process of corpus compilation takes place on a remote server and that corpus data could be analysed both offline, by downloading it on one’s own computer, and online, using the corpus query tool (Sketch Engine) installed on the remote server, really make WebBootCaT a telling example of how some aspects of corpus work have been changing under the impact of the web. With WebBootCaT, corpus work is not only relying more and more on a "distributed architecture", thus embodying one of the changes envisaged by Martin Wynne with reference to the changing face of linguistic resources as a whole in the 21st century (Wynne 2002), but also appears to be moving towards "mass-customization", a keyword in contemporary society.
Chapter V
Exploring Large Web Corpora: from Web as Corpus to Corpus as Web

Introduction
This final chapter explores one of the most radical ways of understanding the relationship between corpus linguistics and the web. This corresponds to the «mega-corpus mini-Web» category among the possible meanings suggested by Baroni and Bernardini for the umbrella phrase web as/for corpus (2006: 13) and relates to the creation of large general-purpose corpora from the web via automated web crawling.

Drawing on descriptions by the creators of the 2 billion word itWaC corpus of Italian, Section 1 briefly introduces large general-purpose web corpora as a new object possessing both web-derived and corpus-like features. Section 2 describes the Sketch Engine as a web-based corpus query tool through which a number of recently compiled web corpora, including itWaC, can be accessed and explored. Finally, Section 3 paragraph reports «sketches» for the words «natura» and «nature», obtained from the itWaC and ukWaC corpora respectively, as an example of the variety of linguistic information that can be derived from the resources and tools described in the chapter.

1. Large web corpora and corpus query tools
In their collection of papers resulting from the First International Workshop on the Web as Corpus (Forlì, 14th January 2005), Baroni and Bernardini argue that «the most radical way of understanding the expression Web as a corpus refers to attempts to create a new object, a sort of mini-Web (or mega-corpus) adapted to language research» (Baroni and Bernardini 2006: 13). This

Note
1 A bootstrap is a leather or fabric loop on the back or side of a boot to help pull it on. By extension bootstrap means «self-reliant and self-sustaining: relying solely on somebody's own efforts and resources» and «starting business from scratch: the building of a business from nothing, with minimum outside capital». In information technology the word synonymous with start up procedure (MSN Encarta 2007: online).
2 The reference corpora used by BootCaT for key term extraction are large general corpora developed from the web using similar methods on a larger scale. The system currently includes five reference corpora (English, German, French, Italian and Spanish) of about 500 million words in average. (Baroni et al. 2006).
eral corpora from the web are generally created via automated crawling, which makes the linguist as independent as possible from commercial search engines, allowing a certain degree of control over the corpus construction procedure. This is however a more difficult approach to using the web as a corpus than the ones described so far in the present study. Dispensing with commercial search engines and performing an autonomous crawl of the web obviously requires considerable computational skills and resources. Then there is the problem of cleaning the data produced by the crawl (removing undesired pages; discarding duplicates; removing mark-up language and other features typical associated with web documents). Finally, if the result is meant to be a very large corpus, the data should be annotated so as to allow analysis through specific corpus query tools.

It is nonetheless out of conviction of the feasibility of such a project that in the past few years a number of large general corpora from the web have been compiled, including the itWaC corpus of Italian and the ukWaC corpus of English. The basic steps involved in the compilation of large general purpose corpora from the web via automated crawling are described in Baroni and Bernardini (2006), Baroni and Kilgarriff (2006) and – as far as the itWaC and ukWaC corpora in particular are concerned – in Baroni and Ueyama (2006) and in Ferraresi (2007). These steps can be summed up as follows:

- Selecting «seed» URLs and crawling
- Data cleaning
- Annotation

Crawling the web for the compilation of a large general corpus requires a number of pre-selected URLs (or crawl «seeds») to start form. This means that the process starts with a program retrieving the pages corresponding to the seed URLs, extracts new URLs from the links in the retrieved pages, follows the new links to retrieve more pages, and so on. While for special purpose corpora as the ones created using BootCaT it seems to be relatively easy to find seed terms (and hence URLs), this is obviously not the case with a general-purpose corpus where, as Baroni and Bernardini point out, one would ideally have a number of «representative» URLs to

object, they suggest, should be characterized by both web-derived and corpus-like features, to answer the widely-felt need for a resource that combines the potential for size, variety and topicality offered by the Web with the reliability of conventional corpora and corpus tools. This seems to represent a stage when linguists finally come to terms with the limitations of the web as a linguistic resource and come to view such limitations as a sort of ‘necessary evil’ which needs to be addressed if one is willing to exploit to the full the web’s otherwise enormous potential. More specifically, the typical disadvantages of web corpora are accepted, assuming that none of these disadvantages are specific to web corpora per se (Baroni and Ueyama 2006: 31) but are rather simply foregrounded by such corpora, while they are in fact common to all «quick and dirty» large corpora:

If one collected a Web corpus of about 100M words spending the same amount of time and resources that were invested in the creation of the BNC, there is no reason to think that the resulting corpus would be less clean, its contents less controlled or its copyright status less clear than in the case of the BNC. Vice versa, collecting a 1 billion word multi-source corpus from non-Web sources in a few days is probably not possible, but, if it were possible, the resulting corpus would almost certainly have exactly the same problems of noise, control over the corpus contents and copyright that we listed above [...]. Thus, we would like to stress that it is not correct to refer to the problems above as «problems of Web corpora»; rather, they are problems of large corpora built in short time and with little resources, and they emerge clearly with Web corpora since the Web makes it possible to build «quick and dirty» large corpora (Baroni and Ueyama 2006: 32).

As to the advantages, apart from size and timeliness, a fundamental advantage of creating large corpora from the web is that this allows «fast and cheap construction of corpora in many languages for which no standard reference corpus such as the BNC is available to researchers». Such languages, Baroni and Ueyama observe, do not simply include so-called «minority languages», but also well studied languages such as Italian and German (2006: 32). As to disadvantages, the only one which seems to be unique to web corpora is related to the necessity of accessing web data through ordinary search engines. This is the reason why large gen-
start from (2006: 16). It is in fact self-evident that, as the starting point of the whole process, this is the step most closely related to problems of representativeness, an issue, as already argued in the present work, extremely controversial with the web (Leech 2007). Here, again, «the fact that the notion of ‘representativeness’ of a corpus (and how to measure it) is far from well-understood» (Baroni and Bernardini 2006: 16, quoting Kilgarriff and Grefenstette 2003) complicates matters at a theoretical level. When it comes to web corpora it seems that the problem can only be addressed on applicative grounds, and in this context post-hoc methods to evaluate the composition of corpora have emerged as new crucial concerns (Baroni and Ueyama 2006: 32; Ferraresi 2007: 43; Sharoff 2007), replacing design based on a priori criteria, which was of paramount importance for traditional corpora. Accordingly, the apparently totalizing concept of representativeness is addressed through the related (and relative) concepts of «balance» and «unbiasedness»2 (Kilgarriff and Grefenstette 2003; Ciaramita and Baroni 2006).

For the compilation of the itWaC corpus of Italian, the seed URLs were retrieved from Google with combinations of words extracted both from traditional newspaper corpora and from «basic vocabulary» lists for language learners, to ensure that both higher/public and lower/private registers were included3. The resulting list of over 5000 URLs was used to start a crawl which went on for nearly 10 days (Baroni and Ueyama 2006: 34).

Once the crawl is over, the linguist is presented with a vast set of HTML documents which have to be post-processed and cleaned before being converted into a linguistic corpus. The first step entails identifying and discarding potentially irrelevant documents on the basis of size, i.e. both small documents (below 5Kb) and large documents (over 200Kb) are removed on the assumption that they tend to contain little genuine text (Fletcher 2004). Then, removal of perfect duplicates is performed. In this phase not only the duplicates of a given document but also the document itself is removed, since it is an overt policy in the compilation of large web corpora to privilege precision over recall – a strategy which can be afforded owing to the vastness of the web (Baroni and Kilgarriff 2006). Besides removing duplicates, which are rather easy to identify, the cleaning process also includes removal of near-duplicates, i.e. documents that differ only in trivial details, such as a date or a header.

After this phase the «noise» of non-linguistic material is removed from the documents. This generally means separating genuine language text from HTML code and from the so-called boilerplate, i.e. linguistically uninteresting material such as navigation information, copyright notices, advertisement, link lists, fixed notices and other sections lacking in human-produced connected text (Baroni and Kilgarriff 2006). The reasons for data cleaning need no explanation. As pointed out by Baroni and Bernardini (2006: 20) it is highly unlikely that one wants the bigram «click here» to come up as the most frequent bigram in a corpus of English, unless the aim of the corpus is precisely the study of the linguistic characteristics of web pages per se, which in turn corresponds to an altogether different way of conceiving of the web as a corpus, i.e. the «Web as corpus proper» (Baroni and Bernardini 2006: 13).

The final step is to filter for language and pornography. Even though web crawling for large corpora generally takes place within one single domain (.it in the case of the itWaC corpus, .uk for ukWaC, .de for the deWaC German corpus, and so on) and this should, ideally at least, by itself ensure that most pages are in the desired language, other strategies are generally adopted for filtering out pages in languages different from the target language. One such strategy is based on the assumption that connected text should contain a high proportion of function words (Baayen 2001, quoted in Ferraresi 2006: 38). Therefore in the compilation of the itWaC corpus a further step in the cleaning of the data was represented by the removal of pages which did not contain sufficient occurrences of function words. This process also worked as a language filter and further contributed to the removal of pages that mostly contained word lists, numbers, and other non-linguistic material (Baroni and Ueyama 2006: 35).

The importance of removing pages containing pornography is also generally acknowledged and stressed. This is done not «out of prudery», as Kilgarriff and Baroni argue, «but because they tend to contain randomly generated text, long keyword lists and other linguistically problematic elements» (2006). For the itWaC corpus, a stop list of 146 words typical of pornographic sites was used to identify and eliminate documents containing more than a
certain number of pornographic words. The whole filtering phase took about one week (Baroni and Ueyama 2006: 35).

The last step in the process is lemmatization and part-of-speech (POS) annotation of the corpus. Given the size of such web corpora this task has to be performed through automated machine-learning techniques. In the case of the itWaC corpus POS tagging was performed with the widely used TreeTagger and lemmatization using the free Morph-it! lexicon. Morphosyntactic annotation of the itWaC corpus took about two days, and resulted in a corpus of about 1.9 billion tokens (Baroni and Ueyama 2006: 35-36).

Using the procedure described above, a number of large general-purpose corpora from the web have been complied in a relatively short time. This is indeed a remarkable achievement whose success however also requires that adequate tools are devised to exploit the full potential of such corpora as sources of linguistic information. The minimum requirement for the tools is of course that «users must be able to browse the query results (displayed with varying amounts of context), sort the matches according to different criteria, and look at random subsets of the results to get a broad overview» (Baroni and Bernardini 2006: 35). Given that the user is very likely, in the case of large web corpora, to be presented with an overwhelming set of results, it is also desirable to reduce and structure the massive amounts of data brought up by the corpus query, such as computing frequency lists, identify collocations, etc...» (Baroni and Bernardini 2006: 35). Many linguists could in fact lack the necessary technical skills to access and query such large web corpora, while copyright problems could refrain the compilers from publicly distributing the corpora for offline analysis (Baroni and Kilgarriff 2006). This seems to suggest the opportunity of adopting an advanced user-friendly web interface that allows linguists to do actual research on the corpus (including the possibility of saving settings and results across sessions) while allowing the compilers to make the corpus widely available through their servers. The requirements of corpus tools specifically designed for large web corpora seem thus to be making corpus search more and more similar to web search, to the extent of signifying a Copernican revolution from the seminal notion of

web as corpus to the new horizons of corpus as web. As Baroni and Bernardini argue, discussing the project for a corpus query tool specifically designed for large web corpora (Wacky query engine) and commenting on the Google’s popularity among linguists:

[the] enormous popularity that Google enjoys among linguists can only in part be explained by the fact that it makes an unprecedented amount of language data available. We believe that an equally important role is played by the fact that Google search is easy to use and can be accessed through a familiar user interface, presents results in a clear and tidy way, and that no installation procedure is necessary. For these reasons, we conjecture that the success of the Wacky query engine and its acceptance among linguists will hinge on its ability to offer a similarly user-friendly, intuitive and familiar interface. As in the case of Google, a Web interface has the potential to satisfy all three criteria. In other words, we should not only use the Web as a corpus, but also present the corpus as Web, i.e. provide access to Web corpora in the style of a Web search engine (Baroni and Bernardini 2006: 37).

It is perhaps worth emphasizing that the authors are here not simply advocating the development of new corpus tools, but also indicating a shift in the expectations of users, as a consequence of a growing and widespread familiarity with ordinary web search. This seems to point to a metamorphosis in our way of conceiving of corpora and corpus tools under the impact of the web, which in turn brings about interesting changes also as far as the basic activities of accessing, distributing and querying corpora are concerned. Some of these changes can be partly seen at work in the Sketch Engine, which will be briefly described in the following pages.

2. The Sketch Engine: an overview

As corpora become larger and require more sophisticated tools, the tendency for a working scenario where the linguist no longer downloads corpora and tools to his/her personal computer but rather works from any computer on data and query tools made available through a remote server has become more typical and desired than it was with traditional corpora. In this new context, corpora and corpus tools are apparently undergoing a process of transformation that seems to be related to similar changes taking
place in society at large as far as the distribution of goods and resources, including linguistic resources, are concerned. While corpora and tools like BNC and the Wordsmith Tools can be considered finite products in a conventional way, in the sense that they are goods reproduced in several copies which can be sold and purchased, this is no longer the case with some of the recently compiled large web corpora and web-based corpus query tools, for which it would be in fact more correct to talk about services. Furthermore, as the notion of «mega-corpus mini-web» becomes a reality, even the basic act of reading, interpreting and drawing conclusions from concordance lines can become a problem. However «refined» and «detailed», mere concordancing and statistics relating to collocates, clusters or patterns may be no longer enough with corpora where words can have thousands of occurrences and the plethora of data with which the linguist is likely to work definitely requires some form of summarising.

This changing scenario is perhaps the best way to introduce the Sketch Engine in the present survey. The service provided by the Sketch Engine website can in fact be seen as a telling example of a different way of conceiving the basic activities of accessing, distributing and querying corpora. More specifically, the service provided through the Sketch Engine website makes a number of large web corpora available for online analysis and exploration, besides allowing the creation of smaller specialized corpora. Corpus analysis can be performed using a web-based corpus query tool, the Sketch Engine, which contributes to a thorough exploration of concordance lines by supporting complex queries and by providing statistics relating to the collocational profile and to the grammatical relations that each word in the corpus participates in. It is of course not the purpose of the present study to explain in detail how the Sketch Engine works but it is perhaps useful to outline some of its key functions, namely the generation of «Concordances», the «Word Sketch» function, and the «Sketch Difference» function.

2.1. Generating concordances

The Sketch Engine mainly works on a number of pre-loaded corpora for several languages, including the BNC, besides allowing the exploration of customized corpora created using the tools made available through the website itself. As the Home Page user interface shows, the first step for the user is therefore to select one of the corpora made available by the service, or one of the tools for the creation of customized corpora:

The basic function provided by the Sketch Engine to explore each of these corpora is the generation of concordances. Here is a sample of concordances for the lemma RISK from the itWaC corpus.
for instance, a sample of concordances for the 429063 occurrences of the lemma RISK in the ukWaC corpus:

Besides reporting concordances in clear KWIC format, the concordance page features a number of buttons which allow further exploration. The «Sample» button, for instance, can be used to create a random sample of the concordances, an option that is particular useful when the number of hits is particularly high, as in this case. The «Sort» button can be used for a simple sort (sort by node word, or one position to the left, or one position to the right); more complex sort procedures can be specified through an advanced sort screen. The «Filter» button allows to specify a word or lemma whose presence or absence is a condition to be satisfied before the concordances are displayed. Here is, for instance, a sample of concordances for RISK from the BNC using the word «cancer» as a positive filter, i.e. displaying only those lines where Risk occurs with «cancer»:

```
Fig. 5.3. A sample of concordances for RISK from the BNC using the word «cancer» as a positive filter.
```

Finally the «Collocation» button generates a list collocates for the node word, which can be sorted according to a number of parameters set by the user. Here is a sample of the collocates for RISK from the ORAL CANCER corpus created with WebBootCat (see Chapter 4) and accessed online through the Sketch Engine:

```
Fig. 5.4. A sample of the collocates for RISK from the ORAL CANCER corpus.
```

For each collocate the system also allows immediate visualization of recurring patterns. This can be obtained by simply clicking on the letter «p» in the «p/n» button left of each collocate:

```
Fig. 5.5. A sample of patterns for the collocation RISK + ASSOCIATED from the ORAL CANCER corpus.
```

Here are, by way of example, patterns for the collocation RISK + ASSOCIATED, again from the ORAL CANCER corpus:
Finally, information about the source-text of a particular concordance line can be obtained by clicking the document-id code at the left-hand end of the relevant line.

While in principle not different from information that can be obtained by querying a corpus with ordinary tools like WordSmith, the way information from several corpora can be accessed using the Sketch Engine makes it a good example of the corpus-as-web metaphor. Whether the linguist is querying the BNC, or one of the new large web corpora such as ukWaC, or one of the customized corpora created by the user through WebBootCaT, the service proves quick, flexible and user-friendly in a way that reminds those Google-like features which should apparently characterize the shift from web as corpus to corpus as web.

2.2. Word Sketches

Besides producing concordances and providing information on the collocational profile of a word, in a way not dissimilar from other typical corpus tools, the Sketch Engine is specifically designed for offering the linguist «word sketches», i.e. «one-page automatic, corpus-based summaries of a word’s grammatical and collocational behaviour» (Kilgarriff 2004 et al.). More specifically, a «word sketch» reports a list of collocates for each grammatical pattern so that, for each collocate, the user can see the corpus contexts in which the node word and its collocate co-occur (Kilgarriff et al. 2004). To provide a comprehensive sketch for whichever word a user inputs, the Sketch Engine needs in the first place to start from the corresponding lemma and the correct word class. That is the Word Sketch entry form compiled so as to obtain a sketch for the lemma PAESAGGIO from the itWaC corpus:

![Word Sketch Entry Form](image)

And here is a sample from the tool’s output:

![Word Sketch Output](image)
quently follow PAESAGGIO/I, the «preN_V» column reports verbs that frequently precede PAESAGGIO/I, and so on. When compared with information that could be obtained for the same word from the same corpus only through concordance lines the qualitative difference of information obtained through word sketches hardly needs to be demonstrated. The «sketch» for PAE-
SAGGIO is useful and thought-provoking, indicative as it is – at a glance – of phraseological patterns, such as «paesaggio agrario», «paesaggio incantevole», «paesaggio circostante», «paesaggio urbano», but also «paesaggio da favola» or «paesaggio da cartolina».

An invaluable option provided by the tool is the possibility of switching at any time between Word Sketch mode and the Concordance mode, so that for each pattern a number of examples are available at a mouse-click. Thus, if interested in examples for the phrase «paesaggi di bellezza», the user only has to click on the number next to «bellezza» in the pattern «pp_di» to be shown all the 107 concordances for this collocation:

All patterns can of course be further explored using the options already illustrated for concordance lines, such as sorting or using filters.

In the case of Word Sketches the information provided by the system is definitely different from that obtained from an ordinary concordancer and this is to some extent related to the changes brought about by a closer relationship between corpus linguistics and the web. Although not specifically designed for interaction with the web, a system that can provide such a summary of a word’s behaviour is an appropriate answer not only to the need of processing large amounts of data, as in the case of large web corpora, but also to the desire of exploiting the inclusiveness, variety and accessibility of web data, without renouncing high standards of linguistic investigation. Furthermore, the very fact that both the corpus query tool and the corpora made available for analysis are offered as an integrated web-based service seems to make the Sketch Engine a good example of what it might mean to present the corpus as web, rather than simply using the web as a corpus.

2.3. The Sketch Difference function

With the Sketch Difference function the user has the opportunity to compare sketches for two similar words. The patterns and combinations shared by the two items are highlighted, while patterns and combinations typical of one or the other are contrasted. Here is, by way of example, a comparison between SCENERY and LANDSCAPE from ukWac:

As this sample from the Sketch Engine report shows, collocates for which the two lemmas share patterns and combinations are sorted according to salience scores and coloured according to dif-
Again, the qualitative difference between information that could be obtained by simply exploring concordance lines is self-evident, especially if one considers that these data were obtained by summarizing (in a matter of seconds) information relating to the 25445 occurrences of «scenery» and the 110908 occurrences of «landscapes» in the ukWaC corpus. These examples definitely testify to the rich potential for linguistic information stored in the interaction between large web corpora and sophisticated web-based corpus query tools, but also indicates the great potential for linguistic information that lies in the possibility of processing more data when the tool performing the analysis can contribute information of this kind.

As to the immediate usefulness of the data, this can hardly be overemphasized. By comparing, for instance, the quickly produced sketch difference for LANDSCAPE and SCENERY with the word sketch produced for PAESAGGIO in the previous paragraph, one can see at a glance how the word «paesaggio» in Italian covers phraseological patterns which in English are covered by either «landscape» or «scenery», such as «paesaggio agricolo/urbano» and «agricultural/urban landscape» vs «paesaggio mozzafiato/ spettacolare» and «breathtaking/spectacular».

3. Exploring large web corpora. Sketches of NATURA and NATURE

The brief overview of the Sketch Engine functions can only suggest the scope and variety of information which can be gained by exploring mega-corpora from the web using a tool summarizing data in a way that is meaningful from the linguist’s point of view. By way of example, this closing paragraph reports information derived from a brief analysis of sketches for NATURA and NATURE, obtained from the itWaC and ukWaC corpora. Again, the main purpose is not so much to provide an exhaustive analysis of the data, but rather to give an idea of the insight into language, and possibly into culture, provided by corpora which have been created with an automated procedure from the web.

3.1. NATURA

The word NATURA occurs 333722 times in the itWaC corpus, clearly a number of occurrences which could hardly be explored
Another recurring pattern, <i>natura del/dell’</i>, seems to be linked to man (<i>uomo</i>, <i>anima</i>, <i>animo</i>) or activities (<i>attività</i>, <i>atto</i>, <i>intervento</i>, <i>operazione</i>, <i>lavore</i>, <i>servizio</i>) as well as to areas apparently related to the legal or economic domain (<i>appalto</i>, <i>assicurazione</i>, <i>rapporto</i>, <i>rischio</i>, <i>prodotto</i>, <i>provvedimento</i>, <i>creato</i>, <i>denaro</i>) and to health (handicap, infertilità, embrione). These contextual features and different patterns seem to provide evidence that web data cover in this case a wide variety of lexical realizations perfectly corresponding to the meaning of the word as reported in Italian Dictionaries (e.g. Zanichelli 2005). Corpus data, however, apparently enrich dictionary meaning by providing phraseology hinting at more topical uses of the word: <i>natura incontaminata</i> and <i>preservare la natura</i>, for instance, seem to be related to contemporary concerns about environmental protection, while <i>natura dell’embrione</i> might be related to recent ethical concerns about scientific research relating to infertility or to the use of stem cells obtained from embryos.

3.2. NATURE

The word <i>nature</i> occurs 273784 times in the ukWaC corpus. The sketch reported by the Sketch Engine shows that the word tends to occur as object of verbs such as «understand, reflect, explore, examine, reveal, investigate» (see the Object_of pattern in the 1st column), which seem to point to a level of high abstraction for the meaning of the NATURE, as already seen for the Italian corpus.

The pattern Adjective + N (4th column) is characterized by such words as «human», «true», «divine», pointing to the spiritual/philosophical meaning of the word NATURE, whereas no instance is reported of adjectives similar to the ones co-occurring with NATURA in Italian, such as «incontaminato» or «rigoglioso». This seems to suggest that the word <i>nature</i> does not necessarily cover the same semantic area of its Italian dictionary equivalent, at least as its concrete meaning related to the idea of landscape is concerned. The only collocates of NATURE which seem to point to a meaning of the word connected with the idea of landscape are those in which NATURE redefines such words as «reserve, protection, trail, park, tourism» (5th column),
promising research field is definitely opening up new horizons for linguistic research.

Conclusion

As this last chapter has shown charting the latest achievements of the web as corpus, the development of new methods for doing corpus linguistics is not simply a matter of new corpora and new tools, but rather of changing ways of conceiving of corpora and corpus tools under the impact of the web and of web search. While the notion of the web as corpus might be giving way to a complementary view of corpus as web, other significant changes are apparently occurring in terms of availability and distribution of tools and resources, such as for instance the shift of both from products to services. This seems indeed to connect the changes taking place in contemporary corpus linguistics to similar changes taking place in society at large, and possibly represents the best way to sum up the real significance of the achievements presented in our itinerary.

Note

1 Information about large web corpora for other languages can be found in the Sketch Engine (www.sketchengine.co.uk) and the Wacky project (wacky.sslmit.unibo.it) websites.
2 The notion of «unbiasedness» is based on the comparison of the word frequency distribution of a corpus to those of deliberately biased corpora. (Ciaranita and Baroni 2006).
3 Detailed information on this aspect of corpus creation is reported in the Wacky project website: http://wacky.sslmit.unibo.it/doku.php?id=seed_words_and_tuples.
4 For a comprehensive overview of the Sketch Engine see Getting started with the Sketch Engine, http://trac.sketchengine.co.uk/wiki/SkE/GettingStart-ed.
The steps taken throughout the book have shown how the notion of the web as a corpus is to some extent grounded on a migration of issues (Gatto forthcoming) between corpus linguistics and information technology, under whose impact the way we conceive of a corpus has been moving away from the somewhat reassuring standards subsumed under the corpus-as-body metaphor, to a new web-as-corpus image, and possibly moving a further step towards the new horizons of the corpus-as-web. On the one hand the notion of a linguistic corpus as a body of texts rests on some related issues such as finite size, balance, part-whole relationship and permanence; on the other hand the very idea of a web of texts brings about notions of non-finiteness, flexibility, de-centering and re-centering and provisionality. In terms of methodology, this questions issues which could be taken for granted when working with traditional corpora, such as the stability of the data, the reproducibility of the research, and the reliability of the results, but has also created the conditions for the development of specific tools that help make the «webscape» a more hospitable space for corpus research. By either exploiting to the full the potential of ordinary search engines, or by reworking their output format to make it suitable for linguistic analysis (e.g. WebCorp), or by allowing the creation of quick, flexible, small, specialized and customized multilingual corpora from the web (e.g. WebBootCaT), these tools seems to be redirecting the way we conceive of corpus work in the new Millennium along those lines envisaged by Martin Wynne as characterizing linguistic resources in the 21st century: multilinguality, dynamic content, distributed architecture, virtual corpora, connection with web search (Wynne 2002).
As the issues, tools, and methods so far discussed have already shown, the emerging notion of the web as corpus can be seen as the outcome of a wider process of redefinition in terms of flexibility, multiplicity, and «mass-customization» which corpus linguistics is undergoing along with other fields of human activity, in a sort of «convergence of technologies and standards in several related fields which have in common the goal of delivering linguistic content through electronic means» (Wynne 2002: 1207). It is indeed owing to such a convergence that one is tempted to argue that changes in corpus work under the impact of the web are related to the new styles and approaches to the sharing/distribution of knowledge, goods and resources which are everyday experience in contemporary society. This seems to be particularly evident in the latest development relating to the creation and exploration of large web corpora where corpus resources and corpus tools seem to be undergoing a process of transformations from products into services.

By way of conclusion is perhaps worth emphasizing again that while the web as a corpus is a promising field of research it can by no means aim at questioning the fundamental tenets of corpus linguistics. As Baroni and Ueyama (2006) suggest, it is only «a matter of research policy, time constraints and funding» that determines whether a certain project requires building a thoroughly controlled conventional corpus, or if it is better to methods that in a way or another take advantage of the web’s controversial status as a linguistic corpus. What is certain is that, as any other field of human knowledge, linguistic research can only profit from the tension created between established theoretical positions and the new tools and methods devised from the needs of practicality and pragmatism. It seems more than desirable, then, that traditional corpus linguistics and studies on the web as corpus should coexist for time to come, providing the linguistic community with a wider spectrum of resources to choose from.
### Appendix 1 – Webcorp output for «scenery»

#### Sort Results on word 1 for 'scenery'

<table>
<thead>
<tr>
<th>Time stamp</th>
<th>Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>200318307:08:141</td>
<td>and buildings (67%), atmosphere (57%) scenery (26%) and the river and</td>
</tr>
<tr>
<td>200309066:29:564</td>
<td>well. Here at last, scenery add-on allowing you to fly</td>
</tr>
<tr>
<td>200301402:45:031</td>
<td>the area - good food, accommodation scenery, walking, unusual and unique shops</td>
</tr>
<tr>
<td>200041919:22:171</td>
<td>variety of fossils, and amazing scenery, Fossils are less frequent than</td>
</tr>
<tr>
<td>200301106:00:004</td>
<td>and romantic resorts with amazing scenery, romantic romances, we suggest</td>
</tr>
<tr>
<td>2000110100:00:004</td>
<td>is a walker's paradise amidst scenery, to die for, with some</td>
</tr>
<tr>
<td>200212303:16:481</td>
<td>the historic monuments, wildlife and scenery of these unique islands. Also</td>
</tr>
<tr>
<td>200401706:43:509</td>
<td>for its tropical landscape and scenery. Located at the southern tip</td>
</tr>
<tr>
<td>200401604:43:509</td>
<td>the historic monuments, wildlife and scenery of these unique islands. Also</td>
</tr>
<tr>
<td>2003091517:03:321</td>
<td>of Orkney's landscape, woods and scenery, Papay Pages Images and information</td>
</tr>
<tr>
<td>2004012912:46:511</td>
<td>of Bleens Beacons, caves and scenery in South Wales. ** Black Mountains</td>
</tr>
<tr>
<td>2004011208:42:143</td>
<td>wealth of historic sites and scenery, Segovia was awarded a</td>
</tr>
<tr>
<td>2003031209:42:143</td>
<td>Forty-eight views of cottages and scenery at Sidmouth, Devon (Somers Cooks)</td>
</tr>
<tr>
<td>2001010100:00:004</td>
<td>unrivalled variety of woods and scenery, © Crown Copyright 2004 Weymouth</td>
</tr>
<tr>
<td>200027030:52:411</td>
<td>discover the areas history and scenery. If that's all a bit</td>
</tr>
<tr>
<td>200201099:58:431</td>
<td>created by its situation and scenery. The loch is home to</td>
</tr>
<tr>
<td>200209242:01:111</td>
<td>that the amenities, attractions and scenery, coupled with the warmth of</td>
</tr>
<tr>
<td>2004012804:09:574</td>
<td>the historic monuments, wildlife and scenery of these unique islands. Also</td>
</tr>
<tr>
<td>2004010100:00:004</td>
<td>the historic monuments, wildlife and scenery of these unique islands. Also</td>
</tr>
<tr>
<td>200401100:00:004</td>
<td>the historic monuments, wildlife and scenery of these unique islands. Also</td>
</tr>
<tr>
<td>2002212100:00:002</td>
<td>the Scottish landscape, countryside and scenery, a lot higher than the</td>
</tr>
<tr>
<td>2002212100:00:002</td>
<td>surveyed, the landscape, countryside and scenery were by far the most</td>
</tr>
<tr>
<td>2003071611:26:055</td>
<td>set in the breathtaking Argyll scenery, some seven miles from Lochgilphead</td>
</tr>
<tr>
<td>1999092412:35:111</td>
<td>器具, mostly cast as scenery, has been a significant attraction</td>
</tr>
<tr>
<td>2004010100:00:004</td>
<td>Handily Countryside with the beautiful scenery as seen in the mach</td>
</tr>
<tr>
<td>2004020515:51:141</td>
<td>which take in some beautiful scenery including several woodland walks. The</td>
</tr>
<tr>
<td>2002224026:40:557</td>
<td>walks through Darley Dale's beautiful scenery</td>
</tr>
<tr>
<td>2002220100:00:004</td>
<td>or the lover of beautiful scenery and the accompanying wildlife, East</td>
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<td>1999082401:16:011</td>
<td>the tourists. The most beautiful scenery is often the most fragile</td>
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<td>2003011060:36:422</td>
<td>with excellent bathing and beautiful scenery, Visitors to Rhosilli can enjoy</td>
</tr>
<tr>
<td>2003082809:28:581</td>
<td>natural resources, such as beautiful scenery, wildlife, or human-made resources</td>
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<td>2003061001:00:004</td>
<td>some of the most beautiful scenery, Listing location, local attractions, fishing</td>
</tr>
<tr>
<td>2003010120:37:301</td>
<td>that we take the beautiful scenery in this area for granted</td>
</tr>
<tr>
<td>2002224026:40:557</td>
<td>areas, woodland walks and beautiful scenery, Sandringham House Brochure Sandringham House</td>
</tr>
<tr>
<td>2002224026:40:557</td>
<td>through and across the beautiful scenery of the Derbyshire Dales, Walking</td>
</tr>
<tr>
<td>2002101000:00:004</td>
<td>courses, often set among beautiful scenery, The Dunes Since opening the</td>
</tr>
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<td>2002212100:00:002</td>
<td>one of the most beautiful scenery of the Dee Valley. Alternatively</td>
</tr>
<tr>
<td>2003093123:27:391</td>
<td>springs, mild mountain climate, beautiful scenery and a large well-kept park</td>
</tr>
<tr>
<td>2001010100:00:004</td>
<td>contains most of the beautiful scenery and locations immortalized in the</td>
</tr>
<tr>
<td>2003011060:36:422</td>
<td>where visitors can enjoy beautiful scenery and excellent wine. 02/13</td>
</tr>
<tr>
<td>20030122912:37:201</td>
<td>Scottish fayres. Surrounded by beautiful scenery in a climate warmed by</td>
</tr>
</tbody>
</table>
monastery's surroundings and the beautiful scenery. From Veece of 15th th
30% +3% +10% +29% Beautiful scenery (16+7%) +11% +15% +5%
at least. The shift in beautiful scenery has been gradual, which may seem small
many people's minds with beautiful scenery, unspoiled landscapes, wildlife, a traditional
through some of the best scenery in the UK. The area
as some of the best scenery in Scotland
midst of some of the best scenery in variety of carriages pulled
through some of the best scenery on a clearly waymarked route
the heart of Dartmoor's breathtaking scenery with 8-suit bedroom
a wedding, bouncing castles, breathtaking scenery and some of the best
some of the most breathtaking scenery anywhere on earth. All this
to take in the breathtaking scenery. There are numerous attractions in
and Llanberis with its breathtaking scenery and romantic landscape. The estate
Brafriff is blessed with breathtaking scenery including spectacular skyline Moor; the
a wedding, bouncing castles, breathtaking scenery and some of the best
Fun Day and the breathtaking scenery of The Great Outdoors. We
of Puckarek's mountains and breathtaking scenery. And if you were hoping
small country boasts such breathtaking scenery. But what price do we
some of the most breathtaking scenery in Britain. In it the
is renowned for its breathtaking scenery. The Rila mountain, with its
with panoramic views and breathtaking scenery. Country walks and cycle routes
walking and climbing with breathtaking scenery throughout the Highlands and Islands
wide open spaces and breathtaking scenery. - come to Snowdonia, Llyn Peninsula
great contrast and breathtaking scenery. On the coast of
spot to enjoy the breathtaking scenery. The Park offers an abundance
countries surveyed. In all cases, the route is rated by at least
Count Dracula! Enjoy the coastal scenery on the way back via
and miles of stunning coastal scenery. Hotels breaks in Devon, Cornwall

to explore the spectacular coastline and wildlife on the Atlantic
as marvelling at the coastline of Portmarnock Bay and the
apart from our stunning coastline, is the nightmare of a
sites, museums, countryside and coastal on offer, there is no
mentioned pertain to the coastal scenery. "Lovely beaches", "rugged, craggy, "baseline"
line in terms of coastal scenery and topography with "smaller beaches
why people visit the County being the single most popular
A stunning recipe of culture and people! Have travelled for
and the descriptions of Devonshire scenery in the works of Charles
with Scotland's national beauty, dramatic scenery and unspoiled landscape attract both
the north is the dramatic scenery of the Staffordshire Moors and
and whither. There is more dramatic scenery along the Yorkshire Coast, and
west coast amidst the dramatic scenery of the Scottish Highlands. Visit
an area dominated by dramatic scenery, unspoiled countryside and an exciting

Cruise 7 Night Stay Enchanting scenery and classical treasures await you
Clear, fresh mountain air, enchanting scenery and scented blissful serenity are
lakes to seek out England's Details Bluework's Minibus Tours Eight

RESORTS Greece offers some fabulous scenery, fantastic sea views and traditional
was absolutely amazing with fantastic scenery and good opportunities for game

year for my holidays. Fantastic scenery, friendly helpful people and always
restaurants to choose from, fantastic scenery and eco-tourism opportunities. Monterey is
countryside the district offers fantastic scenery, history and culture.

Golf courses, friendly locals, fantastic scenery and above all represents good
The mild climate and fine scenery make this the ideal location
the highest, wildest and finest scenery in England with attractive North
some of the Roseland's finest scenery. As its name suggests
the highest, wildest and finest scenery in England. Much of the
as some of the finest scenery in Scotland, visitors can marvel
luxury cottages amidst Scotland's finest scenery. Mains of Taymouth cottages are
of Knoydart amongst the finest scenery Scotland has to offer. We
a trip were environment focused scenery, nature and wildlife, wilderness. People
but give me Swaneset for scenery and climate.6m However you
famous for shopping than for scenery. Visitors from all over the
centrally situated in beautiful Gateway scenery. The Bruce provides excellent food
short river and the gentle scenery it passes through is typical
as a country of glorious scenery and friendly people. You can
take in the beauty of scenery and a wealth of resources
international centres about Scotland: its scenery, history, culture. The most lucrative
valley and gives a lake-like scenery. This part of the sea
the best of the landscape scenery, history and unusual features. The
provide a range of local scenery files and some special aircraft
tourism destination. It has magnificent scenery, a pristine natural environment; cultural
in Reigate and surrounding. Magnificent scenery and breathtaking views are available
remain. Many monuments and magnificent scenery are visible from this location
Si-so Wai Situated among magnificent scenery southwest of Wat Mahathat is
Bay is surrounded by magnificent scenery that offers miles of cliff
tradition, along with its magnificent scenery, unique heritage and friendly folk
pretty little villages and magnificent scenery. Convenient for the Duales, the
Explore the wild, lonely, magnificent scenery, perhaps see a Golden Eagle
by Ben Nevis and majestic scenery, less than half an hour
50 miles through the marvellous scenery of the Derbyshire Dales between
by stunning coastal and moorland scenery. The Gurnard's Head is the
the sea-embracing mountain scenery, deep and peaceful culture, we
castles to spectacular mountain scenery. Scotland has a wealth of
combined with the dramatic mountain scenery, makes it a popular area.

hotel set amidst stunning mountain scenery on the famous road to
bunkhouse ideal for hikers, walkers, and
Free fishing, Balliferry House Hotel
beauty spots, forests and mountain scenery. Conservation of wild animals, for
in stunning coastal and mountain scenery. Award winning restaurant with covered

is surrounded by beautiful mountain scenery and has several beaches along
their original splendour. Stunning natural beauty, lush northern white sandy
Sheilands (prehistoric sites, quiet, natural scenery). Different people come to Scotland
walks & rambles. The natural scenery can also be explored by

cyclists rank the importance of scenery when choosing a destination, and
visitors a great diversity of culture, history, and leisure activities. The
here. "My impression is of scenery, wide open spaces, big skies
a very agreeable variety of scenery, with lochs, mountains, and rivers
explored. A wide variety of scenery awaits the visitor, with valleys and
and explored. A wide variety of scenery awaits the visitor, with valleys
providing a rich variety of scenery to explore from castlecragged valleys

world's best tourist attractions or scenery. In fact they are all
matches the beauty of our scenery. *Tourism in the Highlands Towards

a dramatic backdrop for our outstanding scenery is one obvious draw, providing
with spectacular views and panoramic scenery. A map and a good

for romantic beauty and picturesque scenery, it is not surprising. The
much to offer, from picturesque scenery, to history, tranquility, and rural appeal
to the natural history, picturesque scenery, and antiquities of the western
its situation, salubrity and picturesque scenery. Also a account of the
Devon. See the picturesque scenery and open moors of Dartmoor
the most dramatic scenery in Ireland. Rising dramatically from
some of the most picturesque scenery in North Yorkshire. The town
some of the most remarkable scenery to be found. The Park
famous for its natural river scenery, more details "Lydford range of picturesque and romantic scenery. The adjacent cliffs, which are
Fort William through the rugged scenery of Glen Finnan, over a famous
the genteel rural scenery there is still the odd

Scottish tourism: Your views Scotland is a big pull!
Day enjoying the Western Scotland scenery. The majority of the holiday
Coffin and the beautiful Scottish scenery where the Red Kite, Buzzards
photographs of Brocks Beacon showing scenery, land use, and management problems
challenging fairways. Combined with spectacular scenery, these courses make Victoria an

towns and islands with spectacular scenery are within close proximity to

beech forests and spectacular scenery of this ancient Royal Hunting
road A MILD climate, spectacular scenery, clean sandy beaches and a
Cruise from Ardfern through spectacular scenery while watching birds, cetaceans, and
near Oban. Explore & enjoy spectacular scenery and wildlife Mitchell's Family Amusement
exist within the area. Spectacular scenery is within easy reach of

2 bed rooms, set in spectacular scenery between Pontres and Darnagol Castle
of Cornwall, with its spectacular scenery and rich heritage. The area
some of the most spectacular scenery in Britain. What we look
some of the most spectacular scenery in Wales.

is set within the spectacular scenery of Snowdonia mountain ranges
Enjoy a day experiencing spectacular scenery, 65 miles south west of
some of the most spectacular scenery on earth learn meditation techniques of
the spectacular scenery of mountain, river and gorge
themmed carriages reflect the spectacular scenery. Queensland Holidays - Tour Search
a rural haven of spectacular scenery, the majority of which is
area Crieff railway Centre of spectacular scenery, Crieff Second largest Perthshire town
of the UK's most spectacular scenery, Trips to the Lake District
its wild ponies and stunning scenery, picture-book villages with thatched cottages
holidays taking in Scotland's stunning scenery and world-renowned golf courses Rampant
is renowned for its stunning scenery and charming coastal villages. The
I can enjoy the stunning scenery with a bike ride to
show some of the stunning scenery, hills, canals, viaducts and many
of the Screen The stunning scenery and timeless towns and villages
account of regional strengths: Stunning scenery and lakes (but not all
of the region's appeal. Stunning scenery and lakes (but not all
form the door with stunning scenery and views. Pts are also
Enjoy 8 miles of stunning scenery in the North Yorkshire Moors
play area, family friendly, stunning scenery. The Scottish Seaside Sanctuary Teeming
together with Scotland's stunning scenery which would make for an irresistible

Golfer Course, with its superb scenery overlooking the Irish sea. If
the major islands. The superb scenery of the islands include high
and majority of the surrounding scenery, with the awe-inspiring backdrop of
countryside around the town. The scenery is wonderful and remains largely
visitors a year enjoying the scenery, heritage and arts in this
near the Ynysarn border. The scenery here is very different from

to explore more of the scenery and legacy of historic castles
slow, pointing out all the scenery which I have seen before
outsandtacular scenery, the area is amazing. They are only
while relaxing and enjoying the country and local wildlife. The Chelten
\during summer months and the scenery and wildlife along the banks
explored from Pateley Bridge. The scenery is well wooded in places
that the enjoyment of the scenery by the public can be

to the holiday experience. The scenery of Scotland was the highest
part of the team. The scenery and wildlife in this remote
Lake District and Snowdonia the scenery is largely the result of
so visitors can operate the scenery, from bird watching to processing
the beauty of the scenery and the diversity of the
for lunch and enjoy the scenery. Day 7 - Nant Yr Ardd - Trawcy
destroy wildlife habitats, ruin the scenery, and increase air and noise
recommend Malvern to anyone, the scenery and places to visit
coast, whilst 35% mentioned the scenery landscape or peace and quiet
industry remains to spell the scenery. A mixture of mature trees
to offer every visitor, the scenery is quite breathtaking; from snow
 Park just to admire the scenery, Congestion of Villages and Beauty
Whitby and Filey of the scenery of the Dales and Mines, deep down from heaven. The scenery, the buildings, I am in
of the country where the scenery is a mirror of the
own pace, and enjoy the scenery to the fullest. It can
or just take in the scenery. The market town of Devizes
staying with family, driving through scenery, sampling indigenous or culinary culture
into sampling the area’s unique scenery and rich history. Frank Wuerkmester
our company, enjoy open, unspoiled scenery and discover treasures of Scottish
the quality of the upland scenery. The area is also outstanding
people.” “Space, lovely villages, varied scenery, kindly people and easy driving
the Black Country with varied scenery to tempt you to explore
underline " Water scenery " Two hundred years ago, the
Gradually the taste for wild scenery grew and Ruskin enjoyed the
were impressed by the wild scenery, the prolific bird life and
or interest. From history, wildlife scenery, shopping, eating out or special
greatest asset is its wonderful scenery, whether it is the North
visitors. You can view wonderful scenery, receive a warm and friendly
never far from some wonderful scenery. Whether you want a gentle
to take in the wonderful scenery of the Holme Valley. In
Avis, Eilat enjoys the wonderful scenery of the Edom Mountains and
enjoy the true hospitality, wonderful scenery and fascinating culture and history
they do have such wonderful scenery. For self-catering, there are many
the beauty of Derwentside’s wonderful scenery, why not take a balloon
holiday; there is also wonderful scenery, nightclubs, bars and restaurants, as
Harrogate District Tourism Home Wonderful scenery, a host of attractions, excellent
and fauna in beautiful woodland scenery. The majority of these walks
ancestry, to view the world-class scenery and wildlife, to explore Scotland’s

WebCorp © 1999-2003 Research and Development Unit for English Studies, University of Liverpool.

Appendix 2 – Collocates of SCENERY from the BNC subcorpus Miscellaneous:

<table>
<thead>
<tr>
<th>WORD</th>
<th># TIMES NEARBY</th>
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1. basal cell layers are elongated cells or basal cell skin cancer cells. The second
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Appendix - Concordances for «basal» from the ORAL CANCER corpus

WordSmith Tools -- 23/07/2008 17:30:23
164

eatment of Basal Cell Carcinoma 51.asp

currence rate is similar to that for

tablet cancer. It is not as common as

t/CRt/content/CRt_2_4_4X_Treatment_of_Basal

tumors are often used to remove basal

tesser of Ig4 expression only in the

r, C, Kusnetz, H. Hafsele: 5: infiltrating

lowest layer of the epidermis, the

ure are located in the mid-face.

e are three major types of skin cancer.

typical keratinocytes may be found in

ay you may someday be diagnosed with

6% of non-melanoma skin cancers, (with

t membrane. In normal epithelium, the

Ual-cell carcinomas is a very common

distant portions of the body than are

ay. About 75% of all skin cancers are

t Centers of America (CTCA) use various

w treatment modalities for primary

ical trial of beta carotene to prevent

v. 7 2009; 13(6): 415-420. The study of

ants of the body. After treatment,

After treatment, 94% 2010; 13(6): 415-420. The study of

nt type of nonmelanoma skin cancer after

, R14 was only clearly detected in the

3 A) 1. Additionally, the outer layer of the skin, basal cell carcinomas, and squamous cell

can come back (recu

al Cell Carcinoma of the Face >> Both basal and squamous cell cancers are found

ce cell carcinoma. Arch Derm. 1999; 1

f addition to the above, basal and squamous cell cancers also occur elsewhere.

predict the best results for

th SCC, Pathophysiology SCC arises from

ame G, Selwood T: The relationship of basal cell carcinoma and squamous cell

rt in the skin. The most common are

ng Slides: Contact a Dermatologist Like

ed squamous; cells called basal cells; and cells called melanocytes.

, most p66-stained cells were in the

4-NQO, R14 staining was found in both

h 4-NQO; R14 staining was found in both

al: Use of tanning devices and risk of

Cancer More than 1 million cases of basal cell carcinoma and squamous cell skin cancer will

the two types that are most common are basal cell carcinoma and squamous cell
carcinoma. It is especially used in the epithelium. The cell cycle time of basal epithelial cells is approximately

d on the type of skin cancer.

depending on the type of skin cancer.

ing tissue. Chemotherapy (Topical) - base the skin to fight the basal cell skin cancer In addition to tr

 thickness atypia. If, however, elongated

tion Therapy - this type of therapy for

125

eh, dry, or scaly. To see an example of Basal Cell Carcinoma of the Face >> Bot

e following to enrich your treatment of basal cell skin cancer cells. There are some cell cancer in many instances

e cell skin cancer. CTCA uses both t

the aerodigestive tract or both SCC and basal cell carcinomas (BCC) of the skin.

124

123

122

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114

113

112

111

110

109

108

107

106

105

104

103

102

101

100

99

98

97

96

95

94

93

92

91

90

89

88

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86

85

84

83

82

81

80

79

78

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76

75

74

73

72

71

70

69

68

67

66

65

64

63

62
<table>
<thead>
<tr>
<th>Page 166</th>
</tr>
</thead>
</table>

### Appendix 4

<table>
<thead>
<tr>
<th>7</th>
<th>cancer 4605</th>
<th>26</th>
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<td>83</td>
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<td>nec 529</td>
<td>85</td>
<td>case 295</td>
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<td>85</td>
<td>medical 292</td>
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<td>blood 535</td>
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<td>doe 290</td>
</tr>
<tr>
<td>72</td>
<td>survival 497</td>
<td>99</td>
<td>patient 295</td>
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<tr>
<td>74</td>
<td>chemotherapy 494</td>
<td>90</td>
<td>lesions 274</td>
</tr>
<tr>
<td>79</td>
<td>information 472</td>
<td>91</td>
<td>treatment 276</td>
</tr>
<tr>
<td>81</td>
<td>body 458</td>
<td>96</td>
<td>farmers 256</td>
</tr>
<tr>
<td>84</td>
<td>clinical 452</td>
<td>98</td>
<td>lymphoma 247</td>
</tr>
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<td>86</td>
<td>should 446</td>
<td>100</td>
<td>possible 242</td>
</tr>
<tr>
<td>88</td>
<td>modes 441</td>
<td>102</td>
<td>cells 319</td>
</tr>
<tr>
<td>90</td>
<td>tobacco 442</td>
<td>106</td>
<td>mode 231</td>
</tr>
<tr>
<td>91</td>
<td>parent 417</td>
<td>107</td>
<td>cavo 230</td>
</tr>
<tr>
<td>94</td>
<td>called 415</td>
<td>118</td>
<td>grade 223</td>
</tr>
<tr>
<td>97</td>
<td>small 391</td>
<td>117</td>
<td>effects 220</td>
</tr>
<tr>
<td>99</td>
<td>stage 390</td>
<td>118</td>
<td>tempo 220</td>
</tr>
<tr>
<td>100</td>
<td>type 389</td>
<td>133</td>
<td>chemo therapy 219</td>
</tr>
<tr>
<td>102</td>
<td>lesions 177</td>
<td>119</td>
<td>doctrine 205</td>
</tr>
<tr>
<td>103</td>
<td>tissue 370</td>
<td>120</td>
<td>superein 203</td>
</tr>
<tr>
<td>104</td>
<td>common 365</td>
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<td>nec 202</td>
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<td>111</td>
<td>effects 342</td>
<td>122</td>
<td>tumor 199</td>
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<tr>
<td>112</td>
<td>smoking 341</td>
<td>124</td>
<td>meno 192</td>
</tr>
<tr>
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<td>include 327</td>
<td>125</td>
<td>mammell 190</td>
</tr>
<tr>
<td>114</td>
<td>health 326</td>
<td>127</td>
<td>freeze 186</td>
</tr>
<tr>
<td>115</td>
<td>medical 326</td>
<td>128</td>
<td>test 186</td>
</tr>
<tr>
<td>117</td>
<td>node 323</td>
<td>129</td>
<td>sequence 184</td>
</tr>
<tr>
<td>118</td>
<td>cancer 322</td>
<td>130</td>
<td>secondo 184</td>
</tr>
<tr>
<td>119</td>
<td>cases 324</td>
<td>131</td>
<td>result 182</td>
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<tr>
<td>130</td>
<td>new 321</td>
<td>132</td>
<td>cancer 182</td>
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<tr>
<td>131</td>
<td>trend 320</td>
<td>133</td>
<td>benefice 181</td>
</tr>
<tr>
<td>132</td>
<td>tongue 319</td>
<td>138</td>
<td>metastasis 178</td>
</tr>
<tr>
<td>134</td>
<td>lung 315</td>
<td>139</td>
<td>studio 177</td>
</tr>
<tr>
<td>135</td>
<td>associated 309</td>
<td>141</td>
<td>malaise 173</td>
</tr>
<tr>
<td>137</td>
<td>nasale 309</td>
<td>142</td>
<td>persons 172</td>
</tr>
<tr>
<td>138</td>
<td>increased 287</td>
<td>157</td>
<td>chimigno 150</td>
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<td>lung 266</td>
<td>158</td>
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<td>bone 285</td>
<td>160</td>
<td>organ 156</td>
</tr>
<tr>
<td>141</td>
<td>factors 285</td>
<td>161</td>
<td>bone 153</td>
</tr>
<tr>
<td>142</td>
<td>early 260</td>
<td>164</td>
<td>vol 154</td>
</tr>
<tr>
<td>144</td>
<td>exposure 259</td>
<td>165</td>
<td>vivo 152</td>
</tr>
<tr>
<td>145</td>
<td>area 278</td>
<td>169</td>
<td>stomato 150</td>
</tr>
<tr>
<td>147</td>
<td>side 276</td>
<td>170</td>
<td>cure 149</td>
</tr>
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<td>148</td>
<td>control 275</td>
<td>171</td>
<td>reasoning 149</td>
</tr>
<tr>
<td>149</td>
<td>help 273</td>
<td>172</td>
<td>case 148</td>
</tr>
<tr>
<td>150</td>
<td>normal 272</td>
<td>173</td>
<td>particular 147</td>
</tr>
<tr>
<td>151</td>
<td>studies 271</td>
<td>174</td>
<td>example 146</td>
</tr>
<tr>
<td>152</td>
<td>people 270</td>
<td>175</td>
<td>cats 146</td>
</tr>
<tr>
<td>154</td>
<td>types 265</td>
<td>177</td>
<td>people 145</td>
</tr>
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<tr>
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<td>183</td>
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</tr>
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<td>five 256</td>
<td>184</td>
<td>face 140</td>
</tr>
<tr>
<td>160</td>
<td>cause 255</td>
<td>185</td>
<td>siemina 140</td>
</tr>
<tr>
<td>163</td>
<td>high 253</td>
<td>187</td>
<td>exam 137</td>
</tr>
<tr>
<td>164</td>
<td>expression 252</td>
<td>190</td>
<td>dibnoma 135</td>
</tr>
<tr>
<td>167</td>
<td>doctor 245</td>
<td>191</td>
<td>important 134</td>
</tr>
<tr>
<td>168</td>
<td>symptoms 246</td>
<td>193</td>
<td>musca 132</td>
</tr>
<tr>
<td>169</td>
<td>radiography 242</td>
<td>194</td>
<td>case 131</td>
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<tr>
<td>172</td>
<td>excluding 237</td>
<td>195</td>
<td>reason 120</td>
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<td>malignant 233</td>
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<td>type 128</td>
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</tbody>
</table>
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