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**ORNL**  
**FOREIGN TRIP REPORT**  
ORNL/FTR-3800

**DATE:** October 19, 1990

**SUBJECT:** Report of Foreign Travel of Richard A. Strehlow, Research Staff,  
Metals and Ceramics Division

**TO:** Alvin W. Trivelpiece

**FROM:** R. A. Strehlow

**PURPOSE:** To conduct a Workshop on Terminology Standardization and to attend the  
2nd International Congress on Terminology and Knowledge Engineering,  
Trier, Germany, October 1-5, 1990.

**SITES VISITED:** 10/1/90-10/5/90 Conference Trier, Germany

**ABSTRACT:** Terminological requirements in information management was but one of the principal themes of the 2nd Congress on Terminology and Knowledge Engineering. The traveler represented the American Society for Testing and Materials' Committee on Terminology, of which he is the Chair. The traveler's invited workshop emphasized terminology standardization requirements in databases of material properties as well as practical terminology standardizing methods.

The Congress included six workshops in addition to approximately 82 lectures and papers from terminologists, artificial intelligence practitioners, and subject specialists from 18 countries. There were approximately 292 registrants from 33 countries who participated in the Congress.

The Congress topics were broad. Examples were the increasing use of International Standards Organization (ISO) Standards in legislated systems such as the USSR Automated Data Bank of Standardized Terminology, the enhanced Physics Training Program based on terminology standardization in Physics in the Chinese province of Inner Mongolia, and the technical concept dictionary being developed at the Japan Electronic Dictionary Research Institute, which is considered to be the key to advanced artificial intelligence applications.

The more usual roles of terminology work in the areas of machine translation, indexing protocols, knowledge theory, and data transfer in several subject specialties were also addressed, along with numerous special language terminology areas.

**MASTER**

## **COMPREHENSIVE TRIP REPORT**

### **2nd Congress on Terminology and Knowledge Engineering**

#### **I Purpose of the Workshop on Terminology Standardization and its Relation to DOE Programs**

The purpose of the workshop was to introduce terminology standardization to other workers in the field of terminology and knowledge engineering.

Terminology standardization, the prior negotiation of the meanings of terms, is an active area in advanced ceramics standards development as well as in other technical areas of concern to the Laboratory, and in many of its DOE, NRC, and other programs. The five principal applications of terminology standardization derive from requirements for knowledge structuring and information transfer:

- Database design and use, including management databases as well as material property databases,
- Technical writing improvement,
- Indexing terms for efficient textual information storage and retrieval,
- Efficiency of communication in meetings, and
- Effective technology teaching.

Participation in many of the 140 technical committees of the American Society for Testing and Materials (ASTM) is supported by the Laboratory to benefit its programs. The ASTM provided partial support for the traveler's activity reported here.

#### **II. The Traveler's Role in the Congress**

The traveler was invited by Christian Galinski, Director of the UNESCO sponsored organization, INFOTERM (The International Information Center for Terminology, Heinstraße 38, Wien 2, Austria), to present a workshop on terminology standardization. He requested an emphasis of the viewpoint and well-recognized practical approach of ASTM. INFOTERM along with the Association for Terminology and Knowledge Transfer were the co-conveners of the Congress, and ASTM was one of many supporting organizations.

The traveler, Chair of the Committee on Terminology of the ASTM, had the principal objectives of presenting the workshop and of evaluating activity in the application of terminology standards in database and other information management activities. As Chair of the ASTM Committee on Terminology, a

standing committee of the society with a membership of approximately 150, the traveler is in a unique position to present ASTM's terminology work.

The workshop was designed as a 2-h modular presentation with instructive exercises. It was directed toward those professional translators, information specialists, subject specialists, and artificial intelligence practitioners who do not engage routinely in terminology standardization. This proved to be an appropriate level for the approximately 20 participants. The materials that were developed are expected to be useful in presentations to DOE's Office of Scientific and Technical Information and elsewhere.

### **III. Appraisal of the Congress**

The Congress included eight keynote lectures and eight somewhat overlapping sessions:

- Terminology, Knowledge Theory and Knowledge Engineering
  - New Applications
- Knowledge-based Systems
- Natural Language Processing and Knowledge Engineering
- Documentation Languages and Ordering of Knowledge
- Electronic Dictionaries
- Information Management in Organizations
- Computer Support in Technical Communication
- Terminology and Knowledge Engineering Tools

Five topics are selected here for emphasis. The additional areas of knowledge theory, cognitive science, and some particular implementations of artificial intelligence that were also covered in conference papers were of incidental and general interest to the traveler.

#### **A. The role of terminology in information management in organizations**

The theme of management of information underlay much of the Congress. The topic was treated anecdotally by Mary E. Shacklett of FSI International, Chaska, Minnesota. She described by case study the evolution of an information "service bureau" into a proactive, business problem resolution agent and strategic contributor within an organization.

A paper by Dr. Czap, Professor of Business Administration, University of Trier and president of the sponsoring Association, treated the enormous increase in required documentation in contemporary enterprises and presented compelling arguments for terminology control as part of a management system.

Several terminology databanks are now operating in countries around the world. These are rarely concept based, and, to the traveler, appear to be preliminary and experimental.

## B. Knowledge transfer

### 1. Abstracting of written information

Document representation – the strategies for abstracting technical reports and papers for retrieval efficiency – was analyzed in an advanced fashion by B. Endres-Niggemeyer. Both here and in numerous discussions, it was evident that authors, editors, abstractors, and information specialists need increasingly to be closely coordinated. It is recognized that terminology standardization aids this process.

### 2. Hypertext

The increased cultural diversity of audiences and linguistically varied backgrounds require new varieties of electronic support. In this context the role of Hypertext in information management and knowledge transfer was discussed by several authors and especially clearly by Robert Hein of Reynolds and Reynolds, Dayton, Ohio.

### 3. SGML (Structured Generalized Markup Language)

The traveler had private discussions with one of the keynote speakers, Donald Walker, Manager of Artificial Intelligence and Information Science Research, Bellcore (Bell Communications Research). The traveler described to Dr. Walker the work on SGML and its role in knowledge organization and transfer now being explored by ASTM's Committee on Terminology. This proved to be closely related to the work on electronic data interchange and the text encoding initiative carried out by Walker at Bellcore and by others.

Both the traveler and Dr. Walker agreed that SGML was a potentially valuable tool in information transfer both terminologically and generally. It is clearly much more than a mere formatting language of interest to editors. The traveler and Walker agreed to maintain contact.

## C. Represented subject specialties

Although several participants, like the traveler, were based in physical science and engineering disciplines, a majority of the subject specialists attending the Congress appeared to be from the biological, medical, and pharmaceutical sciences. Other specialties included law, mathematics, and archeology. The

physical and engineering sciences have been better represented at United States symposia on terminology sponsored by ASTM's Committee on Terminology.

#### **D. Natural language processing, knowledge structure, and knowledge representation**

##### **1. Theoretical modelling**

Contemporary models of abstraction and discourse were well represented, but with an unusually strong emphasis on their terminological aspects. The development of concept-based dictionaries and on-line thesauri is now being reported in the expectation that future information handling will be based on these innovations.

##### **2. Electronic dictionary work in Japan**

Japanese work started in 1986 on large-scale electronic dictionaries (including word, co-occurrence, concept, and bilingual dictionaries). The concept based dictionary now includes 300,000 words and terms. The bilingual dictionaries are the result of a research effort involving Japan, Indonesia, Thailand, Malaysia and the People's Republic of China.

The traveler perceived that there is, as yet, little involvement of many engineering or scientific workers from the physical science disciplines in the Japanese work. Textual material provides the data and reliance is therefore placed on the standardized terminologies of ASTM, ISO, etc. The number of people involved in these efforts is large, but the actual manpower level applied to the tasks is difficult to estimate, because of multiple activities of the participating workers.

##### **3. Extensive standardization work in the USSR**

Dr. A. Dzhanradze (with I. Volkova, co-author), representing the USSR State Committee for Standards, described 650 State Terminological Standards that are based primarily on ISO standards. Remarkably, he reported these standards to be distributed in numbers of 60,000 copies and more. It may be noted that much of the source material for ISO technical committee terminology standards derive directly from ASTM technical committee activity. It is clear that the USSR effort is large and significant.

Problems with the Cyrillic alphabet in international data interchange are being addressed, but have not been resolved.

#### **E. Teaching science and technology based on standardized terminology**

##### **1. Physics terminology in Inner Mongolia**

A paper by Prof. Dr. Che Hosbayer and Hasbagan (principal author and translator respectively) of the Inner Mongolian Teacher's University demonstrated with numerous examples the role of terminology standardization in teaching college physics. Interestingly, from this small group 20 papers on terminology have already been written and six symposia held on physics terminology. A group of eleven associate professors is responsible for the development of Mongolian terminology and is now expanding its area of concern to include biology.

## 2. Terminology standardization in the People's Republic of China

The traveler discussed terminology progress in technical terminology with Ms. Su Wubin, Senior Engineer and Secretary General of the China National Technical Committee for Standardization. She showed a keen understanding of the role of terminology standardization in scientific data transfer. Her committee and others are also addressing the problems of Chinese and other non-alphabetic characters in addition to other problem areas.

## 3. Role of ISO TC/37 in Asian terminology development

Both of these groups from the People's Republic of China are being assisted by ISO Committee TC/37 on Terminology Standardization secretary, Christian Galinski. Mr. Galinski presented a comprehensive paper on information handling requirements of non-alphabetic languages.

# IV. Summary

There is a clear need for practical terminology development for database applications in handling both material properties data and other information. The traveler had the objective of comparing the status of this type of terminology work in ASTM with that elsewhere. The results of attendance at this conference were mixed and surprising.

The papers of the Congress did not include any clear descriptions of work on database terminology. The keynote speeches were drawn extensively from the artificial intelligence community. The European standards community was not broadly represented except for members of ISO TC/37 on Terminology Standardization, which had scheduled associated meetings. European community work in terminology standardization related to database design, maintenance, and use did not appear to be represented.

The traveler found these lacks to be surprising, because it is known that terminology standards are being rapidly developed and promoted broadly through the European Community as well as the USSR and in Asia. Little work outside of VAMAS (the Versailles Advanced Materials and Standards organization) is concentrating on early application of technical terminology to material properties

database coordination, a principal active issue in ASTM's Committee on Terminology.

Attendance at the meeting was valuable to the traveler in confirming previous judgments regarding the appropriate course for ASTM's Committee on Terminology, and also because of the advanced theoretical character of some of the reported work, in considering future developments.

The high activity in Asia in standardizing terminology and application of standardized vocabularies to educational and scientific work was evident both from private discussions and from a reading of the published papers of the Congress. This was unexpected and valuable from the standpoint of ASTM, in that the United States has an apparent advantage in its pragmatic, less theoretical approach than do many other countries. Work is under way in ASTM programs in Committees E-49 on Material Property Data and E-31 on Computerized Systems, as well as the Committee on Terminology and elsewhere. This work is timely.

## **V. Recommendations**

The traveler concludes that future participation in this type of conference for specialized scientific and engineering purposes, such as those of the traveler, is contingently desirable, depending on the emphasis placed in the call for papers on:

- subject specialty terminology standardization, and
- practical application of standardized terminology work and products.

Attendance at the Congress was, however, unqualifiedly valuable and useful for assessing efficiently a broad range of current work in the technical and theoretical areas of terminology science and knowledge engineering, the specific subjects of the conference. It will be useful in ASTM's continuing work in development of terminology for materials properties database applications.

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**APPENDIX A****Itinerary****1990**

9/23	Weekend
9/24	Travel to Paris, France
9/25 – 9/28	Personal Leave
9/29	Weekend
9/30	Travel to Trier, Germany
10/1 – 5	To conduct a workshop on Terminology Standardization and to attend the 2nd Congress on Terminology and Knowledge Engineering.
10/6-7	Weekend
10/8	Travel to Frankfurt, Germany
10/9	Travel to Knoxville, Tennessee



**APPENDIX B****Persons Contacted****Discussions on database terminology:**

**Prof. Yasuo Kagawa, Dept. of Biochemistry, Jichi Medical School,  
Minamikawachi Tochigi, Japan 329-04**

**Eausbayr, Assoc. Professor and Dean Department of Physics, Inner  
Mongolia Teacher's University**

**Prof. Feng Zhwei, Computational Linguistics Section, Institute of  
Applied Linguistics, Chinese Academy of Social Sciences, Beijing.**

**Ms. Su Wubin, China State Bureau of Technical Supervision, Beijing**

**Svein Klausen, University of Iceland, Institute for Lexicography**

**Discussions on SGML:**

**Dr. Donald E. Walker, Manager, Artificial Intelligence and  
Information Science Research, Bellcore, Morristown, NJ**

**APPENDIX C****Materials Acquired**

**TKE '90 Terminology and Knowledge Engineering, Volumes 1 and 2,**  
**Hans Czap and Wolfgang Nedobity, editors, Indeks Verlag,**  
**Frankfurt, 1990.**

**- END -**

**DATE FILMED**

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