# TIGERS AND POLAR BEARS

## or: Translating and the Computer

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"The polar bear and the tiger cannot fight" (Sigmund Freud)

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Things are happening after all. Machine aids for translators are beginning to look inviting, and actual machine translation (MT), thrown ignominiously out of fashion by the ALPAC report in 1966 [1], is now in use. Only our scepticism is unchanged. We remain wary, especially of MT. Yet although machine translation − or rather, in most cases, machine pre-translation − certainly has far-reaching implications, it is not, it seems, a threat to translators, unless of course they cannot translate better than the machine. Firstly, there will be no less work for translators. Secondly, MT and human translation are different: they will attract different texts, translators and users. In particular, MT will create a whole new market of users who would not otherwise obtain translations at all.

What follows is part report, part speculation and part an account of how one freelance translator, after many years of distrust, became first intrigued and then, to her astonishment, involved.

## I

### Aslib's multidisciplinary seminar.

Perhaps it is best to start with "Translating and the Computer", the seminar which Aslib organized in Sudbury House, London, on 14 November 1978, and in which Translators' Guild members also played a part.

As a Guild delegate to the Fédération Internationale des Traducteurs' 1977 congress in Montreal, I had dutifully attended the workshops on the machine, expecting to put the subject away again as I had done at 5-yearly intervals since 1960. What I saw in Montreal and at the Federal Translation Bureau in Ottawa convinced me that computers were

now relevant at last, and I reported that our members should be informed. Barbara Snell took the idea to Aslib, and what might have been a low-key lecture session for (with luck) 30 British translators snowballed out of all recognition, with 180 people from 12 countries having a packed, at times hilarious day with a deliberately wide-ranging programme: Artificial Intelligence; two machine translation systems (SYSTRAN, CULT); two machine-aided translation systems (EURODICAUTOM, TEAM); word processors; the contrasting approaches of two big corporations (Siemens, Xerox).

The first thing I noted was that the boundary between machine translation and machine-aided translation is now blurred, since even MT proper works only with an artificially simple original or much correction at a later stage. Introducing the seminar, Professor Juan Sager (UMIST; chairman of CETIL, the committee of experts advising the European Commission on language problems) emphasized that translators need not be Luddites. The machine depends heavily on people and actually needs a new type of translator, one who understands the way the machine works.

Cost, as always, is decisive. Even what Martin Kay of Xerox has called HTLGI (human translation like God intended) is not cheap, and all too frequently, as we well know, it is poor. It is also slow: human translation of the Acta Mathematica Sinica took 18 months, whereas libraries can, and do, buy Professor Loh's MT printout within 4 months of this journal's publication. MT may soon be economic in such cases or for large volumes of translation, as in the multinationals or the European Communities. "Money speaks sense in a language all nations understand." [2]. Machine aids, too, are becoming so cheap that quite a small English translation agency represented at the seminar already had a term bank (machine dictionary) on floppy disks, combined with word processing equipment.

Early MT is said to have failed because the machine, not having our knowledge of the world, could not sort out the relationships within sentences and so resolve ambiguities. Now, as Professor Yorick Wilks (Essex) told us, Artificial Intelligence (AI) techniques can model human association patterns and make the machine "intelligent". AI promises well [3].

The European Communities' approach to their immense translation problems are described later in this article. At the seminar their machine dictionary system EURODICAUTOM (founded 1973) and the American SYSTRAN MT system (bought 1976) were described by Jacques Goetschalckx (EC terminology bureau, Luxembourg) and Peter Arthern (head of the EC Council's English translation department in Brussels). A machine dictionary can be constantly updated and gives plenty of context. EURODICAUTOM includes definitions and sometimes notes. Frank Knowles (Professor of Language, Aston) suggested where Russian-English SYSTRAN might be improved to eliminate such felicities as "It handles it" for "He is courting her", or "We require world" for "We demand peace". Margaret Masterman (Cambridge Language Research Unit) set out the essential mechanisms of MT: fast batch-programmed bilingual MT like

Russian-English SYSTRAN, or pre-edited on-line assisted MT like CULT, which is slower, dearer and of higher quality. Most important, she highlighted MT's need for the human translator's high-grade intuitive skills, not only in pre-editing but in picking out words for special treatment and then programming special dictionary entries for them.

Professor Shiu-Chang Loh (Chinese University of Hong Kong) spoke on CULT, with which he had translated Chinese mathematics and physics journals (on-line since 1978). It was earlier CULT printout which had finally convinced me that MT could compete seriously for what a translator calls "information texts": material written for the interested and informed reader.

E. Tanke (Siemens) outlined the machine aids (term bank, word processors, very flexible programming) used for translating this company's highly specialized texts. Translators' work can be displayed on a cathode-ray tube, printed out or fed via OCR (optical character recognition) equipment for immediate typesetting. It is interesting that Siemens, with probably the largest company translation department in the world, use freelance typists to reduce overheads.

Finally, John Elliston, a Rank Xerox manager, related how Xerox technical writers restrict their vocabulary, producing simpler, more concrete language which SYSTRAN and also more foreigners can understand – and which some of us found more elegant than their standard jargon, good though this was of its kind. Many users, eg. in Scandinavia, read Xerox manuals in English rather than in translation; for these readers the freedom enjoyed by Xerox writers in the past had cost time and effort, even confusion, whereas the limpid style created by the new vocabulary reads easily and fast. There may be a lesson here, not merely for those who write for foreigners, but for many non-literary writers. It seems that writers (and presumably other people) wil accept fundamental changes like these if properly consulted. The Xerox writers are brought from different parts of the world to help determine their restricted vocabulary, since the suspicion of a regional preference, eg. within English or French, could jeopardize the scheme.

Aslib's "Translating & the Computer" (an intentionally broad title), then, gave as general a view as a one-day seminar could. Some 60% of the audience were translators (including, significantly, 15 freelancers), 13% library staff, 13% academics and the remainder from computer science, management and publishing. Discussions were extremely lively and down-to-earth. The proceedings ("Translating & the Computer", ed. Barbara M Snell) are available from the North-Holland Publishing Company, 1979, $29.25 or Hfl.60.00. The event proved to be the first of a series of November conferences, including "Machine Aids for Translators" in 1980 and the larger "Practical experience of Machine Translation" in 1981 (details elsewhere in this Newsletter).

II

The EEC's attack on the language barrier

The immense translation problem of the European Communities (EC) derives from the ideal of multilingualism. Learn a man's language and you are likely to respect his culture, not to invade him: but impose your language on him and you will invade without even noticing. In a community of equals there can be no dominant language [4].

However, the high-minded principle of complete multilingualism in the Communities is neither easy nor cheap to apply. The paragraphs that follow are based on an article by Professor Sager in UNESCO's ALSED newsletter.

Important documents appear in all seven Community languages, and all these seven versions carry equal weight. Over half the budget of the European Parliament goes to multilingualism. A third of the European Commission's graduate staff work full-time on the language barrier, and in 1977 they translated over half a million pages. This volume has been rising at the rate of some 10% per year - and when Spain and Portugal join, the number of combinations will leap from 42 to a horrific 72. Further details can be found in "The Economist" for 12 August 1978, in an article which begins: "The EEC Commission's recent study on the consequences of enlarging the community devoted precisely one sentence to languages: 'Questions arising in this connection require further study'." [5]
(Note, 1981: Language-related costs totalled £170M in 1979, over 40% of the cost of administering the Community. See also my article "Machines take over the Drudgery", "The Times" European Supplement, April 1981.)

A solution had to be found to the steadily rising volume and cost of translation and interpreting in the EC institutions, and in 1976 the European Parliament approved a first 3-year plan of action for the "Improvement of information transfer between European Languages". The plan was officially presented to the public at large at a conference of which many staff translators will have heard: Overcoming the Language Barrier [6], the Third European Congress on Information Systems and Networks, organized in Luxembourg on 3/6 May 1977 by the European Commission's Directorate General XIII (the directorate for scientific and technical information and information management). The multilingual dimension of information transfer was stressed in an impressive display of applied linguistics research and development, with some 700 participants and numerous papers on teaching and the use of languages in the Communities, multilingual terminology, human and machine-aided translation, multilingual thesauri and, of course, automatic translation. Another reason for the conference was EURONET, the Through EURONET we can consult data banks all over Europe, including, ultimately, EURODICAUTOM. The conference provided a meeting-point for future users of EURONET and those responsible for implementing it, and showed users the methods and tools which will soon be available. The main objective of the conference, however, was to give those responsible for the 3-year plan a good view of existing and developing systems and methods, so that the plan could be based on the best knowledge available. A second 3-year plan has followed.

The plans are intended to produce solutions which will reduce costs while maintaining or even improving the quality of the linguistic services. They are administered by the Commission's Directorate General XIII with the assistance from September 1977 of an advisory committee of experts from the 9 member states (CETIL). The British members are Chris Leamy of the British Library, and the chairman, Professor Sager. CETIL also acts as a forum for the exchange of information on the situation in the member states and at the Community level, covering all the interests represented in our Institute of Linguists: language knowledge and qualifications in various occupations, language teaching policies, translation, language policies concerning scientific and technical publications, and current or planned research.

Much of the plan of action concerns the application of computerized methods to the transfer of information between the Community languages. It is divided into the following sections:

> automatic pre-translation of unprocessed texts drafted in
>     natural language
> automatic translation of texts drafted in limited syntax
> terminology banks
> multilingual thesauri
> technical infra-structure (word processing)
> assessment of applied research
> encouragement of multilingualism

The Commission's work under the first three of these headings can be summarized as follows.

## Automatic pre-translation of "natural" texts

The Commission bought the SYSTRAN automatic translation system for development for the language pair English-French in 1976, and has since added French-English and English-Italian versions. Both SYSTRAN and the other existing systems have been designed mainly to supply information quickly to small groups of specialists in limited subject areas. Given the complexity of the documents used by the European institutions in respect of subject matter and text types and the high degree of accuracy and idiomaticity required by the extremely hetrogeneous user groups, both in these institutions and at the numerous levels of national government, the EC demands far more of SYSTRAN than any previous customer. A fair amount of post-editing is required, therefore, and since extensive dictionaries have to be compiled, the system may be used initially for only a limited range of subjects and types of text. This then is definitely machine pre-translation, rather than pure MT. It seems possible that a new generation of post-editors may have to be trained, for many translators and revisors have tended to find the work both difficult and irksome. (However, see my comments in section V. Meanwhile the Commission, again unlike all other customers, is carrying out development work on SYSTRAN and acquiring a large quantity of MT expertise; and SYSTRAN, if not of high quality, is now surprisingly good and clearly

improving.)

A system built upon 30 (let alone 72) language pairs is cumbersome, and it was felt that the considerable European expertise in automatic translation might yield a more convenient system. CETIL therefore began immediately to investigate the possibility of developing a joint European MT system, EUROTRA, which should be multilingual and modular, so that the various stages in the translation process could be developed separately and used for a variety of functions related to information transfer. This would be a major project, supported by both national governments and the Commission.

## Automatic translation of texts in limited syntax

TITUS, the multilingual MT system of the Institut Textile de France, translates textile abstracts drafted in limited syntax. It works into several languages simultaneously and is used by various countries. Once we accept that certain forms of communication can be standardized to some extent, the development of limited-syntax systems for the translation of restricted text types like abstracts becomes very attractive. The exclusion of post-editing would enable multi-lingual versions of texts to be produced much faster and more cheaply, especially as not only translation but the print-out and storage of documentation could be fully automated.

## Terminology banks

The Commission was one of the pioneers in the computer storage of terminology. The importance of terminology centres is enshrined in the UNESCO Recommendation on the legal protection of translators [7] (the "Nairobi Recommendation"). Britain, despite approving the Recommendation in 1976, has yet to set up even a terminology centre. In fact, however, every major country should have a computerized term bank (machine dictionary): an up-to-date, reliable and quick way to find or check terminology and its foreign equivalents. In the Commission too, with its very large number of translators who may work as a team on a single document and have to produce five equally valid and acceptable translations, a term bank is indispensable. EURODICAUTOM is fully operational, but for technical reasons is not yet widely used. There are still far too few terminals. Also, I suspect that the average translator has a slow reading speed (rapid-reading specialists certainly expect this of people with literary modern-language degrees), and that before the scanning of dictionary pages on a television screen feels natural one needs to use EURODICAUTOM a few times under normal working conditions. Fortunately the Commission is expanding EURODICAUTOM and making it more accessible, partly through EURONET.

## Benefits to member states

The benefits of the plan of action will not be confined to the Community institutions. EURONET and the governments of the EC's member states will have access to the new expertise and to the plans' tangible

results (studies;   systems ready for implementation).  (For example, I
understand that government bodies can even now approach the   Commission
for SYSTRAN   translations   in   the subject areas already covered in the
system.   If they want a better translation than SYSTRAN can yet   offer,
the Commission   will teach them to update the system's dictionaries, an
operation which, if properly done, eliminates many more errors than one
would expect.   Similarly, EURONET users will be able to request SYSTRAN
translations of material received through EURONET.)

<div align="center">III</div>

## A translator facing up to the machine

As part of the Commission's   SYSTRAN   development   work,   the   language
philosopher Margaret Masterman and her Cambridge Language Research Unit
(CLRU) were advising on what improvements to make.   The SYSTRAN program
consists of   100,000   instructions with very little annotation.   One of
her proposals was that the linguistic   part   of   the   program   be   made
"transparent",   so   that the translator could understand it.   Instead of
feeling cut off from the machine, he could read the   annotated   SYSTRAN
program and   see   both   where   and   why   an   error had occurred.   Then,
"translated thus from a poor creature to a creator" [8], he could apply
his skills and experience to the devising of new translation rules   and
to the correction of the errors at source.   In doing this he could work
with, and on a level with, the systems analyst.

But would she find an ordinary translator - intuitive, totally ignorant
of computers - who was willing or able to decipher and then "translate"
some SYSTRAN program?   I at least had some curiosity, and   I   was   well
enough established not to have to care about looking a fool.   She faced
me with   the   SUBSENU   subroutine   from   the   first   of   SYSTRAN's five
syntactic passes.   This demanded pluck   and   patience   from   her,   too,
since she   knew   that   the arts person "won't play while in a fog", but
keeps asking   fundamental   questions.   The   report   on   "The   SUBSENU
experiment" by   her   and   the systems analyst Bob Smith is like a comic
novel; if and when it is published it will be a   fascinating   document
of a multi-disciplinary approach to the machine [9].

Perhaps I should stress that I was no more   machine-oriented   than   any
other translator.   Quite the reverse:   all my early training tended to
promote intuition,   not   reason,   and   my   typical   Englishwoman's
arts-biassed education   had   led me to give up science at the age of 13
and mathematics at 14, when it stopped being mere computation.   In some
ways, then, I was remarkably ill-fitted for the   experiment.   However,
as Ewald   Osers   says, "a translator should always try new things", and
we persevered.   I compiled a glossary of the orders in the   subroutine,
so that   they   could   be turned into English.   That was really a simple
translation problem, but it and the comments I made seemed   to   confirm
that translators can come in on an equal footing with systems analysts.
The work will not be easy, but that first time will probably be by far
the worst, particularly as the subroutine chosen was very tricky.

What took the time on that first occasion, sure enough,   was   the   arts

person's constant interruptions as she strove to acquire and maintain an overall vision of the machine - no mean feat when you are staring at a computer language which you do not understand [10]. SYSTRAN, unfortunately, was written in a compact macro language, having been conceived when computer storage was very costly [11]. (EUROTRA, if or when it happens, will be in an approachable "high-level" language, probably PASCAL).

Translators clearly need a popularizer. John Hutchins writes very readably on MT and machine-aided translation [12] [13], for which I am most grateful. We would benefit also from something written specially for translators, even (dare one say it) philosophical.

## Linguistics go commercial

The reason why I, a strictly practical translator, now find philosophy intriguing is very simple: computers force us to ask "What is translation?". Translation theory and linguistics have ceased to be merely academic, simply because the machine cannot help but be a testbed for a theory: an MT system just will not work if the concepts underlying its program do not conform to the reality of language.

I shall be criticized for confusing translation theory with linguistics, but in this context some merging of the two disciplines seems overdue. The linguistics specialists of the last two decades have paid too little attention to foreign languages. As Margaret Masterman says, a translator retains both languages in his subconscious at the same time, whereas some structural linguists tend to revert to being unilingual [14], with the result that their ideas may fall down when applied, say, to a language like Chinese which does not have a subject-and-predicate structure, but conveys meaning by stress and intonation. ("What should they know of England who only England know?" [15])

### IV

## Stress and reiteration

Her own idea of language is based on reiteration (explicit or implicit) and stress [16] [17]. It makes a lot of sense to me. In my experience much more meaning is conveyed by rhythm and stress than we recognize, even in the written word. This is born out by various things that are revealed in difficult or abnormal situations. For example, a dyslexic cannot read without reading aloud. A dyslexic actress like Susan Hampshire, for example, cannot read from a script, but must learn her lines in advance by slowly, softly reading to herself [18]. Similarly, when I myself am faced with a problem in a text, whether English or foreign, I hear myself reading the words at a volume which increases (privacy permitting) with the difficulty. If, for example, a prepositional phrase has more than one possible antecedent, I "test intonations" [19], trying out each possible intonation for size, and selecting the one that imparts the right shape, or rhythm, to the sentence. This also helps to clarify the typically English noun

strings which are the bugbear of foreign translators, as in the following (real) newspaper headline "BIRTH CONTROL SCANDAL PRIEST SENSATION", with its pyramid of layered adjectival nouns. A classic example [20] of the importance of stress arose on the Archbishop of Canterbury's arrival in the United States, when the newsmen at the airport asked if he was going to any nighclubs in New York. Archbishop: "Are there any nightclubs in New York?" Morning headline: "ARCHBISHOP'S FIRST QUESTION: ARE THERE ANY NIGHTCLUBS IN NEW YORK?" (What of Lord Chesterfield's "Everything suffers by translation except a bishop".)

Margaret Masterman suggests that the basic unit of language may be the "breath group". A typical breath group ("at the corner of the street") will contain about 7 words and include two stress points and what hangs on them. There are exceptions, for example, at the beginning of a sentence where there tends to be only one stress point. The breath group corresponds to the brain's short-term memory and probably to the unit used by interpreters. Most important in this context, she believes it is also the "translation unit", the conceptual unit into which we unconsciously divide the texts which we translate.

<u>V</u>

## What will MT mean?

As already implied, I do not expect the tiger and the polar bear to clash. What then <u>will</u> acceptable machine translation imply for translators? I believe it is essentially a question of standards.

How many standards, and whose? Should the standard applied to MT be that of the user, or the (often much higher) standard of the translator? CETIL have been discussing the setting up of different translation quality criteria so as to differentiate according to the importance of the text translated. A human translator, whether staff or freelance, has very little option but to produce his best. If he allows the user to persuade him to do sub-standard work, it is fairly certain to end up in other hands sooner or later, probably with a disgruntled user who will assume it to be of the translator's normal quality. So a translator can afford to have only one standard. However I, for one, do not enjoy doing my best for someone who does not want it. It makes for an uneasy, and short, relationshp with the client.

Instinctively, translators judge a translation by its quality. A poor translation is felt as an affront, particularly since the low average standard of translation is a threat to the profession's status. Yet many users tolerate that low standard. It cannot always be ignorance; there must be other criteria than quality, such as speed and cost. Are our standards appropriate for all users, even for committed information-seekers who bring their own expertise and need no persuading? Professor Loh <u>sells</u> his machine translation of the Chinese mathematical journals; they appear in fact to be <u>what the user needs</u> — not pretty, but comprehensible, and available in a fraction of the time

that humans took.

The public, or publics, need many different levels of translation, but I think they fall into one of two basic categories:

1) Routine "information" texts for the interested, expert reader. Style, even nuances, are of secondary importance. Many of these are likely soon to be machine-translatable. The translations will normally be post-edited, but even without this they will have their uses: the user can scan them to see whether the document is important enough to warrant a high-quality translation; or, for example, if time is short, he can read them normally but expecting errors, which his knowledge of the field will help him to spot (machines are worse than people at camouflaging their mistakes).

2) Texts with a message for the less-than-committed reader: legal, political, school-level educational, publicity. These will not be machine-translatable in the foreseeable future. This is tiger-fodder: with MT taking care of some of the routine, the bad translators might lose, but the good ones might be much happier; they could concentrate on the more rewarding work, and the average standard of human translation would rise.

What of the translators who miss having, say, one gentle day a week on that routine translation? Many, though not all, may find post-editing a good substitute, so good in fact that they will become interested despite themselves in improving the system, both by inserting fresh terminology and by recognizing new linguistic rules. The challenge here is that the machine is logical, whereas the human and his language are illogical: you have to make the illogical seem logical if the machine is to cope with it. It can be rather fun. EC translators, moreover, are particularly fortunate in that the Commission, alone of all the bodies which have bought the right to use SYSTRAN, is allowed to undertake actual development work on the system.

There are more serious fears, however. If we accept a lower standard of language from MT, will it infect the language of the human translator? If so, will we lose precision, then intellectual capacity? After all, it is very hard to think about a thing if you couldnot name it properly. And can there be still worse to follow? As Confuscius said:

"If language is not correct,
then what is said is not what is meant,
if what is said is not what is meant,
then what ought to be done remains undone,
if this remains undone, morals and art will deteriorate,
justice will go astray;
if justice goes astray, the people will stand about
in helpless confusion.

Hence there must be no arbitrariness in what is said.
This matters above everything." [21]

I believe him. But I cannot share the pessimism of those who see the machine dragging down the standards of the human translator. As A. R. Clarke, head of the Commission's English translators in Brussels, has written, translators "see themselves - and rightly so - as the guardians of the purity of the language". [22] I think that the translator's awareness of words and their meanings will survive, as usual. That awareness, after all, is probably what made him a translator in the first place. Meanings matter to us. Indeed, I have been known to suggest that translators selecting a word almost, as it were, take a moral stand: "This is what he means / a true translation / the right thing." Professional pride is a prickly plant, but strong.

There are two tendencies in language. One tendency is to <u>restrict</u> expression, paring down the language and, if unchecked, ultimately impoverishing it. MT might possibly reinforce this by encouraging the adoption of restricted syntax or vocabulary or of <u>pro formas</u> or set patterns for certain information texts (CETIL is interested in these approaches). Anna Meuss has suggested that descriptions of clinical trials for drugs could be fitted on a standard form and machine-translated; space would remain for notes on anything which did not fit the form - notes which would be translated manually. We have fairly set patterns in most patents, Barbara Kostrewski has found them in medical records [23], and according to Eugene Winter they also exist hidden in engineer's reports.

However, this restrictive, truncating tendency in language is counterbalanced by its opposite, the tendency to <u>lift restrictions</u> and luxuriate. Puns and children's flowery writing are obvious examples: we sharpen our wits, almost our teeth, on words. Words stimulate us. Translators, of all people, will not easily lose their sensitivity to them. So if my English changes in the near future (when I shall see a lot of MT), take note - and please warn me.

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<u>Postscript:  translation agency buys MT</u>

A Boston translation agency has now bought the Weidner multilingual word processing system. This is marketed as a translation aid by Weidner Communications of La Jolla, California, and was well received at the American Translators Associaton's convention in autumn in 1978. It consists of a mini-computer, terminal and CRT screen, costs only $125,000 and appears exceptionally convenient to operate. Spanish-English, English-Spanish and English-French versions are already available. Post-editing is done on-line, with both the source and the target versions shown together on the screen. The vocabulary can reach 3 million words, although I have seen surprisingly useful Weidner output produced with a dictionary of only 9000 terms. There is also a dictionary of synonyms. All in all, it would be surprising if the system were not brought to Europe before long.

(Note, 1981: Weidner have marketed here since 1980, and the translation company World-Wide Languages ordered the first British installation in May 1981).

## References

[1]   ALPAC: Languages and machines: computers in translation and linguistics. A report by the Automatic Language Processing Advisory Committee, Division of Behavioral Sciences, National Academy of Sciences, National Research Council, Washington, D.C. (1966).

[2]   Aphra Behn, The Rover, Part II, III, i.

[3]   For an idea of AI's potential, and for fun (unless you are a psychiatrist) try Parkinson et al. on PARRY, a program which simulates a paranoid patient and can be interviewed by a real psychiatrist (Artificial Intelligence, 9, 2 (October 1977) 111/134, esp. 130/133). For example:
"HUMAN:  WHEN DID YOU FIRST LEARN YOU WERE CRAZY?
PARRY:  I DON'T WANT TO TALK TO YOU ANY MORE, BUZZ OFF.
(the model responds to the emotionally-charged embedded presupposition instead of the innocuous main clause).
HUMAN:  BUT I LIKE YOU A LOT.
PARRY:  SOMEBODY SHOULD TEACH YOU A LESSON ABOUT INTERVIEWING
      PATIENTS.
(The model cannot accept this claim from such an erratic interviewer.)"

[4]   After J. Albert Bachrach, head of the European Commission's Medium- and Long-Term Translation Service, Luxembourg.

[5]   The gift of too many tongues, The Economist (12 August 1978) 38-41.

[6]   Third European Congress on Information Systems and Networks: Overcoming the Language Barrier. (Luxembourg 3/6 May 1977). Verlag Dokumentation, Munich (1977), 2 vols.

[7]   The UNESCO Recommendations on the legal protection of translators and translations and the practical means to improve the status of translators, paragraph 12. See in particular Crampton, Patricia: Assimilated to authors, The Incorporated Linguist 16, 2 (1977) 34-39.

[8]   Ben Jonson, Every man in his humour.

[9]   Masterman, M. and Smith, Robert J.: The SUBSENU experiment (1979).

[10]  The opacity of some of what I saw reminded me of the story Leo Rosten heard at a Bar Mitzva, about two Martians who met in

America:
"What's your name?"  asked the first.
"4286.  And yours?"
"3359."
"That's funny;  you don't look Jewish."
The joys of Yiddish, W. H. Allen (1970).

[11] The cost of computer storage is a thousandth of what it was twenty years ago.

[12] Hutchins,   W.J.:   Machine   translation   and   machine-aided translation, Journal of Documentation 34 (1978) 119-159  (Progress in Documentation).

[13] Hutchins, W.J.:   Linguistic  models  in  machine translation, UEA Papers in Linguistics 9 Norwich (January 1979) 29-52.

[14] I believe that this very ability to retain both languages in one's subconscious at once, intact, may be what distinguishes the  good translator from  the bad.  Often, indeed, when the source language persistently shows through a colleague's translations, translators will say "He's a superb linguist, but he just isn't a translator."

[15] Comment by D.G. Lawson, quoting Kipling.

[16] Masterman, M.:   The  basic  reiterative  semantic  patterns  of language, in  proceedings  of Informatics 3, Aslib, London (1978).

[17] Masterman, M.:  Rhetorical punctuation by machine, in  proceedings of 1978  conference Computers in literary and linguistic research, Association for  Literary  and  Linguistic  Computing,  Birmingham (1979).

[18] Personal communication  from  Frank Dale, producer and director of the documentary on dyslexia "If you knew Susie" shown on  BBC  TV, 23 August 1976.

[19] Comment by  Stephen  Walker  at Aslib conference Informatics 5, 27 March 1979.

[20] These two examples I owe to Brian Ledwith.

[21] Translated by  Arthur  Waley.  Quoted  in   Translator's   Guild Newsletter 1, 4, by Barbara Snell.

[22] Clarke, A.R.  and Andre, C.:  A time of rapid growth ... a visit to the Commission's English Translation Division, Staff Courier of the Commission of the European Communities, 34-43.

[23] Kostrewski, B.:  Structural considerations for the  derivation  of application-linked reference  languages  for  medical  information systems, in proceedings of Aslib conference Informatics 5 (26-28 March 1979), Aslib, London (1979).