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APPLYING CONCEPTUAL ANALYSIS IN THE 21ST CENTURY: DESIGN OF A COMPUTERIZED SYSTEM FOR GLOBAL TRANSLINGUAL COMMUNICATION

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0. Translingual Communication and Translingual Concepts

If two persons were chosen at random from the population of the world and were brought together for a time so they could talk about whatever interests they shared, what is the probability that they would be able to understand each other without assistance from intermediaries?

If you and I discussed this question, we would need to clarify the terms 'talk', 'interest', 'share', and 'understand', since their meanings would greatly affect the estimated probability. There are also several established meanings of 'probability' which could cause disagreement. The reason you and I could hold such a discussion is that we already share enough language to permit us to discuss the relevant parts of our languages that we don't share. By 'language' here I mean both the stock of concepts one has and the code one uses to express thoughts about those concepts.

This conference made sure we would share a lot of language by inviting only persons who can speak and understand English and who have also been discussing conceptual and terminological problems before. Many of us have also been exposed to a particular approach (the "COCTA approach") to this subject. Thus this conference, like most discussions, involves people who share, on average, much more language than two persons chosen at random from the population of the world, and also much more language than two persons chosen at random from all those who frequently discuss conceptual and terminological problems.

The tendency for conferences and other discussions, on social-scientific and other subjects, to be unrepresentatively homogeneous in language is a natural one. Since most discussants presumably want to achieve results through their discussions, some such linguistic segregation may also be advantageous. It might even be advantageous for there to be some linguistic

division of labor in the world economy, including in the social-scientific industry.

The field of conceptual and terminological analysis, however, is an a-typical field. It deals precisely with the problems that arise from the fact that the linguistic division of labor is incomplete. It deals with problems faced by people with shared interests but (partly) non-shared language. These people may be divided, in principle, by anything from one term to an entire language. At intermediate levels, they may differ in one or more of the following: specialties, terminological traditions, theoretical traditions, ideologies, personalities, culture areas, communication networks, dialects, writing systems, etc.

Conceptual and terminological analysis, as an applied science, claims to help people communicate about their shared interests across such divisions. Why, then, do conceptual and terminological analysts shun some of these very divisions at their own conferences and sessions? Are they unable to do what they want to help others do? Is this science not yet ready to give a full range of practical help? Is the science really concerned only with solving problems among those whose non-shared language is a small fraction of their total language?

Whatever the reasons, it should be obvious that the most challenging task for applied conceptual and terminological analysis is to enable those with shared interests but very little shared language to engage in what they all agree is useful communication. Because of the massive forces pushing for linguistic segregation in the academic world, it is hard to believe that we shall strive to accomplish this task unless we force ourselves to experience -- and work to overcome -- the most serious linguistic divisions within our own interest group. This ambition would also dictate focusing on conceptual and terminological problems of the fields having the most serious linguistic divisions, e.g. fields that (a) are practiced in divergent societies; (b) have both theoretical and applied aspects (1); (c) are first taught at the elementary and secondary levels of education; and (d) deal with realities that are defined and created by human beings.

Finally, a more aggressively practical science of conceptual and terminological analysis would set a goal of addressing three clienteles: (a) those who are already communicating and think they are doing well (today's typical COCTA addressees); (b) those who are already communicating and know they suffer from non-shared language; (c) those whose non-shared languages have discouraged them from trying to communicate.

Linguistic self-segregation is likely to decline in the near future, making problems of little-shared language more salient. Changes are taking

place in the technology and economics of interpersonal communication which are conducive to a major increase in translingual contact. These changes can be expected to exacerbate language barriers. But at the same time they offer new tools for overcoming these barriers. Conceptual and terminological analysts can plan now for the use of these tools, if they wish to develop methods for facilitating translingual communication. New media of worldwide interactive personal communication will provide a context where conceptual and terminological theories can be applied to the most difficult problems. At the same time, the mediating technology will give the analyst a laboratory in which to measure conceptual and terminological behavior in better ways than was possible before. The result will be improved theory as well as more helpful applications.

1. Translingual Impact of Changes in Communication Technology

Recent and future developments in communication technology will affect the frequency, the cost, and the success of translingual communication. The new technologies include the cathode-ray tube, electrostatic printing, communication satellites, optical-fiber transmission, solid-state memory, and large-scale integration of electronic circuits. These physical inventions have permitted the development of new communication devices and techniques, such as video display terminals, computerized text composition and plotting, packet-switched digital communication, graphics terminals, intelligent terminals, shared database management, computer-assisted instruction, electronic mail, and computerized conferencing. Since these technological changes have been described elsewhere (2), let us focus on what they will do to the processes of communication and, in particular, translingual communication.

One effect will be to decrease the dependency of communication cost on distance. Satellite transmission makes signals between nearby places travel almost as far as signals between distant places. Until now, private messages have either taken longer (e.g. letters) or cost more (e.g. telephone) to travel long distances, thus leaving intact the traditional approximate correspondence among geographical proximity, linguistic similarity, and communicational reachability. For example, in 1980 one could speak by telephone from the Federal Republic of Germany to someone in the same city for about $0.10 per hour, but to the USA the cost was about $400 per hour. The disapperance of the distance barrier will bring many more persons with non-shared language into situations where they can communicate quickly and inexpensively. Language will then be a more obvious barrier than it was before.

Another change will be a reduction in the cost of instantaneously

transmitted textual communication, in comparison with other forms of message exchange. Composing a letter on a terminal, and having the text sent immediately to a machine where the addressee will find it, is already less expensive under some circumstances than composing the same letter on a typewriter or longhand and sending it by mail or facsmile transmitter. Sending a memorandum and a succession of comments on it back and forth in this way is, likewise, less expensive and more effective under some conditions than conducting the same exchange by telephone. One of its advantages is that the sending and receiving parties do not need to be free at the same time -- a special benefit to those separated by wide time-zone gaps.

The advantages of using instant digital text are likely to grow in the future. Thus we can expect that interpersonal communication will increasingly take the form of texts which not only reach their destination quickly, but also can be sent to third parties, routed through third parties, and/or clarified after receipt of a response, all within a reasonable time. Clearly, these possibilities can be applied to the problems of communication across language barriers. Written text is generally easier for (literate) nonfluent persons to decode than are oral messages.

When help is needed, instantaneous transmission makes it more likely that requests for explication or translation can be fulfilled while the message still has time value. And, since it takes more effort to write than speak, textual communication will be terser (3) and hence put a smaller comprehension burden on nonfluent recipients. Senders and receivers of messages will be able to exercise control over what they write and how they read to a far greater degree and at much lower cost than has been true before. This result comes from the fact that the new technologies give advantages to digitally composed, and hence machine-readable texts, and from the fact that large-scale integration of circuits and improvements in solid-state memory technology are sharply reducing the cost of electronic processing of machine-readable information.

Writers can amend, rearrange, expand, contract, merge, and proofread their messages easily, quickly, and cheaply. Addressees can have messages they receive scanned for subjects of interest to them before deciding what to read and when to read it. This scanning can rely on nests of logical "and" and "or" operations too complex for the unaided mind to perform. During the reading itself one can easily mark, excerpt, and route sections of text for preservation, deletion, filing, annotation, or further human or machine processing. This textual control will have many practical uses. Some of these uses will be particularly relevant to facilitating communication

among those with non-shared language. Communicants can use computer-based monolingual and multilingual dictionaries and thesauri, as well as any available programs for machine or machine-aided translation. They can also circulate marked texts to receive and give linguistic help while the reading is still taking place, or to develop consensuses on the meanings or translations of problematic terms.

Another kind of control that the new technologies will increase is control over where messages go. There are many tools used to find people with certain interests: lists of subscribers to special-interest magazines, membership lists, postal codes, obituary notices, print and electronic-media advertising, etc. The routing and processing of digital text messages provides a more sophisticated tool for this purpose. Detailed lists of interests and capabilities can be stored in machine-readable form. Their contents can be deliberately created and modified by the listees, and can also emerge from automatic scanning and comparison of the listees' communication behaviors. Messages can therefore be sent not just to named indviduals but also to classes of those having desired characteristics. If messages need preprocessing by third parties before final delivery, intermediaries with the appropriate skills can likewise be efficiently found. Persons who would otherwise never learn of shared interests can be linked (4). In addition, messages are not directed to an address or telephone number where the recipient is presumed to be, but rather to the recipient's own file in a machine that the recipient can reach from anywhere.

The ability to expand one's existing circle of communicators and to find third parties to preprocess messages will increase the demand for translingual communication while also helping to make it more feasible. It will be possible to find translators who know certain language pairs and also know certain fields, and to route messages or passages to them for help, or to find persons with certain language-subject competence combinations who are able to assist in language learning. It will also be easier to determine how much each language is used in a field and who else wants (or is likely to want) certain texts translated. The same technology will help multiple users coordinate arrangements and payments for translations.

The typical pattern of communication can be expected to change as new technologies spread. Economies of scale have led to a dominance of mass communication at long distances. Messages radiating from few originators to many receivers are typical. The new technologies will reduce the cost ratio between mass and person-to-person media, probably leading to a more polycentric, or "many-to-many", pattern. Even the largest communicating institutions will also find it advantageous to disseminate more individualized mes-

sages than before. This differentiation of messages raises the average amount of translation that is required when messages cross language boundaries, since the effort to translate one message is divided by a smaller average number of recipients. On the other hand, translation can be regarded as a special kind of individualization, and the new technologies reduce the cost of all kinds of individualization, including linguistic.

The developments mentioned above will combine to affect translingual communication in important, but uncertain, ways. Historically, major social and economic changes that have brought peoples into contact have led to linguistic assimilation, except where the dominant speech community has found it profitable to restrict knowledge of its language (5). One prediction might be that the spread of new communication technologies will reverse the post-colonial emergence of new standard languages of intellectual and commercial importance (6).

A global community might develop and bring with it a global language. On the other hand, these new technologies promise to make small speech communities, and linguistic diasporas, more viable than before, by reducing the economies of scale enjoyed by the mass media and the disadvantages of distance. To the extent that they facilitate translingual communication, they may also reduce the penalties paid by persons and organizations that are unable to read, write, and speak a dominant language. Linguistic barriers might become more transparent and pressures to assimilate thus more relaxed. (An analogous effect seems to take place when special languages for man-machine communication are bridged by translation programs. For example, it is no longer as important whether a person knows how to instruct a computer only in OSIRIS or only in SPSS, now that there is a routine in the latter that translates some of the outputs of the former.)

2. Components of Computerized Translingual Communication Systems

Let us now consider how one might harness these new technologies to create a system that could substantially improve the quality of communication between persons with shared interests but non-shared language. What would such a system look like?

On the basis of the foregoing discussion, it seems reasonable to argue that the system would make heavy use of one or more computers, would offer services principally or exclusively in relation to digitally composed textual communications, and would link the communicators with each other and with potential intermediaries via instantaneous transmission channels. The system would typically demand the most sophisticated text-manipulation aids that current technology could offer.

The closest existing type of system to one that could perform the needed functions is what is called a "computerized conferencing system" (7). It consists of one computer linked to several terminals, or several computers linked to each other, via a "packet-switched" digital communication network. The computers of such systems are programmed to offer such services as "electronic mail", text-editing assistance, newsletters, subject-interest directories, deliberation management and voting tabulation, and facilities for the exchange and annotation of drafts of texts. Special features may include timed delivery of messages, anonymity, pseudonyms, access to statistical programs or bibliographical data-bases, and programs for computer-assisted instruction.

A system for translingual communication would be an adaptation of a general computerized conferencing system. It would contain devices and programs to help communicators:

1. enter and retrieve messages in their own languages, using customary writing systems;
2. give instructions to the computer(s) and receive instructions from the computer(s) in their own languages;
3. obtain translations of messages, or parts of messages, which they wanted to send or read;
4. learn languages, or parts of languages, which they wanted to use in communication;
5. make decisions about language use, language translation, and language learning; and
6. reach and carry out agreements about language use and the exchange of language services.

For analytical purposes, we can consider each of these purposes to be served by one "component" of a translingual computerized conferencing system. Let us now look briefly at these six components; one by one.

Component 1: Multilingual Input/Output Facility. The written languages of the world have alphabetic, syllabic, and ideographic writing systems. Among them they use thousands of different symbols. A translingual computerized conferencing system will provide ways for computers to display texts in the forms that ordinary literate persons are accustomed to. It will not force them to learn to read alphabetized versions of their languages, romanized versions of their alphabets, or alphabets whose diacritical marks have been removed or replaced with substitutes. If their language has a customary method of typing, the system will allow them to enter texts in a way that conserves the value of any typing skills they already have. If their language is written but normally not typed, the system will provide

some method of digital composition that is easy to learn for monolingual literates in that language.

The system computer will not necessarily store texts in its memory in a way that resembles the writing system of the language of the text. But users of the system will not need to know how their texts are represented in storage; they will be able to perform search and selection operations by using the same composing conventions as in text entry. The technology for this component is still in its infancy, but considerable progress has been reported, particularly on the output side. Graphical and other display techniques can represent even such numerous and complex symbols as Chinese characters satisfactorily and at reasonable cost. The job of developing appropriate digital entry methods for non-alphabetic languages is far from complete, however (8). What is clear from current trends is that mass human adaptation to arbitrary input/output protocols is neither necessary nor economical. As new (e.g. plasma) display technologies and new (e.g. laser-based pattern-recognition) input technologies continue to emerge, we can expect computer adaptation to existing and diverse linguistic traditions to become more and more practical.

Component 2: Multilingual System Message Facility. In a computerized conferencing system people send messages to and receive them from two different kinds of communication partners: people and machines. Messages exchanged between users of the system and the system's computer can be called "system messages". They include instructions from the system on how to use it; instructions from the user telling the system what the user wants done; and statements by the system explaining user errors, detailing current usage costs, notifying the user about a message that has just been received, etc.

In a translingual computerized conferencing system, system messages will be multilingual. Making them so is a relatively simple task, since they are selections from a finite lexicon, put together according to explicit rules embodied in computer programs. System messages constitute a very limited special language, whose terms have precise correspondences to operations of the system and are therefore perfectly translatable. On the other hand, making these messages multilingual is not a trivial task, because sophisticated systems have various levels of system messages: they use truncation rules and synonyms for user-entered messages, and different levels of verbosity for machine-produced messages, to suit both novice and advanced users.

System messages are important because they convey critical information between the system and the user, and there is little or no room for contextual interpretation. Since some system messages are frequent and since users are presumed to be unfamiliar with computer techniques and interested only in improving their communication with other human beings, it is very useful for system messages to resemble the statements that an ordinary speaker of the user's language would make in conveying the information at hand.

New users also experience system messages before they ever send or receive a human message, and the need to use a foreign language to communicate with a computer is bound to convey to the user, even one who knows that language, an impression that the system was basically designed for members of a foreign group (9). A multilingual system message facility would go into effect very soon after a user made contact with the system. The act of specifying which language the system messages should be in would be one of the very first things a user did, even before performing any required registration or "log in" rituals.

Component 3: Translation Support Facility. A translingual computerized conferencing system will be able to help its users translate texts in two ways: (a) by facilitating access to human translators and their products, and (b) by helping writers, readers, and translators perform translations more efficiently. I have alluded to the major methods in Section 1.

Access Aids: The directory of users would include information on which languages they can translate from and into, as well as what their subject expertises are, so those needing help can find appropriate helpers. The status information about messages would include translation-relevant information. For example, when someone received a message it would be labeled as to whether it was an original or a translation, if an original then whether it had been routed to a translator for translation, and if so routed then what language(s) it was going to be translated into. Automatic translation routing would be available based on message origin, length, contents, etc., so translation could be underway before the receiver was aware of the message. Messages could be marked as to whether the whole message or just parts were to be translated, and into which language(s). A method of marking words, phrases, and sections needing translation would be used which could be made visible by a translator but would be invisible to an ordinary reader. Writers and readers would be able to do their own full or partial translations, marking passages which they wanted a translator to verify. Likewise, translators would be able to provide tentative alternate wordings that left the original ones intact and could be accepted, rejected, or modified by the users. "Translator", here, refers to (a) professional translators, (b) users willing to help with translation problems in their

fields of competence, and (c) message senders themselves, to whom messages can be returned marked for terms needing translation (or just clarification in the original language).

Translation Aids: Although high-quality fully automatic translation of ordinary language is not available now and cannot be foreseen, computer programs can help make translations faster, more satisfactory, more consistent, and less expensive (10). In fields having machine-readable multilingual dictionaries and thesauri, these could be made available to facilitate the searching of message contents, the user-interest directory, etc., by persons not fluent in the language of the writer, and by writers and translators to help make drafting in a non-native language or translating technical material more efficient. For example, the reader might point to a word and the computer would display its translation equivalents immediately; or a writer would insert a native term into a text being drafted in a foreign language, and the computer would (after inspecting its context) insert a proposed translation. Programs that compare a text with a list of common misspellings or common words, or with syntactic patterns that are typical foreignisms in a particular language, would also help non-native drafting of messages. Any available programs that parse sentences and attempt to produce full translations could also be accessible. For communication in highly regularized situations, such as air traffic control, games, and questionnaire completion, machine-readable multilingual phrase-books could also be used, so that each communicator appeared to be writing in the language of the reader (11). The state of the art will be improving for a long time, but in a computerized conferencing system it is possible to attach new aids to the existing repertoire without long delays. What is more, the system's computer could keep records of how each term and phrase had been translated, and those working on translation programs could use these records to hasten their improvement of the existing aids.

Component 4: Language Learning Support Facility. Language learning and translation are usually understood as separate activites, but in the context of a computerized conferencing system they almost merge. As one can see from the description of Component 3, the system would encourage cooperative translation by communicators with as-needed advice from experts. This activity would naturally lead to learning, lessening the future need for translation support. Indeed, some students of language learning claim (though the evidence is mixed) that it takes place more successfully as a byproduct of language use than in formal learning situations (12). There are, however, computer programs for language teaching, even if mostly rather primitive (13), and these can be made available to users of a computerized conferencing system, who may be strongly motivated to learn a particular language once the system brings them into contact with persons who share their interests but not their language. Programs that teach special languages might be still more appropriate. And the system's user directory could also list who was willing to coach or tutor (not just translate) which languages. Given the text-oriented communication taking place in the system, the emphasis would be on competence in reading and writing rather than speaking; and computer-mediated language learning -- whether programmed or human-taught -- is naturally much better suited to build up textual than oral skills.

Component 5: Language Decision Support Facility. Users of a translingual computerized conferencing system will be making language decisions. The same computer that helps them communicate can also help them make better decisions about how, linguistically, to communicate. A set of programs offering such help, usually called a 'decision support system' (14), can help in two ways: (a) by providing information relevant to informed decision-making, and (b) by carrying out, or helping the user carry out, evaluational operations on that information.

Information Support: The major language decisions that users will make are what language to compose a text in, whether to have a text (either one's own or one from someone else) translated, and how much time to spend studying which language(s). Relevant information for these decisions includes: who knows which language(s); who uses which language(s); who is studying which language(s); which kinds of texts, in what quantities, are being translated into which language(s); what it costs to have a text in a certain field translated from a certain language into a certain other language; how much time it takes to achieve a certain level and kind (e.g. reading, writing) of competence in a certain language as used in a certain field; how reliable the supply of translators between certain languages in a certain field is; and how good the teaching programs for teaching a certain language to speakers of a certain language are.

Some of this information can be collected as a byproduct of activities that a translingual computerized conferencing system would monitor in any case. Some would require soliciting and tabulating comments from users. Making it available would not only help users make more intelligent decisions about language, but would also make it easier for potential suppliers of language services to notice and evaluate opportunities for profitable activity, e.g. the development of teaching or translating programs or thesauri.

Evaluation Support: There are many procedures for evaluating quantitative and rank-ordered information in order to decide which of several al-

ternatives to choose (15), and computer programs routinely carry these out for decision makers. Where the user knows which procedure will generate the optimal decision, the information can be given to the computer and the computer can "make" the decision. Where the user is unsure, the computer can show the user (with the aid of video graphics) what would follow from various alternatives under various assumptions, and the user can then make a choice. If the user needs human help in making a decision, the computer can facilitate access to such help in the same way as it provides access to persons with translating or language-teaching skills.

In all these types of consultation, the system's ability to find and brief an appropriate expert and relay messages between expert and user with no travel and little delay is crucial: it makes possible for the first time a truly as-needed style of consultation, where the consultant charges by the minute or even second rather than day or hour and needs to spend very little dead time between jobs, and where the consultant's expertise and availability rather than proximity is what determines who is consulted about what. It also permits efficient referral behavior: the primary consultant can in turn solicit an opinion from a secondary consultant (who may be thousands of kilometers away) for as little as a few seconds. Of course, decisions are made not just by individuals, but also by groups. A group of persons planning extended discussions may want to decide on a language regime for their group. Here they have an additional problem: even if each member comes to a conclusion, their conclusions may differ and need to be reconciled. The conferencing system's programs to facilitate deliberation, straw polls, and definitive voting can be of use to them. These programs themselves can be multilingual, so that persons who cannot understand each other can nevertheless deliberate and vote on what method they will adopt to bring mutual intelligibility about.

Component 6: Language Services Market. All of the features described above cost money to operate, and someone must pay for them. The translingual computerized conferencing system would help reduce the cost of the services and reduce the cost of the payment process itself. Service costs would be lowered because better decisions would be made about what services to obtain, the rendering of the services would be more efficient (e.g. less wasted time), and services wanted by more than one user would not be performed in duplicate as a result of ignorance. When a text translation was requested, the file of translations already performed would be checked first. The cost of payment would be reduced because billing and collecting would take place automatically under control of the system. The system would operate an electronic funds transfer system and could at almost no

marginal cost transfer very small amounts of money between accounts. It could therefore automatically collect royalties on the use of translations, translation programs, teaching programs, thesauri, etc. This capability would lead to an increase in the production of language services, as producers formerly discouraged by the inefficiency of royalty collection found it profitable to invest. Where services were subsidized by grants rather than paid for by users, the granting agencies would have access to detailed usage records to evaluate how productive their grants were and where else they might want to direct future subsidies.

Not every translingual computerized conferencing system would have all six components. What a system offers depends on what its users want, how much they or someone else is willing to pay for these features, and what they cost. There are likely to be major differences in the near future between the demands of different user groups, and hence substantially different systems could be developed. The final section will comment on these differences.

3. A Strategy for Translingual Communication Development

There are several computerized conferencing systems in existence, but none comes close to offering the services that would qualify it as "translingual" (16). Those interested in developing and using a translingual system should consider the alternative paths of development. Developing first those capabilities that would find immediate users seems to be the most promising strategy. What are the capabilities most likely to be demanded in the near future, then?

Two kinds of clientele for an early development effort would be: those who communicate translingually but not with computer support; and those who communicate with computer support but not translingually. Examples of the former are members of some international organizations. Some organizations (e.g. those of the United Nations family) adhere to a practice of having human beings translate all official communications into all official languages (regardless of overt demand), at what they themselves admit to be a very high cost (17). Others (e.g. labor, youth, peace, women's minority, and academic organizations) do not have sufficient resources to provide translingual services, so they either suffer communication barriers or filter out all except fluent speakers of an official language when recruiting international officers and representatives. Persons in groups like these already know with whom and about what they would like to communicate, and they would be receptive to proposals for use of a computerized conferencing system that could serve their translingual needs. For them, the translation

support facility would have the most immediate interest, and indeed the European Communities have been very active in sponsoring work on computerised translation support.

Potential clients of the second type can be expected to emerge in two situations. One is where an ongoing monolingual computerised conference attracts the interest of a person or organization that has some difficulty with the conference language. The other is where there are monolingual conferences in two different countries or language areas, dealing with the same subject, and whose members decide they would like, temporarily, to merge the conferences into one bilingual conference. In the former case, one can assume that the peripheral newcomer would be willing (or forced) to do all the necessary adaptation. The system would remain unilingual as perceived by the dominant-language majority. The peripheral user would need more help in drafting texts than reading them, and given the small volume of translation work machine translation would be uneconomical. So adapting a system to accommodate such needs would mean, essentially, providing facilities for automatic and deliberate routing of texts to a (known) human translator for full or partial translation or checking. A next stage could provide for text-marking by the receiver to request clarifications from the sender, optional language information in the directory of user interests and specialties, and system messages in a second language when explicitly requested by a user.

Merging two monolingual computerised conferences into a bilingual one would be more complicated, if one assumes that the members would insist on equal access to all system resources regardless of which language a member commanded. Translation on demand, or translation regardless of demand, would be provided as a function of the kind of message or document. A register of existing translations would be needed to avoid duplicated effort. All system messages would be bilingually available. A roster of language competences of all members would be required, so that professional translators could be supplemented or aided by specialists in the field who happened to be bilingual, and, depending on which the two languages were, a third bridge language might be required to effectuate translations and consultations. The system would, however, be far simpler than a full-fledged general-purpose system, since it would be limited to two user languages and, because of its organisational sponsorship, it would not need a language-services market component to keep cost accounts.

Development of any of these kinds would help prepare the ground for the evolution of a general, multilingual communication system. At first, the rudiments of such a system would probably be used by an international

group of persons concerned with translingual computerised conferencing itself — the very group that was developing the system. Computerized conferencing as a whole has been most heavily used by specialists in computerised conferencing, and we must suppose that an analogous tendency would characterize the early years of translingual computerized conferencing. The trial period for this new kind of system, however, would be of particular value (and interest) because some of those involved would be computer sophisticates knowing only one human language and little about linguistics, while others would be specialists in translation and language learning who had little or no expertise in computers or man-machine systems. In a sense, these developers would exhibit a double language barrier, and if they could produce a system that satisfies them it would stand a good chance in the wider market.

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