MT News International

Newsletter of the International Association for Machine Translation

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IAMT

MT Summit 4 and TMI-5 to be held in Japan in 1993

Plans are already in hand for holding the Fourth MT Summit in Japan in the summer of 1993 and for it to be preceded by the fifth of the conferences in the series Theoretical and Methodological Issues in Machine Translation (TMI-5).

The third MT Summit conference was held last year in Washington. On the foundation of IAMT it was agreed that the MT Summits should be held every two years rotating between the three regional associations of IAMT. As most readers will already know, the fourth TMI conference is taking place this coming June in Montreal (details can be found elsewhere in this issue.) To date, this series of conferences has been held every two years at a location in North

America. The proposal to hold the fifth TMI conference next year in Japan breaks this pattern. The reason for the change is explained by Makoto Nagao, president of IAMT.

"We are going to organize the Fifth Conference on Theoretical and Methodological Issues in Machine Translation (TMI) in Kyoto, Japan, on July 15-17, 1993, in connection with the Fourth Machine Translation Summit Meeting (MT Summit) which will be held in Kobe, Japan, on July 19-21, 1993. MT Summits were held in Japan, Europe and US in 1987, 1989 and 1991 respectively. The Fourth will come back to Japan, and this time the sponsor is the International Association for Machine Translation (IAMT) which was organized last year at the Third MT Summit. MT Summits will continue in the future in Europe, US and Asia alternately in odd years. TMI Conferences were held first at Colgate University, second at Carnegie-Mellon University and third in Austin, Texas, in 1986, 1988 and 1990, respectively. The Fourth is going to be held in Montreal in June this year. IAMT and AMTA (Association for Machine Translation in the Americas, a daughter association of IAMT) are helping the conference financially.

The MT Summit Meeting has the primary purpose of surveying the state of the art of MT and the trends of users and developers in the world, and of discussing issues such as how to enlarge the user market, what are the problems which are obstacles for wider usages of MT, how these problems can be and should be solved, what are the research directions for future new MT systems and what kind of assistance and promotion the governments and other organizations should offer to solve these problems. Therefore, the program of the conference is basically organized by presentations and panel discussions by invited speakers.

MT Summit is one side of a whole. We must have a conference by paper submission from all over the world. There will be many interesting and successful examples of MT systems' usages, new developments of MT and its related systems and technologies, and basic researches which will become main technologies in the next decade. We need a conference where we can present and discuss these problems. TMI is the best conference for this purpose. We think that TMI Conference and MT Summit are complementary in their nature, and hence to be combined and to be held every two years. There is an opinion that these two conferences would be better held alternately each year, one in even years and the other in odd years. This would be one possibility. However, we think that this idea has some problems. One is that the interested people in this area must travel every year, which is too expensive. If the two conferences are combined, people can get at a stretch a total view of MT activities: the state of the art of MT, and the future directions both in actual usages and in research and development. Another problem is that many research papers on MT and related technologies are traditionally submitted to COLING, the Computational Linguistic Conferences, which are held in even years. TMI would conflict with COLING if it is held in even years."

Makoto Nagao extends a welcome to all IAMT members and to all others with an interest in MT and its development to the two conferences. The first announcement of the TMI-5 conference will be found elsewhere in this issue.

Directory of MT Systems

It has been suggested that IAMT should compile a directory of commercial and experimental MT systems. The editors of MT News International have agreed to collaborate in its compilation by gathering information about systems from their regions. It is anticipated that the directory would include details for each system such as language pairs, hardware and software requirements, dictionary sizes, subject ranges, user facilities, methods of analysis, grammars, translation speeds, costs, compatibilities, etc., as well as references to recent documentation and reviews, and addresses of major users. The directory will be compiled partly from already published sources and partly from a questionnaire sent to relevant companies, organizations and research groups. In order to ensure comparability in descriptions it is essential that all entries conform to a standard format. It

is desirable also that the directory answers the needs of potential users. This announcement is an invitation to IAMT members to contact the editors (as given in the panel on the front page) with suggestions on content and arrangement. It is hoped that pro-formas and questionnaires can be sent out in the second half of this year and that a preliminary directory will be ready for the fourth MT Summit next year.

AMTA

MT Evaluation Workshop/Showcase

Preparations are rapidly falling into place for the MT Evaluation Workshop/Showcase in San Diego (2-3 November 1992), the first "happening" to be organized jointly by AMTA and IAMT. The scheduling of this pair of tandem events is designed to attract not only MT developers but also MT users and potential users, including representatives of the translation industry who will be attending the 33rd Annual Conference of the American Translators Association at the same site on 4-8 November.

The MT Evaluation Workshop will be examining the latest approaches to the assessment of MT, an issue that is currently being thrust into the limelight by developments both in MT and in related technologies. One of the Workshop's primary tasks will be to propose a broad typology for the classification of MT systems so that in the future comparisons can focus on products that have similar characteristics and purposes.

The Evaluation Workshop will start out by looking at some of the "glass box" issues involved in the assessment of system components and then move on to taking the measure of MT as it meets users' needs in practical settings--i.e. the "black box" approach. There will be panels throughout both days. (The program is filling up, but it is not to late to recommend studies of interest. Nominations should be sent to Roberta Merchant, Co-Chair, AMTA Evaluation Committee, 5420 Storm Drift, Columbia, MD 21045.)

The MT Showcase, which will run in parallel and continue on the morning of Wednesday, 4 November, will feature MT systems in various stages of development for the benefit of participants in the Evaluation Workshop and also in a Workshop on Machine Translation for Translators on 4 November being sponsored jointly by AMTA and the American Translators Association, as well as the general public.

The Showcase features a series of fresh approaches designed to focus attention on MT systems, enhance understanding of their capabilities, and attract a wide audience of potential users:

* In addition to traditional booths, the Showcase will provide a theatre-style setting for organized 45-minute briefings at which many exhibitors will present live demonstrations.

* Extended scheduling until 7:00 p.m. on 2 and 3 November and from 9:00 to 11:00 on 4 November will give conference-goers many more hours in which to enjoy the exhibits and presentations without competition from regularly scheduled sessions.

* MT Showcase is open to the public! It is designed and positioned to reach the full range of sectors interested in MT, including MT developers, principals of the translation industry, and those learning about MT for the first time.

Space will be limited in the Evaluation Workshop. Participants are urged to register early. A registration form is provided at the end of this issue.

XEROX Seminar

XEROX Corporation, an active member of the Association for Machine Translation in the Americas (AMTA), is presenting a seminar entitled "Machine Translation and Multilingual Document Processing". XEROX Corporation uses DocuTran, a document translation and

production environment which integrates Systran Translation Systems and XEROX's own multilingual document processing technology.

The date for this event is Wednesday 27 May 1992, from 9:00 a.m. to noon or from 1:00 to 4:00 p.m. The address is: XEROX Corporation, Executive Communications Center, 135 East 57th Street, 19th Floor, New York, NY 10022. For more information, please contact Steve Gusner, XEROX, at (212) 815-7220.

MT Yellow Pages for the American region

AMTA is preparing a roster of names and addresses of members and key MT personnel, companies, and projects in the format of a "yellow pages" directory. Its purpose is simply to put people in touch with one another; it will not undertake to provide information about MT systems. While the first edition, scheduled to appear in November 1992, will focus on the Americas, entries will be accepted from other regions as well.

As with a typical yellow pages directory, the entries will be divided into classified sections: Commercial Systems, Consultants, Developers, Translation Agencies (that use MT), Users, etc. The publication costs will be largely defrayed with advertising (free or at reduced rates for members of the affiliated associations) and revenue from sales to the general public.

Volunteers willing to help develop and produce this resource should contact Joseph Pentheroudakis, the AMTA Regional Newsletter Editor, at the following address: Joseph Pentheroudakis, ATBD, Microsoft Corporation, One Microsoft Way, Redmond, WA 98052; fax: (206) 936-7329; voice: (206) 936-3528; email: josephp@microsoft.com

AMTA Treasurer's Report

Membership: A total of 154 memberships have been received, 99 in calender year 1991, and 55 in 1992. The breakdown by category is 89 active members, 58 associate members, 1 institutional member and 6 corporate members.

Donations: We have received one donation, of $425.69, from the Center for Machine Translation at Carnegie Mellon University. Many thanks to CMU!

Interest: Interest in our savings account has earned us $2.46 in 1991, and $40.49 in 1992.

1991 Income and Expenditures: Our total income in 1991 from memberships and interest was $5527.46. Our expenditures included dues to the International Association for Machine Translation (IAMT), printing and mailing costs for our flyers, and startup expenses for our computerized memberships lists and accounting procedures. The total expenditures were $2001.52, for a net balance forward of $3525.94.

1992 Income: Total income for 1992 is $7372.12 to date, from memberships, donations, interest, and the 1991 balance forward.

1992 Expenditures: 1992 expenditures have included office supplies, phone and mailing expenses and dues to IAMT. In addition, $2610 has been transferred to the Program Committee for support for TMI-92 ($2000) and an advance for the Evaluation Workshop in November ($610). Total expenditures for 1992 are $3058.17 to date, leaving a current balance of $4313.95.

Submitted 24 April 1992, Roberta H. Merchant

AMTA PEOPLE

As of March this year, Joseph Pentheroudakis, AMTA Regional Newsletter Editor, has joined Microsoft's NLP research group. Joseph will continue his association with the AMTA and the newsletter; he can now be reached at the following address:

Joseph E. Pentheroudakis, ATBD, Microsoft Corporation, One Microsoft Way, Redmond, WA 98052;fax: (206) 936-7329, voice: (206) 936-3528, email: josephp@microsoft.com

EAMT

Workshop in Saarbrücken

EAMT will organize a workshop in Saarbrücken in October (29th and 30th) with the provisional title: 'Computer integrated translation and the user'. The workshop will be organized by Tom C. Gerhardt (Luxembourg).

The idea of the workshop is based on the proposal of the Ministry of Sciences (of Saarland) to organize a scientific programme to accompany the 'Saarbrücker Technologiemesse 1992' (Saarbrücken Technology Fair). When Tom Gerhardt heard about it, he proposed to have a workshop on 'language barriers' combined with a special exhibition on language tools. To make the package more attractive, there will now be a conference to be held in the exhibition area on the second day which will be open for the visitors to the fair who have pre-registered for the workshop. The participants of both groups will have the opportunity to listen to interesting reports on applications (how to solve which problems with which system), to watch demonstrations of systems and to pose 'awkward' questions to the system providers.

The programme for the 30th October is nearly finalized. However, the programme for the 29th has still to be specified, but it is anticipated that there will be presentations and discussions of a more general and system-independent nature. More information will be available at a later date.

JAMT

Foundation of Asian Association

Plans are well under way for the broadening of JAMT into an Asian Association for Machine Translation (AAMT). It is expected that the association will be founded in the coming July, after discussion at the second general meeting of JAMT. It is possible that in addition to the present JAMT Journal published in Japanese (details of contents are given in 'Recent publications') there will be a journal from JAMT/AAMT in English. However, it is also possible that *MT News International* will function as the AAMT newsletter. When everything is clarified, the details will be announced in the next issue of MT News International.

CONFERENCE REPORTS

MT World '92

The conference MT World '92, sponsored jointly by JAMT and the Ministry of International Trade and Industry, was held in the Tepia Hall, Tokyo, on the 19th and 19th March.

The symposium was attended by 250 participants. The program was as follows:

1) A word of welcome, by Makoto Nagao, Professor at Kyoto University. [A description of the MT scene worldwide and of the foundation of IAMT and its regional associations.]

2) Report on the 'JTEC Panel on Machine Translation', by Masaru Tomita, Associate Professor at Keio University

3) Panel Discussion: Controlled Language. Chair: Yuji Uchida (Fujitsu); panelists: Reiko Kobayashi (IBS), Susumu Andou (Toin), Chieko Yamauchi (IBM)

4) Panel Discussion: Case Study of MT Application. Chair: Shougo Iwashita (Inter Group); panelists: Susumu Dounomae (Nagase), Taketoshi Kashiwabara (Subaru International), Shinji Kamata (FDS), Osamu Hurukawa (YHP), Hirohito Iida (Japan Convention Service), Terumasa Ebara (NHK), Mitsuo Sugama (SONY), Miyoko Yuasa (BABEL).

5) Machine Translation and Human Translation, by Shimpei Itagaki (JTF).

6) Panel Discussion: Methods for System Evaluation. Chair: Hozumi Tanaka (TIT); panelists: Takenori Makino (Tohou Univ.), Shoichi Yokoyama (Electrotechnical Laboratory), Junichi Nakamura (KIT), Tatsuro Ashizaki (JICST), Satoru Ikehara (NTT), Takeshi Narumi (Toin), Masaji Nii (Toppan)

7) Panel Discussion: The Future of Machine Translation. Chair: Makoto Nagao (Kyoto Univ.); panelists: Hozumi Tanaka (TIT), Hitoshi Iida (ATR), Yuji Uchida (Fujitsu), Hitoshi Suzuki (Sharp), Junji Nagata (Oki), Mikihito Hirata (NEC), Masaya Amano (Toshiba), Katsuo Koga (NOVA), Kouichi Takeda (IBM)

The exhibition attracted 420 visitors. Exhibitors and MT systems were:

Exhibitor	System	Languages
OKI	PENSEE	E/J, J/E
CATENA-RESOURCE	TRANSLATOR	E/J
CSK	ARGO	J/E
SHARP	DUET	E/J
SUBARU INT'L	CATS	E/J, J/E
TOSHIBA	AS-TRANSAC	E/J, J/E
NEC	PIVOT	E/J, J/E
EDR	Electronic Dict.	E&J
NOVA	PC-TRANSER	E/J
HITACHI	HICATS	E/J, J/E
FUJITSU	ATLAS	E/J, J/E
MATSUSHITA		J/E

MT Goes Live

MT Summit III (Washington, DC, 1-4 July 1991) may well have set the stage for a new trend in the MT world with its series of live demonstrations for seated audiences. The combination of an increasingly informed and demanding public coupled with steady improvements in the performance of MT systems puts new focus on encounters of this kind. This kind of setting gives audiences the clearest possible picture of how MT systems work, enables them to interact directly by testing the various features offered, and provides a question-and-answer forum in which everyone gains a better understanding of the particular product.

A total of 11 different MT developers and vendors presented live demonstrations in a theatre-style setting at MT Summit III in the historic Chinese Room of the Mayflower Hotel. A wide spectrum of technology was used for text input, transmission, and projection. Some of the systems were accessed from distant mainframes, others from sophisticated workstations, and still others from low-end PCs. With all the necessary equipment and interfaces in place thanks to the efforts of Exhibits Coordinator Bill Fry, the conference-goers were regaled with a seamless show of big-screen MT in action.

As the spectators watched, the Systran EXPRESS dialup service relayed input to a mainframe computer in La Jolla, CA, and returned the resulting translations to Washington. Similarly, personnel from the Pan American Health Organization, after using an optical character

reader to scan in texts supplied by the audience, telephoned a mainframe elsewhere in the city and processed translations from and into Spanish using their two systems, SPANAM and ENGSPAN.

A series of systems were demonstrated from workstations. Translation Technologies International (TTI) put the Tovna system through its self-teaching paces, while Executive Communication Services (ECS) presented their LFG-based MT Toolkit, a development environment for MT systems. Japanese-to-English translation was featured in presentations by Mitsubishi, Fujitsu, and Nippon Telegraph and Telephone (NTT). Mitsubishi's MELTRAN-J/E and Fujitsu's ATLAS-II are commercial products, while NTT's ALT J/E is still in the laboratory. Carnegie Mellon University's Center for Machine Translation demonstrated its knowledge-based KANT system, and the University of Geneva's Dalle Molle Institute for Semantic and Cognitive Studies (ISSCO) showed a unification-based MT application translating real avalanche warning bulletins between German and French.

Two PC-based systems were also demonstrated: Socatra's XLT, which translates from English to French, and Linguistic Products' PC Translator, which produced examples of translation into Spanish and English.

Penang Conference on Computational Linguistics

The International Conference on Current Issues in Computational Linguistics was held at the Universiti Sains Malaysia (Penang, Malaysia) from 12th to 14th June 1991. A number of papers were concerned with various aspects of MT. Comments are based on author's abstracts and supplementary information provided by Harold Somers (UMIST).

Twelve problems for machine translation (Christian Boitet, GETA, Grenoble) [representation and handling of ambiguity; maintaining a correspondence between abstract structures and text, so that meaningful linguistic operations can be introduced in text processors; design of tools which incorporate procedural and heuristic annotations into formal static descriptions; lexical and grammatical formalisms which facilitate fine tuning; design of systems which 'learn' from existing bitexts and from revisors' corrections; 'fuzzy' understanding; reusability of lexical data; handling documents as a whole, rather than sentence by sentence; encoding text in a useful way; matching architecture to use; measuring progress.] Pronouns in Referent Grammar and in the MT-system Swetra (Bengt Sigurd, University of Lund) [English/German/Swedish MT system] An overview of the machine translation system ETAP-2 (Karin Steifensand, All-Union Centre for Translation, Moscow) [brief overview of research in the then USSR, followed by description of ETAP-2 method for English-Russian translation based on Mel`chuk's Meaning↔Text model.] String-Tree Correspondence Grammars as a base for the automatic generation of analysis programs in machine translation (Zaharin Yusoff, Universiti Sains Malaysia, Penang) [previously demonstrated on ROBRA (Ariane) now applied to JEMAH system.] An interlingua design for message translation (Victor Shou-Chuan Yang and Charlotte Wang Yang, University of Pittsburgh) [English-Chinese system using concepts, messages, and their relations as the interlingua, with electronic dictionary as knowledge base and empirical translation rules as inference engine.] A new approach to machine translation: the TU-SIL translation system (Stephen Beale, Thammasat University, Bangkok) [based on semantic research of the Summer Institute of Linguistics, focussing initially on the languages of South-East Asia.] Structural and lexical information within a functional approach to machine translation (Erich Steiner, Universität des Saarlandes, Saarbrücken) Classifiers and an interlingua for multilingual machine translation (Chinatsu Aone, MCC, Austin TX) [based on comparisons of English and Japanese constructions, within unification-based categorial grammar.] Dependency grammars for bilingual text generation: inside FoG's stratificational models (Richard I. Kittredge, University of Montreal, and Alain Polguère, National University of Singapore) [system for generating weather forecasts in English and French from meteorological data, based on Mel'chuk's Meaning-Text model.] Multilingual text

generation: an architecture based on functional typology (John Bateman, USC/ISI (Marina del Rey CA), Christian Matthiesen, Keizo Nanri and Licheng Zeng - all University of Sydney) [extension of the Penman system, to design a multilingual systemic-functional grammar, examples from Chinese, English and Japanese.] Malay official letters translation (Ahmad Zaki Abu Bakar and Noor Hapidah Muhayat, Universiti Teknologi Malaysia, Kuala Lumpur) [stereotypical frame filled interactively in user's own language, generated automatically into a target language.] Processing proper nouns in machine translation for English news (Naoto Katoh, Noriyoshi Uratani and Teruaki Aizawa - all of NHK Science and Technical Research Laboratories, Tokyo) [research for experimental English-Japanese system at NHK.] A uniform strategy for word selection in a machine translation system (Hsi-Jian Lee, National Chiao Tung University, Taiwan) [use in CEMAT, a Chinese-English system, of feature lists in a frame-like structure.]

SYSTEMS AND PRODUCTS

Winger 92

Winger A/S, a Danish software company founded in 1990, announce the availability of their Winger 92 system. It is claimed that the system can be easily integrated into new and already existing application programs, such as word processors, data base applications, communication systems. The heart of the system is the language-independent 'Cromsky Engine', developed since 1988 with the assistance of linguists from the University of Copenhagen and financed by the Danish Development Finance Corporation. This kernel combines with other programs, UPSA (Universal Programming Language for Sentence Analysis), SALT (Structured Analysis Language for Translation purpose), UPCUP (Universal Phrase Classification Utility Programme), which describe the grammars of the languages and the classification of dictionary entries, and with API (Application Programme Interface) and RID (Reduced Information Database). Winger 92 is a complete standalone MT system, running on PC/MS DOS (minimum hardware requirement 640K RAM and 40MB free harddisk storage), available at present for Danish-English and English-Danish, with Spanish-English and English-Spanish versions in preparation. For more information: Winger A/S, Skodsborgvej 48 F1, DK-2830 Virum, Denmark. Tel: +45 45831166, fax. +45 45830244

NSF Hears about Knowledge-Based MT

Jaime Carbonell, Director of Carnegie Mellon University's Center for Machine Translation, spoke about knowledge-based MT in a lecture for an audience of policy-makers, interested professional staff, and invited guests at the National Science Foundation in Washington, DC, on 7 April.

Following a general introduction in which he characterized MT from the perspectives of workflow (pre-editing, interactive intervention, postediting), the task being done (languages, domains, text types, assimilation vs. dissemination), and the technological paradigm (direct, transfer, and interlingual), Carbonell went on to describe the work at CMU, where two lines of research are being undertaken in parallel. On the one hand, the KANT system uses a controlled input language and is designed to produce output in as many as 11 languages which will not require postediting. On the other hand, PANGLOSS is a large knowledge-based system that is intended to fill an intermediate niche between the narrow sublanguage approach and general-purpose translation.

Carbonell concluded by emphasizing that funding agencies should focus on fostering increased synergy between research, development, and customer interaction. Investments are urgently needed to reinforce the loop. Unless synergy is achieved, he said, "MT will never work."

TEXT CORPORA and NLP TOOLS

The European Corpus Initiative has been founded to oversee the acquisition and preparation of a large multi-lingual corpus to be made available in digital form for scientific research at cost and without royalties. The first phase is on a purely voluntary basis. The present goal is to produce (by October 1992) a multi-lingual corpus covering as many as possible of the major European languages, with standardized (TEI-conformant) markup, covering textual material of all kinds. The main method of distribution will be a CD-ROM, possibly two if enough material can be collected, available for around 25 ECU. Addresses for further information and offers of material for inclusion: Henry S. Thompson (ECI), HCRC, 2 Buccleuch Place, Edinburgh EH8 9LW, Scotland; Fax: +44 31 650-4587; email: eucorp@cogsci.ed.ac.uk. Susan Warwick-Armstrong (ECI), ISSCO, 54 route des Acacias, CH-1227 Geneve, Switzerland; Fax: +41 22 300 1086; email: susan@divsun.unige.ch

      The Association for Computational Linguistics Data Collection Initiative (ACL/DCI) is an activity which collects machine-readable text for the purpose of scientific and humanistic research, and distributes it at cost and without royalties. The first CD-ROM has been available since September 1991. It is in ISO 9660 format, and contains about 300 Mb of Wall Street Journal text, a collection of about 200,000 scientific abstracts, the full text of the 1979 edition of the Collins English Dictionary in the form of a typographer's tape, and some samples of tagged and parsed text from the Penn Treebank project. Address for information and a user agreement form: Rafi Khan (email: khanr@unagi.cis.upenn.edu)

      A third release of the Alvey Natural Language Tools (ANLT) is now available. The UK Alvey Programme originally funded three projects at the Universities of Cambridge, Edinburgh and Lancaster to provide tools for use in natural language processing research. The DTI and SERC has funded their continued support and enhancement. The tools, a Morphological Analyser, Parsers and a Grammar and Lexicon, are usable individually as well as together (integrated by a 'Grammar Development Environment') forming a complete system for the morphological, syntactic and semantic analysis of a considerable subset of English. The ANLT system is available by anonymous FTP from Cambridge University, Computer Laboratory. Contact address: Lynxvale WCIU Programs, 20 Trumpington St., Cambridge, CB2 1QA, UK; Fax: +223 332797.

      LN Electronic List: LN (Langage Naturel) is an international electronic distribution list for computational linguists. Its goal is to disseminate calls for papers, conference and seminar announcements, requests for software, corpora, and various data, project descriptions, discussions on technical topics, etc. The list is primarily French-speaking, but many items are circulated in English. It provides a forum for scholars working on French, but it is by no means restricted to this field. The list is sponsored by the Association for Computational Linguistics (ACL) and the Association for Computers and the Humanities (ACH). Currently the list consists of about 600 members in 31 countries.

To join LN, send a message to
      LISTSERV@FRMOP11.BITNET,
containing only the following line:
      SUBSCRIBE LN your name
Send messages to be transmitted on the list to LN@FRMOP11.BITNET.
In case of problems, send a message to one of the editors:
      Jean Veronis VERONIS@VASSAR.BITNET
      Pierre Zweigenbaum ZWEIG@FRSIM51.BITNET

USERS VIEWS

Is MT profitable? a round table discussion. Part 1
[Translated from JAMT Journal issue 4, January 1992, p.3-8,
by Sarah Mortimer, MITAKA.]

Participants: Taketoshi Kashiwabara (Representative Director, Subaru International KK), Shinji Kamata (Head of MT Centre, Fujitsu KK Document Service), Isao Tominaga (Head of Information, Japanese Information Centre for Science and Technology) Chairman: Takeshi Narumi (Member of Newsletter Editorial Committee, Language Research Institute, Jujirushi KK)

Chairman: Thank you all for taking the time to participate in this discussion. Firstly, I would like you to give us a brief resume of your company and then I would like to hear your views on today's theme. Could you begin, Mr. Kamata?

Kamata: Our company is a wholly owned subsidiary of Fujitsu, with 140 employees. Our turnover in the last fiscal year was 2.6 billion yen. Our main business is translating, writing manuals (technical writing) and editing (block copy, layout). The MT Centre to which I belong is part of the Translation Department. Last year's sales in connection with MT amounted to just under 100 million yen.

Some years ago Fujitsu first brought out the ATLAS MT system and we were commissioned with the task of developing the dictionaries. It was undertaken with some enthusiasm by the operations department. However, our company was not a computer programme company and so the creation of the dictionaries was carried out using English language experts and Japanese language experts without access to software. We used large M series computers (which the company was on the point of phasing out completely) in conjunction with large multi-purpose computers from Kawasaki Kojo. At this point large computer projects were pretty well coming to an end. Now there was a worldwide "downsurging" - transfer to small computers like workstations and PCs. Following this trend, ATLAS itself was adapted for use with workstations two years ago. With relation to this project, we are also undertaking introductory consultations for Fujitsu regarding the best use of the technology for client sales. This is still continuing.

Since last year we have been offering a translation service in which we receive a request from a client for the translation of a text and have it translated by machine and returned straight away. This uses MT menus loaded onto 'Niftyserve' and 'Asciinet' PC systems. It has been going on now for barely a year but it brought in revenue right from the start, so it's been a great success in business terms. Even now, demand is gradually increasing. I think this will continue for a while. But you need to have software for administrative purposes for this sort of business. With reference to today's theme of whether or not this is profitable, I would say that yes, it is fairly profitable. But one could say that the development of MT systems costs billions of yen and the number of businesses which could do it is limited.

Apart from this though we are doing other MT jobs which are profitable. We are undertaking translation work for newspaper databases for some clients on a daily basis - well, apart from Saturday and Sunday. We receive the copy in the morning and return it in the evening, so without MT it wouldn't be possible. The reason is that MT should not be used for ordinary texts (a professional translator can produce English text merely by looking at the original), but for newspaper databases it is necessary to use the correct English names for companies. It's impossible for a translator to remember thousands of company names absolutely faultlessly. Machines should only be used when only a machine will do. There are hundreds and thousands of companies in Japan and likewise throughout the rest of the world. When you get a name like 'bentsu', you wonder what the correct equivalent is in English. For translating all these sorts of things correctly, if they are not known they can be looked up; it costs money, but once they have been input they can be used again and again. We have been contracted to work on databases for certain companies using this method. As well as this, there are Fujitsu internal users - but we mustn't get involved in that.

It would be completely absurd for novices to try to use current MT systems. Taking dictionary compilation as an example of the problem, it would be ridiculous if someone tried to input whatever they liked without getting used to the system. For example, if you input the name of some company like "America XX" using a capital A, then if you write ABC the translation would come out as America XX BC. So in that sense, if you are not used to MT and you don't know the problems, the whole thing can still be completely useless. MT systems are still not at all user friendly; there are some who say that the user interface is the problem but in fact it is the system itself. There are various problems. It has become our task to use the system skilfully somehow, even though it is an extremely unsophisticated system and very difficult to use. I think that the sales of MT would probably increase if these problems could be resolved.

Chairman: With reference to what you have just said, is it Japanese to English translations which are more common? Even for the databases?

Kamata: For the uses I've mentioned, it's almost entirely Japanese to English. Only Niftyserve sells Japanese-English and English-Japanese at a ratio of 1 to 1.5. This is used by general clients as an MT system starting from scratch. Apart from that, up till now translators have become involved almost exclusively in Japanese to English.

Kashiwabara: It seems that Niftyserve targets the documents of the general public, but I think you can make expanded dictionaries -how does dictionary compilation work with Nifty?

Kamata: With Nifty that's the client's responsibility. Legally we're not allowed to see any of our clients' documentation. It's like tapping a telephone. It's only when claims or inquiries come, such as when the text doesn't read correctly, that you really understand exactly what's happening. We offer a service whereby the client enters nouns into a dictionary and we input and store them on our system. For the time being all the communication problems are solved, but ultimately it comes down to the problem of quality.

Kashiwabara: In those circumstances there are lots of contributions on all sides, but I think that although the dictionary naturally belongs to the client, Fujitsu Document Service must have some control over it, mustn't they?

Kamata: That's true. Since it is the property of the client however, we can't take copies at our own convenience without the client's permission.

Kashiwabara: I think that Fujitsu Document Service is carrying out valuable work on the creation of dictionary databases which will surely materialise in the future.

Chairman: Right. Could I now ask Mr Tominaga of the Information Centre to give a resume of his activities. Please could you tell us particularly about the current continuation of the Mu project.

Tominaga: The Information Centre [JICST] was established in 1957, under the umbrella of the Science and Technology Agency. In our position as a mainstay of information handling, we have concentrated up until now on disseminating information from abroad in Japan. Around 1984-85 there was a demand not only for bringing in information from overseas (America, etc.) but also for offering information from within Japan. There was what has been called an 'information breakdown', and since then, it has been made very clear to us that if information from within Japan is not provided then information from abroad should not be brought in. The result was an obligation to offer Japanese information abroad. However, when considering how the mountains of information could be presented it was easy to say that everything should be translated and published, but it was impossible to find the manpower required and the budget for such an operation.

Thus, development started on the Science and Technology Agency's Mu project... From 1982 to 1986, Professor Nagao led the development of the Mu-1 system and from this the prototype was created. The Information Centre used Mu-1 as their basis for developing a more practical version. Then, from 1987 to Spring 1990, the first fairly costly stage of creating an operational system was achieved.

From 1984 an English database had gradually been compiled from papers published in Japan in scientific and technical journals from around 1957. With the JOIS online system, detailed information was offered overseas. However, only a small amount of information could be offered because it was basically translated manually. The amount of data doesn't bear talking about and, as I mentioned earlier, there was criticism from overseas.

As there was no alternative, manual translation was stopped in August 1990 and some form of MT system had to be used. 2.2 million titles or abstracts of papers were offered on the English database in the course of the year. A little over 40% of these were provided by MT. The rest of them had English abstracts or titles provided by authors, as it has recently become standard practice to encourage writers of Japanese papers to do this. So for approximately 58.9% at least, the English was written by the authors. About half the development costs was apportioned to the dictionaries; we now have dictionaries of 540,000 terms. We deal with a lot of data relating particularly to public agencies, so the English names of these, right down to departments, are important - the names of many organizations occur in the dictionaries. Of course, private companies are also important. The translation into English of about 91,000 abstracts is taking place at a rate of 7,000 a month, including pre- and post-editing. The translation are pre- and post-edited, but final filtering is undertaken by eight revisers (two of them native speakers). Translation companies (five in all) are given the task of pre- and post-editing. The texts are distributed among them according to their specializations. Any deficiencies in specialist terminology in the English text which are left at the final post-editing stage are amended at the final checking stage by specialists. The same applies to company names, so the system gradually amasses language data.

Pre-editing can be very arduous because one of the special characteristics of abstracts for scientific and technical texts is that they have been compressed to around 300 characters; at worst there may be 40 to 50 consecutive kanji. When you try to machine translate this sort of text, it is futile to imagine that smooth English can be achieved even if you divide the text where it can be divided neatly and you get something which looks more or less like English. So, in the process of pre-editing these kinds of texts you can also prepare dictionaries to cope with any long strings of kanji which appear. As a result 540,000 entries are now complete - including medicine. I said that manual translation stopped in August 1990; in fact manual translation and MT had gone on side by side for a trial period of between six months and a year previously.

With reference to today's topic of whether or not MT is profitable, although we are carrying out general translation work we are not yet using MT for this purpose. We are using it just for the creation of the database that I've mentioned and our translation costs are three times lower than with using human translators. So in our eyes that's profitable. The time spent using computers has also been reduced. If you compare the time taken for MT with that of human translation, it has been said that the total time is in fact greater for MT, if you take into account pre- and post-editing. However, the computer time is getting less. A task which took 30 minutes now takes 25. The service time or turnabout time has also decreased. I think that with a bit of inventiveness it will decrease more. At present we are recording information on large computers and only producing databases for internal use. However, I would hope that in the future we could receive papers on any subject and offer a service of raw translation or translation with post-editing. At the moment we're performing simple batch processing but for the near future we're currently planning methods for preparing translations via TSS at the stage of creating the Japanese abstract or for providing translation assistance in general over a nationwide network.

Chairman: Thank you very much. Let's now turn to Mr.Kashiwabara. We'd like to hear a resume of your company, what lead you into MT, and what sort of use you are putting MT to at the moment.

Kashiwabara: Our company was started up in 1977 as a specialist translation company, achieving corporate status in 1985. It was actually in 1988 that we started work with MT in earnest in the way we do today. But we set up as a corporation with the assumption that our aim would be

to have a firm plan for business development based on MT in the future. I'll talk about the lead-in to MT in a moment.

At present we manage all the paraphernalia required for bringing newspapers and magazines to the point where they are ready for publishing, i.e. MT and then processing finished translations with DTP and various electronic processing systems... The broad categories of our work are MT, DTP and, as before, manual translation for texts which cannot be translated by MT. At present, the division between MT translation work and that which cannot be tackled by machine is about 50/50, but I would like to see the level of MT rise to about 80% within two years. By this I don't mean that the number of manual translations should decrease but that the level of MT processing should increase, so that there would be a relative rise of the percentage. We are also involved in interpretation work or business relating to special events. The turnover is just under 400 million yen.

The lead-in to MT arose from a situation which is probably quite a familiar lament among people in the translation business - namely the quality of the translations themselves, the lack of translators to monitor it, and the difficulty of management itself. Once you have produced a good translation, the client naturally puts in another order expecting the same results, but it is an extremely difficult art to continue to produce work of the same quality. Above all, as a translator myself (though not much of one), I think that it is shameful, even problematic, that translators are so rare to find who are able to collect commonly-held data and accumulated know-how. Most translators work entirely alone. If anything happens to them, their accumulated knowledge disappears and at the same time the client's trust is lost. There are exceptions but the majority of people just want to make a living with what they've got. As the technological revolution progresses, they can't keep up. It is not unusual in fact for the new version of some computer software to come out before the translation of the original computer manual has been completed. Translators have no sense of urgency in this regard, and seem to feel that one should be grateful for their existence. In this climate it is difficult to seek improvement. The idea that one can look after clients' interests and also the advancement of one's own business is relevant for all members of staff - but the foundations for this are crumbling.

In many places you still run up against the extremely low opinion in which the translation business is held. Generally speaking we are not entered into industry listings in the financial world. But quite recently we have begun at long last to appear in the listings for service industries. It has been said that translation is really a branch of the entertainment industry - like authors who write academic literature which doesn't sell. With the rising standards of today's translators, one of the problems is supporting them.

Japan was said to be too exclusive with regard to publishing technological information abroad and the problem of translation was a bottleneck. I worked continually for JETRO, MITI and so on, and came across this feeling quite a lot. I don't think I now need to feel inhibited from speaking about this, but from 1986 to 1988 JETRO carried out a survey of companies with a technological background which were making inroads into foreign markets... Company profiles were published, and of course details of activities abroad, e.g. companies seeking inroads into Belgium or Holland, potential output, technological cooperation, progress of factories abroad, etc. All this information was presented in various analyses, and was universally welcomed...All this brought a new problem, as there was no follow-up organization in place and no budget for one. Of course, requests came from abroad asking for more information or for contacts with companies, but this had not been foreseen. From the UK came a formal protest about the terrible organization in Japan... Taking the view that if it could not be followed through then it would be better to give up, the project ended after two years.

As far as problems of follow-up and user interface were concerned, we thought we should provide data in a way which was user friendly for users abroad, e.g. on Macintosh or IBM. At that time there were various exchanges with foreign companies and governments. With full knowledge

of the great demand for Japanese technological information, and with work from JETRO, we took the final decision to move over to MT.

There was one other factor in fact before that... We translate a large quantity of newspaper articles and I don't think there is anything more troublesome. There are various problems with proper nouns. Newspaper articles are written in a limited time and so hardly any of them are easy to translate. There are many cases where what is required is the translation of articles, e.g. on computers, communications, semi-conductors, etc. We thought that headlines alone would not be enough for the clients and that they would certainly require at least an abstract of the article. Limiting ourselves to a certain number of fields we laid out 5 million yen at a time when we had just achieved corporate status with a capital of 1.8 million. It was enough money to sink us completely. We had a trial period of a month in cooperation with foreign-owned companies in Japan and overseas clients. It was extremely successful, but yet again translation was a bottleneck... For the first publications we began picking out articles but after about ten days we gradually ran out of steam. The cost of translation was great, and we gave up this joint operation after one month. At that time we just thought that it would be good if we could do that sort of thing in earnest.

One of the duties of managers of foreign companies in Japan is to collect data in Japan and to send the most vital data back to their own countries when appropriate. I question their capability in this area. I think there is a great need to offer services to these people. If there are only manual translators available, then I think this is completely impossible.

According to a later JETRO study, if people do not use MT they are in danger of having to close down. At this time, the Bravis Micropak, etc., materialised and it was said that translators would be forced out of business, but nothing of the sort happened. In the business world good translators looked on it as a challenge and that is still the case now. There are lots of people who felt that this sort of thing would not get in the way of their job. Our service is a Computer Aided Translation Service (CATS) developed for our own use. I think this should be regarded as an excellent tool by a good human translator. When guns first appeared in Japan their use was perceived as an act of cowardice by masters of the sword or spear. But I think that rather than regarding MT with animosity, it should be used as one's own tool. If the number of skilled users of this interface does not increase then the world of MT cannot expand.

[to be continued]

FROM THE ARCHIVES...

The first MT conference, 1952

John Hutchins

It is now exactly forty years since the first conference on machine translation took place at the Massachusetts Institute of Technology in June 1952. The intention was to bring together everyone known or believed to have some interest in the topic. It was a small affair, with just eighteen participants, organized by Yehoshua Bar-Hillel who had been appointed the year before to the first MT research post at MIT.

The conference was taking place only three years after the famous memorandum of Warren Weaver in July 1949, which effectively launched MT research in the United States, and indeed only five years since the very idea of using the newly invented electronic calculators for translating languages had been proposed. Nevertheless, in this short period, as the conference revealed, many of the issues which still concern MT researchers had already been raised. Although the proceedings of the conference were not published at the time, we have contemporary accounts written by Erwin Reifler (University of Washington) and by A.Craig Reynolds (IBM Endicott Laboratories),

published in the newly founded journal Mechanical Translation, vol.1(2), 1954, pp. 23-32, and vol.1(3), 1954, pp. 47-55, respectively.

The conference opened with a public session on the 17th June. Bar-Hillel outlined the potential of MT to cope with the increasing volume of scientific research literature; Leon Dostert (Georgetown University) spoke of his experience in setting up simultaneous translation services at the Nuremburg trials and at the United Nations - he was sceptical about MT, believing that there was no shortage of human translators; Olaf Helmer reported on some tentative MT experiments already undertaken at the RAND Corporation; and James W. Perry (MIT) speculated about the relation between MT and automatic indexing and retrieval systems.

Participants were already aware of the formidable linguistic and computational difficulties ahead. Both Reifler and Bar-Hillel were convinced of the crucial involvement of human translators, not only as post-editors but also to prepare texts. To minimize source language problems Reifler had two proposals. The first was pre-editing, "the use of a human editor to rearrange the source language insofar as possible in accordance with the syntax of the target language, and secondly, employment of various inserted signals to notify the machine of syntactical arrangements inseparable from the word form". The second was to train authors (or "more particularly their secretaries") to write with MT in mind. Of the two suggestions, participants apparently preferred the 'pre-editor' approach rather that what we would now call the 'controlled language' approach. Some were attracted by a suggestion from Stuart Dodd (Washington Public Opinion Laboratory) for the "standardization of English syntax as a means of simplifying the use of English either as a source language or as a target language", e.g. regularizing verb forms (*She did be loved*) and pronouns (*I will send he to she*) and, of course, the use of words in one meaning only.

The conference was also attracted by the ideas of Victor Oswald (UCLA) for domain-specific dictionaries ('micro-glossaries' he called them) to minimize the problems of "multiple meanings" (i.e. alternative choices in target languages). Such micro-glossaries could be established on the basis of statistical frequency analyses of vocabulary. Oswald had done work on German texts in brain surgery, and his UCLA colleague William Bull had analysed Spanish texts.

Syntactic analysis appeared to be something quite new. From a painstaking analysis of German, Oswald had concluded that structural 'blocks' could be isolated which could be treated as units in the rearrangement required for translation into English. Bar-Hillel's presentation of what he called 'operational syntax' and which is now known as categorial grammar was a revelation: "a completely new concept to the linguists of the conference who had intuitively felt that such a structure did exist but without the tools of symbolic logic had been unable to isolate the essential features that lead to the exceedingly simple arithmetic operations." The latter, of course, appealed greatly to the computer engineers present.

As in some modern conferences, there was no lack of crystal gazing: William Locke (MIT) looked forward to voice input and output devices, and Erwin Reifler speculated about a 'universal grammar' as the basis for an interlingual switching code. Leon Dostert proposed that "general MT ... should be so developed that one translates first from the input language into one 'pivot' language (which in our case will, most likely, be English) and from that pivot language into any one of the output languages desired." Reifler correctly foresaw this as an idea "which will certainly become an important feature of future MT."

There was little practical experience of programming. Harry Huskey (UCLA) had experimented with a small micro-glossary in a word-for-word translation program on the SWAC computer at the National Bureau of Standards. Andrew Booth (Birkbeck College London, the only non-American at the conference) gave an extended account of his and Richard Richens' experiments in England using punched cards for translating abstracts to and from many languages (the work had been reported briefly in Weaver's 1949 memorandum). The computer engineers were however optimistic and were already discussing the relative merits of different programming methods and storage devices.

At the end of the conference on June 20th, Leon Dostert, who had now been converted from his initial scepticism, suggested "the early creation of a pilot machine or of pilot machines proving to the world not only the possibility but also the practicality of MT." As we now know, immediately after the conference Dostert began collaboration with IBM to produce a small-scale Russian-English system, which was demonstrated in January 1954 and stimulated the subsequent massive funding of MT research in the United States.

RECENT PUBLICATIONS

Carbonell, Jaime, Chair; Rich, Elaine, Co-Chair; Johnson, David; Tomita, Masaru; Vasconcellos, Muriel; and Wilks, Yorick. *JTEC Panel Report on Machine Translation in Japan*. Baltimore, Maryland: Loyola College in Maryland, 1992. 142p. Distributed by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, USA, telephone +1 (703) 487-4650. Publication number PB92-100239.
Contents: Foreword. Preface. Executive summary. 1. Introduction: Machine translation in Japan and the U.S. (Jaime Carbonell) 2. Technical infrastructure (David Johnson) 3. Languages and application domains (Muriel Vasconcellos) 4.Knowledge sources for machine translation (Yorick Wilks) 5. Life cycle of machine translation systems (Masaru Tomita) 6. The uses of machine translation in Japan (Muriel Vasconcellos) 7. Acceptance of MT: Quality and productivity (Muriel Vasconcellos and Elaine Rich) 8. MT contrasts between the United States and Europe (Yorick Wilks) 9. Research and development (Elain Rich) 10. Future directions in machine translation (Elain Rich). References. [A review of the report will appear in our next issue.]

Laffling, John: *Towards high-precision machine translation, based on contrastive textology*. Berlin, New York: Foris Publications, 1991.(Distributed Language Translation, 7.) xiii,178 pp. ISBN: 3-11-013388-1 £35.
The book argues that the knowledge required for the achievement of high quality machine translation is contained in and can be derived from a corpus of bilingual texts within a particular subject area, whether such texts are actual translations of each other or texts produced independently of each other. The author sets out to examine the extent to which lexical ambiguity can be resolved and bilingual lexical choices can be made solely on the basis of the linguistic information contained in texts, i.e. without recourse to non-linguistic knowledge.

Hutchins, W. John and Somers, Harold L.: *An introduction to machine translation*. London, etc.: Academic Press, 1992. xxi, 362 pp. ISBN: 0-12-362830-X £19.95
This book is intended as an introduction to machine translation primarily for students of linguistics or computer science, e.g. in courses on computational linguistics or artificial intelligence, but it could also be of value for the researchers in related spheres of natural language processing or for anybody interested in finding out more about the prospects and achievements of MT. It aims to introduce the well-established core of methods and approaches, to explain the problems and difficulties, to describe what has been achieved and what remains to be done in machine translation. The emphasis is the description of basic principles rather than the discussion of practical aspects of operational systems.
Contents: Foreword by Martin Kay. Preface. General introduction and brief history. Linguistic background. Computational aspects. Basic strategies. Analysis. Problems of transfer and interlingua. Generation. The practical use of MT systems. Evaluation of MT systems. Systran. SUSY. Meteo. Ariane (GETA). Eurotra. METAL. Rosetta. DLT. Some other systems and directions of research. Bibliography. Index.

Proceedings: International Conference on Current Issues in Computational Linguistics, 10-14 June 1991, Universiti Sains Malaysia, Penang, Malaysia. [Penang]: 1991. 471 pp. [see conference report elsewhere in this issue.]

Luckhardt, Heinz-Dirk and Zimmermann, Harald H.: *Computergestützte und maschinelle Übersetzung, praktische Anwendungen und angewandte Forschung.* (Sprachwissenschaftliche Computerlinguistik, Band 14) AQ-Verlag, 1991.

Journal articles

Language Industry Monitor, *no.7, Jan-Feb 1992*: p.2-3: John Chandioux's GramR - p.3: PC-Translator version 3.3 - p.4-5: Eurolang: a new runner in the MT race - p.5-6: Eurotra Denmark: diversifying - p.6-7: Winger's CAT system. *no.8, March-April 1992*: p.4: DARPA's MT thrust - p.6-7: True European translation tools - p.7: The many flavors of Translation Memory

JAMT Journal, *no.4, January 1992* p.1-2: Thoughts for the New Year (Makoto Nagao). - p.2: JAMT activities. - p.3-8: Round Table discussion: Is MT profitable? - p.9: Introduction to research: ATR Automatic Translation Research Institute (Hitoshi Iida). - p.10-11: MT quick reference guide, part 2: morphemic analysis. - p.12-15: From the battlefield of translation: Linguistic nationalism (Satoshi Watanabe) [also in English]. - p.16-17: User guide, MT using a PC network (Shinji Kamata). - p.17: conference report: NLPRS'91 Singapore. - p.18: Conference guide. - p.19-20: Guide to MT World '92. - p.21: Members' comments. - p.22: How to advertise. - p.23: Notices from the secretariat.- p.24: Addresses of members.

Language International, *vol.4, no.1 (1992*), p.7-8: IBM Translation Tool (Robert Clark). - p.8-10: [reports of new MT systems from Linguistic Products (Texas), from Logos (MT software for Unix), and for English-Chinese translation.] - p.29-30: MT theory and MT practice, report of the 13th annual international Translating and the Computer conference (Geoffrey Kingscott) *vol.4, no.2 (1992)*, p.5-7: Interview with Professor Makoto Nagao (Geoffrey Kingscott). - p.7-11: Is machine translation actually translation? (R.Lee Humphreys)

Computational Intelligence *7(4), 1991. Special issue on Natural Language Generation.* Contributing authors: S.Carberry, R.Dale, N.Haddock, E.Hovy, G.Kempen, R.Kittredge, T.Korelsky, M.Maybury, K.McCoy, D.McDonald, K.McKeown, M.Meteer, D.Mooney, J.Moore, C.Paris, O.Rambow, E.Reiter, Y.Schabes, S.Shieber, F.Smadja, D.Suthers, K.Vijay-Shanker, G.Yang, I.Zukerman

TA Informations *31 (1), 1991: Special Issue on Semantics and Machine Translation* **Contents**: Présentation (Y. Lepage); Représentation des informations lexicales dans les dictionnaires électroniques (N. Nédobejkine); Détermination sémantique en analyse structurelle; une expérience basée sur une définition de distance (J. Chauché); Degrés d'abstraction des représentations intermédiaires en traduction automatique: l'exemple d'Eurotra (L. Danlos); Le temps de la linguistique (F. Lab); Du transfert à la traduction: quelle(s) sémantique(s)? (G. Bourquin); Calcul du référent du sujet non exprimé en espagnol (C.Vigroux). [TA Informations is the semi-annual journal of ATALA, the French computational linguistics association (Association pour le traitement automatique des langues). This issue is sent automatically to all ATALA members; non-members can order it (at 100 FF.) from the publisher at the following address: Klincksieck, 11 rue de Lille, 75007 Paris, France. To join ATALA, send a check to the association at: ATALA, 45 rue d'Ulm, 75005 Paris, France. Please state your address and affiliation. Annual dues are 150 FF for individuals and 200 FF for institutions.]

CHIP, *no.9, September 1991*, p. 26-29: Forschung: Maschinelle Übersetzung (Gero von Randow) [general article covering ALPAC, CEC involvement, Eurotra, METAL, CMU.]

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