C. J. ROSS: BRITISH TERM BANK PROJECT - THE HERIOT-WATT EXPERIENCE

(Introduction: Data processing aspects - (1) Data structure, (2) Storage & retrieval routines; Terminological aspects; Project context; Conclusions.)

Introduction

The research on which the following article is based was carried out in the Department of Languages, Heriot-Watt University (Edinburgh), between October 1986 and September 1987, within the framework of the British Term Bank (BTB) project. Set up in autumn 1984 at the instigation of Professor Juan C. SAGER of the Centre for Computational Linguistics (CCL), University of Manchester, Institute of Science and Technology (UMIST), the project brought together the language departments of five technologically orientated British universities with the aim of generating the initial database and user interest necessary for the establishment of a financially self-sustained UK national teirmbank, similar to those already operating in a number of European countries (SAGER & PRI-crce 1983). The function of the Research Associate (RA) appointed by Heriot-Watt (initially for a period of one year, but with the expectation of extension for a second) in connection with the project was the collection of terminology in a subject field to be selected, and its storage using the PC-based "demonstrator model" software developed at CCL (canDELAND 1987). This process would, it was envisaged, also act as a field test of the software while furnishing opportunities for the establishment of contacts with potential users of, and contributors to, an operational termbank.

The subject field identified for the Heriot-Watt contribution to the BTB project was that of sound insulation, an area in which the university's Department of Building enjoys a considerable reputation both domestically and internationally. As an area of relatively low-level technology, this field was considered to be a suitable choice for software testing, since it was anticipated that the terminology concerned would have a less clearly defined structure than that employed in the pure sciences or high-level technologies - areas in which the bulk of previous testing had occurred - without presenting the problems associated with social sciences data. A joint work programme was drawn up by the two departments to allow for the verification of all the assembled data by subject experts in the Department of Building or, in the case of foreign-language equivalents, by their counterparts abroad.

It is not proposed to describe in detail the course of work at Heriot-Watt over the year concerned, but rather to outline briefly the issues and problems highlighted by that research. These
have to be seen, however, in the light of the development - or rather lack of development - of the overall BTB project. With the failure to attract funding from the Wolfson Foundation, of which initially high hopes had been held, it became clear early in 1987 that the project as originally conceived was not going to proceed. The decision was therefore taken by Heriot-Watt not to finance the RA post for a further academic year, since the University's own experience in the field of computerised lexicography was not such as to permit it to pursue the more ad hoc, responsive approach to terminological work now seemingly indicated. The project as such is thus complete at Heriot-Watt, although the RA remains attached to the Department of Languages in another capacity and will thus be in a position to tie up remaining loose ends, in particular those concerned with the verification of already assembled foreign-language data.

The primary objective, that of creating an initial, high-quality data stock in the chosen subject field, has been achieved, at least with regard to English-language terminology. A glossary, covering some 200 concepts, has been compiled (1), including definitions (newly drafted for the project), contexts and other supporting data. Equivalents in French, German and Spanish are included, where locatable in the available literature and subject to verification by native-speaker experts. This process is currently underway with regard to Spanish-language terms and it is hoped to extend it to French-language ones. All German equivalents included are taken from DIN standards; they will not be subject to further verification.

Data processing aspects

The first area in which general conclusions might be drawn from the Heriot-Watt research is that of the computerisation of terminological data - the structure of the data files set up and the software used for storage and retrieval of those data. Given the truncated nature of the project, the testing to which these were subjected was by no means comprehensive, even within the confines of the relatively narrow subject field. In any case, development work is still continuing on both aspects at CCL. Some comments are, however, appropriate.

(1) Data Structure

With regard to data structure, that used for the project was devised by CCL from study of existing term banks (SAGER & MCNAUGHT 1986) and is described in Appendix I to this article. It underwent certain modifications over the period of the project (see Appendix II), some of which had already shown themselves to be indispensable for work in the chosen subject field. Thus a maximum length of 48 characters, as originally implemented, for all main terms was inadequate when, for example, "equivalent weighted normalized impact sound pressure level" (58 characters) denotes a distinct standardized concept in sound insulation. Similarly, the maximum field lengths of 180 and 120 characters, respectively, allocated to the definition and concept fields were insufficient.
In the case of the definition field, in fact, it was clearly unrealistic to impose any arbitrary upper limit, since without full source-language definitions the value of the data compiled would be totally undermined. The introduction of full subsidiary information for abbreviations and, especially, full synonyms also represented a significant improvement, since it permitted differences in usage etc. to be highlighted. The reductions to the term record size effected by suppression of all source and source type fields were not considered to be significant, since these fields had in any case shown themselves to be superfluous.

One problematic area left unresolved by these amendments was the location and extent of supplementary annotations. In practice, the scope note field was not found to be necessary, probably because the chosen subject field was already a highly restricted one (2). It could therefore be used to record additional information relating to a concept rather than a term or synonym, where this proved desirable (3). Similarly the grammatical note field included in the supplementary information for all main terms, full synonyms, abbreviations and foreign-language equivalents was found to be superfluous as regards its overt purpose and was, in practice, used instead to record additional relevant information relating to terms (eg the reasons why a particular full synonym has become obsolete, or differences in conceptual structure between language areas reflected in the absence of a 1-to-1 correspondence between source-language term and foreign-language equivalent(s)).

This latter case is, of course, a particularly difficult area in computerised terminography, and it is unclear whether there is any wholly satisfactory method of resolving the difficulties associated with it. The CCL data structure omits any field supposedly showing the degree of "overlap" between a source-language term and its foreign-language equivalent, sometimes attempted by a crude "total"/"partial" classification. This decision seems entirely justified since the information gained by the use of such a field is effectively valueless- the need is for specification of differences in the areas of use between a source-language term and its equivalent rather than a mere acknowledgement of their existence. On the other hand, reliance on a single context (4) entry to distinguish adequately between differing usages in distinct language areas did not prove adequate in the chosen subject field - hence the resort to use of the grammatical note field. The use of multiple contexts would allow the area of use of a particular foreign-language equivalent to be more widely illustrated, but would not permit delimitation of that area, which is often the real point at issue. It would seem therefore that a separate text field, either replacing or supplementing the present grammatical note, is required for all foreign-language equivalents.

(2) Storage and retrieval routines

With regard to the initial storage and subsequent modification of data, the routines devised by CCL proved adequate during the period of the project. One point worthy of note was the need when
modifying an entry to confirm or reject all data items up to the
field of immediate concern, a screen at a time, prior to effect-
ing the amendment at issue. Thus, for example, to correct one
character in a French-language equivalent for a particular term,
it might prove necessary to view, and confirm as correct, the
concept data screen, the main term subsidiary data, the abbrevia-
tion, full synonym and foreign-language equivalent summary scre-
ens as well as an unlimited number of screens relating to indi-
vidual abbreviations, synonyms and equivalents - each requiring two
keystrokes - before making the single amendment desired. A system
whereby direct access could be achieved to the field or fields to
be amended for a particular term record would make the modifica-
tion process significantly quicker and less tedious for the ope-
rator.

With regard to data retrieval, one major improvement carried out
by CCL at the request of Heriot-Watt was provision of an option
to suppress display of the subject field during searches of the
index. Since only one subject area was involved in the pilot pro-
ject this involved no loss of information, while the additional
space thus provided for the display of main terms and full syno-
nyms was essential to the identification of individual entries
when carrying out queries (or, indeed, amendments) (5). A problem
which remained was the fact that the related terms field of the
proposed data structure (6) was never in fact implemented, as a
result of which searches of the database by chaining on the basis
of terminological relations continued to be impossible. The ab-
sence of such a facility means that the value of the term bank
software is severely reduced, since the establishment of struc-
tured relationships is central to the discipline of terminology.
However, this problem is not essentially a data processing one.
It is rather a problem of the discipline itself, and as such will
be considered in the following section.

Terminological aspects

Turning to terminology theoretical aspects of the project, the
first point to be considered is the tricky one of subject field
delimitation. The particular subject field chosen, that of sound
insulation, illustrated the point nicely, since this is an area
which lies at the junction of at least two disciplines (acoustics
and construction), and indeed also of a third (electronics), if
terminology of instrumentation involved in sound insulation mea-
urements were to be included. Thus certain terms ("impact sound",", flanking transmission") may have rather different, and
more precise, meanings when used in referring to sound insulation
standards rather than general literature on the subject. On the
other hand, a number of terms used widely in construction, such
as "batten", "tie" or "joist", are fundamental to much literature
on sound insulation techniques, without in any way being specia-
list to the subject. In other words, even such an apparently clo-
sely defined subject area has extremely ill-defined terminologi-
cal boundaries. By focussing on the concepts involved, in line
with terminological principles, the first problem was on the
whole capable of solution, with a number of terms appearing more
than once in the database as a result (7). Inevitably, the second
problem had to be approached on a more ad hoc basis, the principle adopted being that of including general building concepts essential to distinguish between distinct types of insulating construction (eg "batten"), or related with particular insulation problems (eg "tie"), while rejecting those which, though present in sound insulation literature, play an essentially passive role in the subject (eg "masonry wall", "floorboard"). Nonetheless, the boundaries of the subject area remained far from clear, and an extension of the pilot project into other aspects of sound insulation would undoubtedly have served to aggravate this problem, both in consideration of materials used in construction and of electronic instruments used in insulation measurements.

A second issue generally recognised in the terminological literature and by practitioners in the United Kingdom is that of whether terminology should be normative or descriptive in its approach. While WUSTER’s original conception of the discipline tended more towards the former view, the reality of practice in the UK has moved towards a more descriptive approach, especially as terminographical work has moved out of its original field in the pure sciences and technology, in particular electro-technology. In the context of a pilot database, one of the functions of which is intended to be assistance in translation of English-language terminology into other languages, a descriptive focus is almost inevitable. This is particularly the case in a field like sound insulation, where it is clear that terminology usage, at least in English, is often extremely loose (8). Nor is the situation eased by the paucity, and at times conflicting sense, of dictionary or other definitions. In effect, the most authoritative source is that provided by BSI standards in the field, but these do not cover anything like the full range of concepts concerned and in any case are heavily influenced by the English used in ISO standards, often at variance with that actually employed by British practitioners (9). Under these circumstances there is an evident danger that the adoption of a purely descriptive approach in compilation of a term bank might serve to compound and entrench an already existing degree of terminological confusion. The presence of a usage field for all terms included in the database means that the danger can be limited, but the crucial issue here is the degree of authority attached to the terminological data concerned. This point will be addressed in the following section, since it is essentially concerned with the project structure rather than with terminological principles as such.

The third issue of terminological theory to be touched on here concerns the relational structuring of concepts which lies at the very heart of that theory. All literature on the subject stresses the vital importance of such structuring in distinguishing terminological work from mere special language lexicography. Any system of concepts which lacks a structure of this type is not only unsound from a terminological viewpoint, it is also essentially incapable of retrieval other than on the basis of an alphabetical ordering, ie it remains fundamentally a (sophisticated) dictionary. Two major problems arise, however, in implementing the idea of a relational structure. On the one hand, a number of potential relations between concepts may be identified - see, for example,
FELBER (1984: 120-130) - and symbols assigned to them, but the question of how best to represent these within the format of an individual term record has yet to be properly addressed. Since the related terms field of the pilot project term record was never in fact implemented, no testing of possible solutions was carried out. What did emerge during interrogation of the pilot database, however, was the restriction imposed by inability to chain between terms, i.e. to link directly from examination of a particular term record to that of related term records, without the need to return to the term index, examine other term definitions, etc.

In fact the difficulties involved in implementing some such facility are by no means insurmountable. The need would be for:

(a) a suitably flexible data structure (allowing inclusion of multiple related terms for any given record);
(b) an agreed set of relations and their character representations at the time of input to the database;
(c) an economical means of storing those representations within the computer's memory (i.e. a relational database structure of some description);
(d) a validation capability to ensure that specification of any related term occurs in a manner consistent with their representation within the term bank (no spelling mistakes, no use of synonyms instead of main terms, etc.);
(e) suitable retrieval software (again, a standard DBMS requirement).

Clearly, then, the related terms field could be made operational. Yet in a subject such as sound insulation, where construction terminology bordering on everyday language is employed alongside the precise language of insulation standards, the value of a sophisticated relational structure is often questionable. "Party wall", "partition wall", "double-leaf wall" and "separating wall" are all terms which in the particular field refer to distinct and significant concepts, but it is at best debatable whether anything is gained by relating them all to the broader concept of "wall" and, more significantly, by expending human and computing resources in permitting the representation of that relationship.

Certainly sound insulation is not unique in this respect. Once terminology moves away from the fields of natural science and high-level technology into lower-level technologies and the social sciences a similar situation is always likely to arise. The question then is whether the loss of analytical ability involved in suppressing the facility to record related terms (other than a general, thesaurus-like broader term/narrower term categorisation), already noted above with regard to the pilot project, is sufficiently serious to justify the expenditure on more sophisticated data structures and the programming to exploit them. To a large extent the answer to that question will depend on the context in which terminological work takes place, but that in itself indicates that the concept of a national - or multinational - term bank covering, at least potentially, the entire range of natural science, technological and social science subject fields may well be an inappropriate basis for practical terminology collection and utilisation.
Project context

That context is the third aspect on which lessons could be drawn from the Heriot-Watt experience. The BTB project represented an attempt to set up just such a national term bank, initiated essentially by language specialists rather than by users of terminology themselves, albeit in the presence of evidence of an existing need among such users (SAGER & PRICE 1983). The particular form of the pilot project at Heriot-Watt reflected that situation, in that the initial approach to the specialist Department concerned, that of Building, emanated from the Languages Department and not vice versa. Although the support received from the Building Department throughout the pilot project, both from the designated contact person and other colleagues approached informally, was excellent, the fact remained that the work being carried out appeared to be essentially peripheral to the Department’s concerns. This could be taken as indicating both a failure to sell the project sufficiently well within the University, and the placing of a relatively low priority on the availability of clearly-defined terminology in an area of Departmental expertise. It would seem that practitioners in the subject are, on the whole, content that terminology usage provides no major problems, although it has already been noted that considerable variation is apparent in such usage.

Under such circumstances, there were obvious difficulties for the project RA in acquainting himself, as a layman, with the subject matter concerned. Although a process was devised to permit all English-language terminological data generated to be verified by subject experts, there can be little doubt that such data could have been generated more efficiently and accurately if the experts concerned had worked in conjunction with the RA throughout the project. Clearly an arrangement along these lines would only be possible if a collaborating technical Department were to be involved in the process of project design at a much earlier stage. Of course, difficulties related to the generation and verification of foreign-language data - in essence, the establishment and maintenance of contacts with professional colleagues in other language areas - would still have remained, but these too could be much reduced if the motive force behind a project of this type were to come, at least in part, from practitioners in the chosen subject field. In this connection, however, it must be noted that the relative insignificance of the international commercial dimension in sound insulation (10) means that the harnessing of non-academic practitioners in other language areas remains unlikely, a particularly important consideration at a time of public sector financial stringency like the present - and the foreseeable future.

This last point underlines again the significance of the subject environment in which terminological work is carried out, an issue which has already arisen in the foregoing sections. First, this environment will determine to a large extent the resources which can be devoted to such work, and thus the level of sophistication in terms of equipment, software, etc. which can be utilised. Thus,
terminological projects in high-level technology fields enjoying major inputs in terms of public sector research funding and generating significant trade flows between language areas will clearly be able to call on vastly greater resources than work in lower-level technology or social science disciplines, which are relatively starved of public money and commercially much less important. Secondly, the type of subject field will also influence the type of terminological data which require to be recorded in a term bank. Again, social sciences and lower-level technologies may employ terminology which is much less amenable to classification in strict conceptual structures and to expression in the form of numerical, or quasi-numerical, codes (11). Finally, the relationship between subject field practitioners and terminological specialists in the promotion of particular projects will be of considerable importance. On the one hand it will heavily influence the ease of contact with centres of expertise in the subject area, and thus the ease with which data can be compiled, and on the other it will largely determine the status which is accorded to that data, and so its subsequent usage and maintenance. Clearly these differences between subject fields have implications for the concept of a national term bank covering, at least in theory, the entire range of scientific knowledge.

Conclusions

Clearly the fate of the BTB project - collapse as the result of unavailability of adequate financial backing - must call into question the economic viability of such a national, multidisciplinary facility. Moreover, the experience obtained during 1986/87 at Heriot-Watt of practical terminological compilation would tend to reinforce such doubts, in that it suggests that the concept itself may not be a valid model for future work in the area.

While the software developed at CCL for use in a microprocessor environment has proved to be largely satisfactory for the collection of data in the chosen subject field, nonetheless the nature of those data and the way in which the software was applied both tend to suggest that more account needs to be taken of the varying demands imposed, and opportunities afforded, by the characteristics of individual subjects. These differences can be summed up under two headings, although the categories obviously interact with each other.

(a) Resource availability. The commercial significance of a particular subject field is a determining factor in the extent of financial resources available for terminological work, above all given the prevailing political climate in the United Kingdom. Such resources in turn largely determine how ambitious any projects undertaken may be, in terms of the scope of data collection and the sophistication of analysis facilities.

(b) Data structure. The extent and type of information which can usefully be collected on individual concepts will probably also vary according to the nature of the subject field - its breadth, the level of the technology involved,
the degree of specialisation of the terminology encountered, etc. In particular, the applicability of implementing a rigorous terminological structure, as conceived by WUSTER, will be affected by such considerations. The ways in which the assembled data are to be retrieved, and thus the software required, will be determined largely by the appropriate data structure.

It is clearly of the utmost importance that experts in the individual subject field be involved, along with terminologists, from the very outset of any projects undertaken. Only in fields in which practitioners themselves are thoroughly convinced of an existing need for some sort of terminological resource at national level is effort expended on creating such a resource likely to prove fruitful. This consideration applies both to the compilation of monolingual data in the source language and to the establishment of satisfactory links with experts in other language areas, from whom reliable foreign-language data may be obtained.

The above considerations would suggest that the concept of a national term bank for the UK must be more flexible than the model adopted in the BTB project. In terms of the material to be collected it would be limited to the specification of a core data structure, probably substantially reduced from that used by BTB, but possibly also backed up by guidelines for record extensions suitable for applications in particular types of subject field. Organisationally, the minimum requirement would appear to be for a central information exchange, through which details of these recommended structures could be disseminated, as well as information on projects already in motion. The key issue would seem to be the establishment of communications channels which would enable terminologists to become aware of perceived needs in individual subject fields, where resources are already available, and where their skills could usefully be harnessed. Terminologists must be responsive rather than directive if they wish to secure their future employment.

Notes

1. The glossary is available from Department of Languages, Heriot-Watt University, Chambers Street, Edinburgh EH1 1HX, Scotland

2. The scope note field was seen by CCL as a means of restricting usage of terms to particular sub-fields of subjects recognised by the term bank as such. In this particular case (sound insulation), the subject area chosen would itself, in all probability, constitute such a sub-field in the event of the data collected being incorporated within a larger, main-frame resident term bank.

3. For example, the fact that the single-number quantities describing the airborne sound insulation properties of individual building elements, derived from measurements made in the presence and absence of flanking transmission and indicated by the symbols $R_w$ and $R'_w$, respectively, are regarded as distinct concepts known as "weighted sound reduction index" and
"weighted apparent sound reduction index", whereas in the case of impact sound insulation properties of floors the corresponding single-number quantities $L_{NW}$ and $L_{' NW}$ are now regarded as referring to the single concept "weighted normalized impact sound pressure level".

4. There is, of course, no reason why the existing context field, of unlimited length, associated with each foreign-language equivalent should not be used to hold multiple contextual examples. However, since only one source reference code and page number may be held, such a procedure would violate the principle of strict attribution of all contextual data.

5. Using the original software, only the initial 26 characters of any term (or synonym), or inverted forms thereof, could be displayed. Thus, for example, it was impossible to distinguish between the index entries "weighted normalized impact sound pressure level" and "weighted normalized impact sound pressure level, equivalent" (the latter derived from "equivalent weighted normalized impact sound pressure level").

6. See Appendix II.

7. For example, "flanking transmission (1)" and "flanking transmission (2)" are separate terms which relate to distinct concepts.

8. Thus the term "mass", which would appear to be almost incapable of ambiguous interpretation, is frequently used in sound insulation literature to refer to the concept more appropriately identified as "surface density", the units of which are kilograms per sq. metre. Apart from this glaring example, however, a number of terms were identified which are clearly used to refer to more than one concept - as fundamental a term as "impact sound" is used to mean a much narrower concept in the context of standards than in general usage in the field.

9. BS 5821 : 1984, the BSI version of ISO 717 (see Bibliography), includes in its "National foreword" the remark that among the changes from the previous version BS.5821 : 1980 is the replacement of the term "index" by "single-number quantity" - in line with ISO usage - although "(u)se of the term 'index' is more usual within the United Kingdom".

10. The two main areas of potential international exchange related to sound insulation are (a) instrumentation and (b) construction materials. In the first case, the market is to a large extent dominated by a single (Danish) manufacturer which is thus in the position of effectively determining much of the terminology used. In the second case the products concerned, like most of those used by the construction industry, have a low ratio of value to weight and volume, so that individual national - or indeed local - markets are the rule. Thus the need to translate terminology for commercial purposes is relatively rare.

11. A set of "quasi-numerical" codes would consist of a discrete set of well-defined categories, indicated by single letters or other alphanumerical codes.
Appendix I

Data structure
Initial demonstrator model record format

Field

Record origin
Pool number
Term number
Originator
Entry date

Language

Subject
Term
Term source
Term source type
Term source number
Term source page
Usage note
Scope note
Full synonym(s)
Abbreviation(s)
Definition

Definition source
Definition source type
Definition source number
Definition source page
Context

Context source
Context source type
Context source number
Context source page
Foreign lang.equivalent

Language
Equiv. source
Equiv. source type
Equiv. source number
Equiv. source page
Usage note
Equiv. context

Context source
Context source type
Context source number
Context source page

Comments

Recording centre (ie Heriot-Watt)
Unique within pool
Initials of recording individual
Field repeated for each update of record
Source language (in this case English)
In this case "Sound Insulation"
Maximum 48 characters

Maximum 6
Maximum 6
Maximum 3 lines, 80 characters per line

Maximum 2 lines, 80 characters per line

Maximum 48 characters, repeated as required

Maximum 2 lines, 80 characters per line
Appendix II

**Data structure**
Demonstrator model record format as finally implemented

<table>
<thead>
<tr>
<th>Field</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Record origin</td>
<td>Recording centre (pre-set to Heriot-Watt)</td>
</tr>
<tr>
<td>Pool number</td>
<td>Unique within pool</td>
</tr>
<tr>
<td>Term number</td>
<td>Pre-set</td>
</tr>
<tr>
<td>Originator</td>
<td>Field repeated for each update of record</td>
</tr>
<tr>
<td>Entry date</td>
<td>Pre-set to English</td>
</tr>
<tr>
<td>Language</td>
<td>Pre-set to &quot;Sound insulation&quot;</td>
</tr>
<tr>
<td>Subject</td>
<td>No maximum length</td>
</tr>
<tr>
<td>Term</td>
<td></td>
</tr>
<tr>
<td>Term source number</td>
<td>No maximum length</td>
</tr>
<tr>
<td>Term source page</td>
<td></td>
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<tr>
<td>Usage note</td>
<td></td>
</tr>
<tr>
<td>Scope note</td>
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<tr>
<td>Context</td>
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</tr>
<tr>
<td>Context source number</td>
<td>No maximum length</td>
</tr>
<tr>
<td>Context source page</td>
<td></td>
</tr>
<tr>
<td>Full synonym</td>
<td>No maximum length, repeated as required</td>
</tr>
</tbody>
</table>

| Synonym source number         |                                               |
| Synonym source page           |                                               |
| Usage note                    |                                               |
| Synonym context               |                                               |
| Context                       |                                               |
| Context source number         |                                               |
| Context source page           |                                               |
| Scope note                    |                                               |
| Abbreviation                  | Repeated as required                          |
| Abbr. source number           |                                               |
| Abbr. source page             |                                               |
| Usage note                    |                                               |
| Abbreviation context          |                                               |
| Context                       |                                               |
| Abbr. context source number   |                                               |
| Context source number         |                                               |
| Context source page           |                                               |
| Scope note                    |                                               |
| Foreign lang. equivalent      | No maximum length, repeated as required       |

| Language                      |                                               |
| Equiv. source number          |                                               |
| Equiv. source page            |                                               |
| Usage note                    |                                               |
| Equiv. context                | No maximum length                             |
| Context                       |                                               |
| Context source number         |                                               |
| Context source page           |                                               |
Bibliography


