TRANSCRIPTION AND EDITION OF A MEDIEVAL MANUSCRIPT WITH THE HELP OF THE COMPUTER

ANNE GILMOUR-BRYSON
Institut d'Études Médiévales
Université de Montréal

It is to the person who has not yet worked with computers, and who is faced with a long and difficult editing task, that I wish to address myself. A project need not be vast, nor have access to a great deal of money in order to make good use of the computer. I propose to set forth the method I used, and the ways in which it proved helpful, with the hope that it may encourage other non-computer specialists to make use of that ubiquitous tool—the computer.[1]

Father Mariano D'Alatri of the Capuchin Historical Institute, Rome, advised me of the existence of an unedited manuscript: Vatican Archives, Castel Sant'Angelo, Armadio D-207, unique transcript of the trial of the Templars in the Papal States in 1309-1310. The more important trials of the Templars in Paris and in London, as well as several others, have been edited by Michelet or by Schottmüller.[2] These trials frequently exist in two versions, one available in the Vatican Archives, the other kept in the place where the trial occurred.

It would seem evident that D-207 is not complete as it contains references to events not in fact in the document. The introduction including the papal letter of instruction is missing. The first thirteen membranes of the *rotulus* (33.5 by .273 meters) are badly damaged by poor restoration or by mould. Creases in the parchment, and occasional further areas of mould, obscure words or lines elsewhere. About 60% of the text is, however, in excellent condition.

Dr. Serge Lusignan, professor of the computer treatment of medieval texts at the Université de Montréal, Institut d'études médiévales, suggested that I enter the complete text of D-207, beginning with the most legible portions, as an aid to transcribing the only partially legible sections, and as a means of producing the

[1] The non-specialist may consult David Herlihy, "Computer-Assisted Analysis of the Statistical Documents of Medieval Society," in *Medieval Studies: an Introduction,* ed. James Powell (Syracuse: Syracuse University Press, 1975). A. Chandor, J. Graham, R. Williamson, eds., *A Dictionary of Computers* (Middlesex: Penguin, 1970). Vern Bullough, Serge Lusignan, Thomas Ohlgren, "Computers and the Medievalist," *Speculum,* 49,2 (1974), 392-402.

[2] Jules Michelet, *Le Procès des Templiers* (Paris, 1841-51). Konrad Schottmüller, *Der Untergang des Templerordens,* II (Berlin: Mittler and Co., 1887).

Manuscripta, XXII (1978), 25-39

most accurate and complete text in a minimal length of time.

It is advisable to enter the complete text whenever possible, including punctuation, since while it is very simple to eliminate unnecessary words later during certain types of text treatment, it is exceedingly time consuming to add them at a later stage should they be needed. If, as in my case, the complete text is to be automatically reproduced by photo-composition using the computerized text, nothing may be omitted.

The first step involves entering the text into the computer. I used a terminal, a machine similar to an electric typewriter with the same keyboard. Provided that a satisfactory program exists to treat textual material (I used TELUM, an on-line file-editing program developed at this university), it is not necessary to punch cards manually nor to change prose into a complex code. The text, or any part of it, can be automatically transferred onto punch cards, if this is desirable, at any time.

It is, none the less, preferable from the outset to use some signs or symbols as well as the usual letters to identify material or types of material which the computer will eventually be asked to list or treat in some way separately from the text as a whole.[3] If only an index and concordance is required, the use of symbols to identify particular words is not necessary. Since the edition of a manuscript will presumably have an index of its own, however, some way of further separating certain items from the text as a whole may be required. One could not ask the computer to list separately all bishops in the text if the computer had no way to distinguish the names of bishops from other words. If, for example, only the names of people and places are to be treated later in this way, one could simply precede and follow each of them when entering text with any symbol, letter or number not used for any other purpose in the text. The names of persons might be entered as: *IOHANNES DE VASSANO* or *PETRUS THEBALDI DE TYBURE*; places as $VITERBIUM$ or $ALBANO$. If further categories seem desirable, one could use % to identify names of churches: *ecclesia* %SANTE MARIE%, and @ to identify particular functions of persons in the text: @EPISCOPUS@, @IUDEX@ and so on. It does not matter which symbol one uses. What is important is to try to determine which categories will be needed before entering the text. Naturally these strange symbols are eliminated before printing any definitive version of the text.

[3] Lucie Fossier, Gian Piero Zarri, "L'indexation automatique des sources documentaires anciennes," *Institut de recherche et d'histoire des textes* (Paris: CNRS, 1975), 17-21 et passim.

It is not impossible to add categories to a text already in the computer. I had to do this with my own text in which only proper nouns had been identified during input. Adding the symbols for a dozen different categories needed by the eventual index to the edition added about two weeks to the job of preparing the text. These various symbols will make it possible for the computer to arrange the categories of items either by the order in which they appear in the text, or by alphabetical list, whenever such information is needed. The essential references to the place of each item in the text will automatically be furnished at the same time, facilitating enormously the preparation of the index.

The text may be entered on the terminal while on line with the central computer, or on cassettes subsequently transferred to the computer. In either case, any amount of correction can be done on the line one is typing. In order to decide which method of text entry to use two factors should be considered. Cassettes may be filled when it is impossible to use the central computer due to overloading or a general breakdown. This method also costs about one third as much as entering text while on line. On the other hand, cassettes are very difficult to correct, exception made of the line being typed, until the text has been transmitted from cassette to computer. It can be annoying to know that errors exist and be unable to correct them until some future time.

Once the text, or any part of it, is in the computer, a command is given to the Computer Center to print-out or list the text.[4]

```
LIRE ANNE
DIS
```

In about one hour, a printed copy of the file is ready to be picked up. The cost for a file of 10,000 words is about $1.00 for printing plus a charge for the paper used. We receive bills for our time used and services needed from the Computer Center. These bills are for our records only as all approved projects are carried out free of charge.

The main difference in entering text for computer use instead of preparing a typescript is that each line must, from the beginning, bear a numerical reference to its place in the original text—the line or verse number. This number permits the computer, when treating the text later, to furnish a precise reference to the place of each word in the original document. The computer itself generates a number for each line in the text as the text is entered. This number has nothing to do with the line numbers in the document and will

[4] Computer commands are listed here only as an indication. Each system or program has its own series of commands.

disappear when the text is finally printed. The lines are more often numbered by the computer by tens than by ones, which enables the operator to insert up to nine lines of missing text without changing the numbers of the following lines. The equally important reference number to membrane, page or folio can be added to all the applicable lines with one command after that portion is entered and need not be repeated on every line:

```
/R 10760 12590 // 12 /
```

The above command requests the computer to add the membrane number twelve, followed and preceded by a space, to the beginning of all lines bearing the computer numbers 10760 to 12590. The first three lines of membrane twelve would now appear numbered:

```
10760 12 01
10770 12 02
10780 12 03
```

Text for purposes of identification in the Computer Center exist in files of any desired length bearing names invented by the operator. Computer use is less expensive when the machine treats small amounts of material; hence the practice of dividing a text into separate files worked on one at a time. Correcting also proceeds faster if one is working on relatively small amounts of text. My six files were identified as Anne1 to Anne6.

It may take the novice somewhat longer to enter text on a terminal than it would to use a typewriter. One must not ignore, nevertheless, the important fact that the operator can work as I did from a handwritten transcript, or even from photographs of the manuscript, which could not be handed over to a Computer Center operator. He does not have to furnish a neat and legible version if he is going to enter the text himself. He will spend scarcely any more time entering his complete text than he would in preparing a version for someone else to enter. If funds permit the use of a paid person to enter the text, a text like mine of 59,500 words would cost about $683.00. Two persons would enter the text on punched cards. An automatic comparison of the two sets of cards reveals any errors in key punching.

When cassette Anne1 was full and entered, the computer was asked to produce a listing of the text entered so far. This cassette contained membranes 29 through 36 in random order, skipped several more difficult ones, then included membranes 43 to 45. I had decided to transcribe my text beginning with the clearest membranes, proceeding successively to more and more difficult portions and ignoring for the moment the real order of the material. When working with a text destined for the computer, the text may

be input in any order whatever and quickly rearranged in perfect order at any time:

```
*Lire 500 650 Anne1
*Lire 120 370 Anne2
*Lire 10 490 Anne1
*Lire 10 110 Anne2
```

This command results, in several seconds, in the text heretofore existing out of order in two files being put in order.

It is easier, when beginning transcription of an unfamiliar and difficult manuscript, to begin with the most legible sections. D—207, like all legal texts, was highly repetitive. By entering the clear portions first, I hoped to use the computer's memory to reconstitute the only partially legible portions by bringing together identical expressions elsewhere in the text. This aspect more than any other led me to use the computer to work on my text.

After text entry, the next step is to begin corrections. Correcting by computer is without doubt one of the greatest possible aids to the transcriber of a difficult manuscript. In this case, the enormous saving in time and cost of having the text retyped several times during the stage of preparation of the final text is infinitely greater than the somewhat longer time which may have been required to enter the text in the first place. The amount of time saved by using the computer to produce a clean error-free text would be directly proportional to the difficulty of the manuscript. A text written in a clear hand on a manuscript in good condition transcribed by an expert paleographer, might, upon verification, require almost no correction. In that case, while the use of the computer would furnish various quantitative and linguistic information, and would help enormously in preparing an index, its role in producing the text would be relatively small.

I was faced with a long manuscript posing serious problems caused by its condition. Had I worked and corrected on typed pages, I am sure that I should have had to type the almost sixty-thousand word text at least five times were it to remain readable. Unless the typist is an expert, and sometimes even then, each successive typing generates further errors necessitating continual proofreading of the text. Correcting by means of the computer produces a change only in the word, or often only in the syllable, to be corrected. All other words remain unchanged. Consider the following line with its two errors:

```
420 . . . PRESENTIBUS FRATRE THEBALDO VICARIODICTI DOMII EPISCOPI . . .
```

Use of the following command:

```
/R 420 /IOD/IO D/
```

produces the following result:

```
420 . . . PRESENTIBUS FRATRE THEBALDO VICARIO DICTI DOMII EPISCOPI . . .
```

Another command corrects "domii":

```
/R 420 /II/INI/
```

resulting in:

```
420 . . . PRESENTIBUS FRATRE THEBALDO VICARIO DICTI DOMINI EPISCOPI . . .
```

It is, of course, possible to correct more than one mistake in a line with the same command, or, if the line is hopelessly incorrect, to destroy it and insert a corrected line in its place.

At this point I requested, using thirteen lines of command, that Anne1 be treated by the program JUEDEMO in order to receive a printed copy of an index with all the words in alphabetical order, with references to the frequency of use and position of each in the text, followed by a concordance in which every word of text was printed out in the center of a line with the five or six preceding words to the left, the five or six following words to the right. These tools made it possible to verify word usage, grammatical form, resemblances, differences and punctuation. The command is by computer standards quite simple:

```
TEXTE = ANNE1
COMMANDE = VOCAB KWIC
REF = 7 GAUCHE
LIGNE = 90
TITRE = PROCES DES TEMPLIERS (CONCO TOTALE)
EDITION = COL 1 FREQ 1 REF *
OPTION = ALPHA
CONTEXTE = ISOLE LARGEUR 132
LANGUE = LATIN
ALPHABET = A,B,C,D,E,F,G,H,I,K,L,M,N,O,P,Q,R,S,T,U,V,W,
X,Y,Z,*,',(,),$,%,?,[,],<,>
LET TAMPON = -FDL
FIN
```

The words to the left of the equal signs are common to all users of JEUDEMO; those to the right apply to my particular job explaining such necessary items as length of line, alphabet and signs used, symbol used to separate words which continue onto a second line and the type of references I wish to receive.

INDEX

DOMINUS	06 06	06 49		2
DOMINIS	02 46			1
DOMO	04 48			1
DOMUS	04 88			1
DORSI	04 02	04 04		2
DUCATUS	01 18	06 08	06 38	3
DURAVERUNT	05 17			1
DICTIS	02 46			1
ECCLESIA	06 07	06 36		2

ECCLESIE	02 31	03 61	04 51	04 90	05 20	
	06 42					6
ECCLESIIS	02 49					1
EDICTI	06 65					1
EDICTORUM	01 37	01 54	06 13			3
EDICTUM	01 48	02 28	02 30	02 33	02 40	
	02 43	02 48	06 54			8

The first five columns of references provide the place of each word each time it occurred in the text. The single numbers refer to the frequency of that form in the portion of text treated. The above frequency figures refer to 9000 words of text only.

CONCORDANCE

06 06	VENERABILIS PATER	DOMINUS	IACOBUS DEI GRATIA
06 49	PLURIBUS TESTIBUS ET	DOMINUS	IACOBUS SUTRINUS
04 48	QUIA EXPULSA TOTA DE	DOMO	ET CLAUSURIS DOMUS, UT
04 02	ET IN ANO SEU SPINA	DORSI	.XXXI ITEM, ALIQUANDO IN
01 18	PETRI IN TUSCIA,	DUCATUS	SPOLETAN., APRUTII (. . .)
05 17	QUOD TANTO TEMPO	DURAVERUNT	SUPRADICTI PRAVI MODI ET
02 46	INQUISITORUM RETULIT	DICTIS	DOMINIS INQUISITORIBUS SE,
06 07	DE CHABLEIS IN	ECCLESIA	SANCTI MARTINI TURON.,
02 31	IN HOSTIIS DICTE	ECCLESIE	SANCTE MARIE DE AVENTINO

The above example of a concordance has been modified in length to fit the page. In fact, a concordance is normally 132 characters long containing several more words than I have indicated here. It also includes every use of a word, whereas I have indicated various examples but not every use of each word.

JEUDEMO, a program put into use at the Université de Montréal in 1972, was created precisely in order to treat textual material in certain specific ways: listing words in alphabetical order or inverse order, counting the number of different forms, the length of words and their frequency, and permitting a search to be made for particular words, or even groups of letters, although they may be separated by a variable distance in the text.[5] This program produces indexes and concordances in answer to the basic requirements of persons working in the humanities wishing to make use of the computer. Special programs are developed by the programmers to handle more complicated situations which require individual software.

My first index and concordance used only $35.47 worth of computer time. The job was accomplished in eighty-two seconds. The amount of information in the first index was not sufficient to permit with certainty the establishment of the difficult portions, but it did

[5] P. Bratley, S. Lusignan, F. Ouellette, "JEUDEMO: a text-handling system," in L. Mitchell, *Computers in the Humanities* (Edinburgh, 1974).

provide a great aid in correcting the text.

I realized that a word that I had transcribed as "Carbonana", using Schottmüller's spelling of the word, was in fact "Carbonaria", as it clearly appeared in membrane 9 where the abbreviation indicated the presence of an "r".[6] Previous appearances of the word had been ambiguous. The word which I mistook for "Lanilo" in membrane 21, and copied similarly several times later, turned up in membrane 25 with a capital "b" as "Barulo". Errors of this sort, had it not been for the computer-generated index or alphabetical list with references to the manuscript, would have required seven or eight hours of reading of the text each time in order to find every other use of that particular word. I doubt whether I should ever have found every use of some of the less important words needing correction. It is sufficiently arduous when reading through sixty thousand words looking for just one, that the eye has a tendency to skip past certain words, including perhaps the very one required, in order to dwell on something more important.

The index makes it much easier to correct misspelled words now that every use of a word, even though it be separated by hundreds or thousands of lines of text, will appear only a few lines away from all uses of that word in the list. Since the index includes the textual references for each word, a few minutes suffice to check every place in the entire manuscript where a certain word appears in order to make sure of the spelling, or of the expansion of an abbreviation. An historical text like mine containing thousands of proper nouns is particularly prone to uncorrected errors in spelling caused either by simple typing mistakes or by variations in the transcription of what may in reality be the same word. Proofreading is unlikely to catch these words present at some distance in the text as they look equally plausible. For example:

UGUICCIO
UGUICTIO
UGUICZIO

appeared at intervals of three hundred lines in the text, but in the same column of the index. A check back to the proper places in the manuscript showed that in fact the scribes had spelled the name three different ways. In the case of certain other names, however, a manuscript check showed that I had erred in my transcription and that the scribe or scribes had not spelled that name in different ways. Proofreading, particularly when one does it alone, never removes all the errors. The eye capriciously accepts a misspelled word in all

[6] Schottmüller, p. 404.

too familiar text. I was able to correct twenty-two errors which appeared in the final text but had not been detected in at least eight previous proofreadings.

The most helpful feature of the concordance at this point in the transcription process also concerns the correction of errors. When one reads a list of sentences in sequence in which *qui incipit* appears in all but one, which lists *quod incipit,* one is led back to the manuscript in order to find out whether the original scribe, or the transcriber, is responsible for the difference. I never changed a letter simply because of discrepancies noticed in the concordance. It was the spelling and usages of D-207 which I wanted to reproduce regardless of whether or not such spelling or usage was grammatically correct or uniform with other uses. What the concordance does is to provide a sort of red light suggesting a further check with the document.

In the course of verifications between the computer listings and the manuscript, I found on at least twenty-six occasions that I, like a medieval scribe, had skipped one or more entire lines of text because two lines, separated by several others, happened to begin with the same words. This ommission would ordinarily have meant the retyping of several pages of text. Instead, I simply typed the command:

```
/I 340
12 43 INQUISITORES A SEDE APOSTOLICA DEPUTATI SECIALITER
```

to indicate that I wished the missing line (12 43) to be inserted after the existing line (computer number 340), and the remaining text automatically moved ahead the necessary distance to permit this procedure. Far more often, perhaps three hundred times, a word was found to be missing. Another command:

```
/R 150 /DOM/DICTI DOM/
```

would ensure that in line 150, *domini* would become *dicti domini.* The other words in the line would move ahead but remain unchanged.

At the outset I did not know exactly how I would treat certain words. Would the place names ending in "n̄" be transcribed "Viterbiensis" or "Viterbien."? Should I differentiate between "i" and "j" or "u" and "v"? Several consultations with experts during the transcription period produced conflicting advice. I transcribed these words in several different ways at different moments. After coming to a decision, a few commands requested the machine to change all place names previously written out in full back to the "n." form. For example:

```
/R 10 85000 /VITERBIENSIS / VITERBIEN./
```

Another series of commands changed all the "j"s in the text to "i".

/R 10 85000 /J/I/

It is necessary to be exceedingly careful with this sort of command in order to make only the requisite changes. A command to change all "i"s to "j"s would naturally result not only in the desired return to Johannes from Iohannes, but in *inquisitor* becoming *jnqujsjtor.* When in doubt, a trial change on a representative section of text may help to decide which method is the quickest and simplest way to bring about the desired result. Only with a computer can one make changes affecting thousands of words in less than one minute with the knowledge that every word which ought to have been altered, in fact, has been.

For my particular purpose, the most useful feature of the second and larger concordance, made later at a cost of $75.00 in three minutes of time and including about half the text, was the aid it furnished in deciphering the only partly legible portions. I did not wish merely to use the probable missing word, nor to leave a blank space, but, given the two sorts of clues I had, to find out what word had actually been written there. First, I noted the previous key word or words which were readable and checked the concordance to see whether or not this or these words had in fact been used before. As most of this reconstitution was rechecked after entering membranes 9 through 57 and making a concordance of 54,613 words representing 4,929 different forms, and as the material in question is more than usually repetitive, this method was most successful. The damaged portions existed only in the parts of the document using legal formulae and never in the portions comporting testimony. If one compares the frequency of repetition in D-207 of 9.36 in a section containing 25,000 words, with the results of a study done on portions of commentary by Abelard, one finds repetition in Abelard of 6.4 in a portion containing 22,715 words of text. The same study shows much greater richness of language in a contemporary chronicle in which a sample of 25,445 words yielded 3,823 lemmatised forms with an average repetition of 6.6.[7] My particular method of using the concordance to find similar phrases could not have been used had I been working with a less repetitive text.

Once the concordance indicated the probable word or phrase, it

[7] Serge Lusignan, "Informatique et analyse de commentaires philosophiques médiévaux, *"Revue Internationale de Philosphie,* 103 (1973), 10-18. P. Tombeur, *Raoul de Saint-Trond Gesta Abbatum Trudonensium I-VII, Index verborum, Relevés statistiques* (The Hague, 1965), p. 23.

was necessary only to make sure that at least several of the requisite letters were visible in the damaged portion. As there were no actual holes in the section of D-207 under discussion, I could usually make out, with the help of enlarged photographs or magnifying lenses, enough letters to be reasonably certain of the missing word. Whenever any letter in the reconstitution was invisible, I inserted what that letter logically must have been within square brackets.

Let us consider several simple examples of this means of filling in otherwise blank spaces in a transcription. One line of membrane nine contains the words . . . *edictum ac ipsorum* [. . .]*itorum sigillorum munim*[. . . .] *rob*[. . .]. A check with the concordance shows that *edictum ac* may be followed by *nostrorum sigillorum,* clearly not the case here, or by *ipsorum inquisitorum*, which is the case here. *Sigillorum* is always followed by *munimine roboratas.* The complete phrase must read: . . . *edictum ac ipsorum* [*inquis*]-*itorum sigillorum munim*[*ine*] *rob*[*oratas*] . . . On another line of this membrane is "Viterbien." followed by a partially illegible word ending in [. . .]"eñ". The concordance shows that in the only four similar cases where "Vitierbien." is used in the same context followed by another place name, it is always "Tuscanen.", which in an enlargement of the line seems to be the case here as well. On line 24 of membrane 9, the two words following *presentibus,* when checked in the concordance, seem to be most probably *etiam* followed by a title: *domino, magistro, fratre,* etc. In this case, the "tia" of *etiam* is visible as is the "do" of *domino.* We clearly have *presentibus* [*e*]*tia*[*m*] *do*[*mino*] . . . One last example in line 33 of the same membrane: Iacobus de Monte Cuccho *qui pro* . . . The concordance lists nine similar cases. Each time *pro* is used in this way it is followed by *magno preceptore in illis* (or *dictis*) *partibus se gessisse.* In this case, on the microreader, the "ll" of the fourth word is visible indicating the presence of *illis* and not of *dictis.* At least one or two letters of the other badly faded words remain to show that the usual phrase probably existed here as well.

When 90% of the text had been made into an index and concordance, I returned from the Vatican Archives with a partial transcription of the first six membranes, those which had been so very badly damaged and which were unreadable on microfilm. The computer had furnished me with separate lists of each word in the MS about which I was unsure, and of each place where a portion of the text was illegible, enabling me to check in the most rapid and logical fashion each problem posed so far. I had been able to resolve many problem areas in the rest of the text, but I had been

able to decipher only 20% to 60% of the words in many lines of the early membranes, none at all in some small areas.

The technique I used to reconstitute larger portions of text differs somewhat from that I used previously to decipher only one or two words at a time. Once again the first step was to note any uncommon words readable in the portion to be completed. Finding an *et, predicti* or *quod* will not help fill in the spaces as these words are used respectively 4,401, 72, and 753 times in the text. Space will not permit me to explain the entire method in detail here, but I would like to give one example of how it operates. The problem involves reconstituting membrane 2, lines 61 to 68. On the manuscript I was able to make out the following words:

02 61 . . . quia nullus comparuit pro parte predictorum [. . .]
02 62 [. . .] magni preceptoris dicti ordinis in
02 62 dictis partibus constituti, nec aliquis [. . .] abs[. . .]
02 63 contumaciam accusare comparere curavit, licet ipsorum contumac[. . .]
02 63 [. . .] de [. . .] possent,
02 64 [. . .] are, de benignitate et equitate canonica
02 64 [. . .]
02 65 eos [. . .] et eorum quemlibet in diem sequentem hora vesperarum
02 65 [. . .] velle [. . .]
02 66 [. . .] die [. . .] dicti mensis post horam vesperarum,
02 66 [. . .] si non [. . .]
02 67 con[. . .] eos [. . .] et quemlibet eorum
02 67 [. . .]
02 68 in dicto loco Sancte Marie de Aventino de U[. . .]

Lines 69 to 71 are completely illegible, after which the membrane ends.

A check with the concordance revealed the following information: *quia nullus* occurs only in membrane 10, line 22; *pro parte predictorum* occurs on 10,23 and 14,22; *nec aliquis* only in 10,24. As *quia* had not been as clearly visible as I might have wished, I also checked *quibus nullus comparuit* in case I had erred in my transcription. That phrase could be found in 14,22, 18,42 and 50,02. The other visible words or phrases which exist in 02, lines 61 to 67 did not, however, fit in the formulae found in membranes 14, 18 or 50. It seemed that only the formula already found in membrane 10 would serve. I then fitted the possible words from 10 into the blanks in 02. I rechecked to make sure that each word transcribed from 02 existed in membrane 10, lines 23 onward. I

then entered the text for these lines as follows:

02 61 . . . quia nullus comparuit pro parte predictorum [ordinis militie
02 62 Templi Ierosolimitani et] magni preceptoris dicti ordinis in
02 62 dictis partibus constituti, nec aliquis [qui eorum] abs[entiam et
02 63 contumaciam accusare comparere curavit, licet ipsorum contumac[-
02 63 iam] de [iure] possent,
02 64 [ac ipsos contumaces reput]are, de benignitate et equitate canonica
02 64 [et propter magnitudinem negotii]
02 65 eos[dem] et eorum quemlibet in diem sequentem hora vesperarum
02 65 [se] velle [expectare dixerunt; et etiam comminati sunt
02 66 se] die [. . .] dicti mensis post horam vesperarum
02 66 [ipsius diei] si non [comparuerint omnes predicti vocati vel citati, processuros]
02 67 con[tra] eos[dem] et quemlibet eorum [non comparentium, prout
02 67 de iure fuerit procedendum et melius possint,]
02 68 in dicto loco Sancte Marie de Aventino de U[rbe.]

JUEDEMO will soon allow us to search for isolated letters or words within a given amount of text even though they are separated from each other. It is, however, much less expensive to use the concordance to perform the same function. It is possible to ask for a concordance which prints out two or more lines of text with each word instead of only one. A concordance of that sort is unfortunately two or three times as long and once again more expensive than the usual sort. If two or more plausible formulae are found when reconstituting text, each is cited. As always, the reconstituted text is placed within square brackets to enable the reader to accept or ignore the words presumed to have occupied that space.

Each use of the concordance, rather than a rereading of the complete text, saved me about one full day's work. In five months I was able to transcribe the entire text, enter it, correct a first time, verify my transcription with Father Raymond Giguère, Professor of Paleography, correct again, reverify against the microfilm at least twice more and make final corrections. At each stage, sometimes at the end of each day, I would request a new copy of the text so that I never had to work on written-over, many times erased, or pasted-over material.

I would estimate that by ordinary means the job would have required at least two years. Much more important, it is doubtful that

the final text achieved without the help of the machine would have been as close to the original. Certainly the search for similar formulae within the text would have required many months had I been obliged to proceed by reading the text each time.

The computer and its listings serve not only to help prepare the most error-free possible text, but also to assist with other aspects of the present or future work to be done. A text being edited for historical use may, none the less, contain much information of potential use to a linguistics expert or a philologist. The statistics automatically compiled by JEUDEMO while making the index—frequency and rate of repetition of each word—as well as the easily identified spelling variants, may be easily furnished to anyone who wishes to have them. The computerized version of the text can be made available to anyone who needs it, thus saving the long job of text entry. As more and more texts become available from computer centers all over the world, scholars should be increasingly able to work on sophisticated problems of text treatment or analysis without having to enter every text at the start. A computerized text is a much more versatile building block to future research than a conventional printed version of a text.

The index can be a great help to content analysis. I may refer quickly to the answer to any of the 127 questions asked each prisoner during the interrogations by two easy steps. The location of each question in the text may be found in the index of words under the roman numeral used to indicate that question in the text itself. A further check, to make sure that this matter was not discussed by a witness when replying to a different question altogether, is provided by means of one of the key words used in the allegation. Answers to question VII—that the Templars believed that Christ died for his sins and not to save mankind—may be found in the index under VII or under the word *sceleribus.*[8]

It would be foolish to pretend that there are no problems in using the computer in a project of this kind. It is necessary to be willing to spend several days or weeks to learn the right series of commands to effect the desired operations. Naturally, each computer center puts out a manual which explains how one uses its programs. Since these manuals are usually written for computer experts and not for those who possess no previous knowledge of computer studies, they may be extremely difficult, if not impossible, to follow.

[8] Vat. Arch. Castel Sant'Angelo, Armadio D-207, membrane 3, lines 45-46: "Item, ipsum non fuisse passum pro redemptione humani generis nec crucifixum sed pro sceleribus suis."

It helps considerably if one can be taught by someone who is a colleague in one's own field first, a computer user second. Lemmatisation of a text, although it may be partly accomplished automatically by the computer, is a long and tedious process. It was not needed for my text treatment up to this time, but will be done later if it becomes necessary. Breakdowns of the central computer cause frustrating delays and problems. Computer time itself may be difficult to obtain because of overuse of the system or a scale of priorities in effect in some universities.

For many potential users cost is a drawback. I have used $1400.00 of computer time up to the present moment. On the other hand, professional typing and retyping of the text would have cost considerably more than that. Production of the thesis by photo-composition will cost much less than secretarial fees. More important, it will require no proofreading whatever. The work will be finished in less than one third of the time I would otherwise have needed, allowing me to progress with another project.

I should like to thank Dr. Lusignan and the Centre de Calcul, Université de Montréal, for their help in carrying out this project, Father Giguère and Dr. Hugues Shooner of the Institut d'études médiévales for the invaluable assistance with problems of paleography, Father Leonard Boyle of the Pontifical Institute of Medieval Studies, Toronto, for his advice and encouragement, the Canada Council and the Government of Québec who awarded me doctoral grants to edit this manuscript and assisted with travel expenses.