ISKO News 4

Tools for Knowledge Organization and the Human Interface
Report of the First ISKO Conference

1. Introduction

The first biennial conference of ISKO was held at Darmstadt, Technical University, Aug.14-17, 1990. Consistent with its aims the topic was aptly chosen to be "Tools for Knowledge Organization and the Human Interface". The conference was co-sponsored by the German ISKO Chapter, the Committee on Classification and Thesaurus Research of the German Documentation Society (DGD/KTF) and by FID/CR, the Committee on Classification Research of the Fédération Internationale d'Information et de Documentation.

There was an impressive gathering of about 200 experts participating in the conference and its preconferences. They represented 23 countries of North America (USA and Canada), Asia (including participants from China, Japan, India, and Israel), and Europe, with participation also from the East-European countries, such as the USSR, Hungary, Czechoslovakia and the GDR.

The conference was divided into 12 plenary sessions and 12 workshops, with three workshops running in parallel conducted between the plenary sessions each day. In all about 60 papers were presented and discussed according to the program as published in advance in International Classification 90-1. Most of the papers were already there in a finely edited and published pre-conference volume and distributed free of charge to the participants (1).

The remaining papers, the synthesis by Eric de Grolier and the summary of the panel discussions will be included in the second volume soon to be published by the Indeks Verlag.

In the opening session on Aug.14, at 6 PM, Dr.Ingetraut Dahlberg, director of the conference and president of ISKO, welcomed the participants and referred to the symbolism in the Darmstadt wedding tower on the Mathildenhöhe (depicted on the conference program) and the mosaique in the museum as possible guides to faithfulness and love to be kept in mind during the days of the conference. There was also a note of welcome by the representative of the Technical University, Prof.Dr.Gerhard Knorz, speaking on the present state of this University.

In the following we will only report on the 12 plenary sessions. The accounts of the 12 workshops as given by the chairpersons in the 11th plenary session will follow in a separate report.

2. The Plenary Sessions

The first plenary session immediately following the inauguration was a panel discussion chaired by Dr.Winfried SCHMITZ-ESSER, Hamburg. The panelists included Rafael CAPURRO, Stuttgart; Mary DYKSTRA, Halifax, NS; Robert FUGMANN, Idstein; Charles HILDRETH, Springbrook Drive, IL; Erich MATER, Berlin; and Brian VICKERY, London. The animated discussions centered on the nine postulated of Don Swanson in his article "Information retrieval and the future of an illusion" (published in J.Amer.Soc.Inform.Sci. 39(1988) No.2, p.92-98). A brief summary of the nine postulates had been distributed to the participants beforehand. The discussions on the possibilities of computers vis-a-vis the capabilities of man heralded the very theme of the conference. It is recognized that there has been a spectacular progress in computer-aided information retrieval, yet the machine will always have its built-in limitations. The human being must always remain in command of the machine. In serving the reader and analyzing their queries it is impossible for a machine to have the required human judgement. The postulates truly warned against the total algorithmic text analysis and search. A machine cannot recognize meaning, judgement is always elusive and thinking has no rules. Computers cannot think.

The second plenary session held on the morning of Aug.15 at 9 AM with Winfried GÖDERT, Hamburg, in the chair saw Charles HILDRETH speaking on "End users and structured searching of online bibliographic databases; recent research findings". He pointed out that the system designers have not investigated well enough the several major causes of subject search failures. Describing the methods of structured searching of online catalogues he examined the limited role of classification in improving subject searches. He went on to describe two online catalogue research projects involving classification-based retrieval and browsing. The first project evaluated the retrieval efficiency of the system combining classification with probabilistic retrieval methods. The second project examined the effect of two classification-based search aids on retrieval performance and user satisfaction.

Immediately followed the third plenary session with Winfried GÖDERT still in the chair. Masanobu FUJIKAWA from Tokyo spoke on "Concept theory and facet analysis of knowledge units with emphasis on artificial intelligence research". Explaining the process of thinking he semantically defined the term "concept" and related it to image, pattern structure, structural relations and representations. He maintained that only concepts lead us to knowledge and intelligence. The value of research in knowledge engineering and artificial intelligence lies in explaining the nature of knowledge. From his practical experience he stated that at the Japan Information Center for Science and Technology he has designed a programme to select abstracts which contain sentence structures in which certain terms have particular relations through the word matching process.

The fourth plenary session was chaired by Tim C.CRAVEN, London, Ont. Alan GILCHRIST, Brighton, UK, spoke on "Knowledge Organization and the Human Interface". He described his lecture as his personal and incomprehensive views on the situation in the U.K. He pointed out that despite the massive research only a few tangible products have resulted. At present it is not feasible to build an expert system that is intended to carry out intelligent retrieval. In knowledge organization

there is no substitute for hard intellectual work.

The fifth plenary session was chaired by Winfried SCHMITZ-ESSER. Otto SECHSER, Zürich, spoke on "Classification issues in databases from machine-readable text data". He described the system and components of TELEDATA which is a factographic database in Zürich. The database represents an alternative category of a retrieval system comprising both business oriented DBMS and text data. Its classification problems are important not only in connection with indexing and end-user retrieval but also in the process of generating and updating the database. He asserted that we should develop a hybrid system of human and machine indexing that automatically processes the easy part of the job and may assist the human experts to do the rest.

The sixth plenary session was held with Alan GILCHRIST in the chair. Brian VICKERY spoke on "Classificatory principles in intelligent interfaces". He expressed that intelligent interfaces to databases need to incorporate several kinds of knowledge, such as knowledge of information retrieval techniques, of subject structure and terminology of search statements. Organization of knowledge involves the use of various methods of representation, including structures common in bibliographic classification: hierarchy, facets, semantic categories. He illustrated with examples the coming together of the techniques of artificial intelligence and information science. Knowledge structures are being combined with those of AI. So the variety of knowledge needed in intelligent interfaces is being effectively captured and represented.

The seventh plenary session was chaired by Norbert MEDER, Köln. Roland HJERPPE, Linköping, Sweden, spoke on "A framework for characterizing systems for knowledge organization: A first basis for comparison and evaluation". He stated that comparison and evaluation of different systems of knowledge organization is loaded with problems as most of the tests have been focussed on IR and the results achieved in searching. The manner of comparing classification systems takes into consideration only a small, albeit important part of the sequence of processes and products of which a classification system is made. However, some questions regarding the level of hierarchies and distribution of items in each class, remain still unsolved.

The eighth plenary session was chaired by Loll ROLLING, Luxembourg. Karen Markey DRABEN-STOTT, Ann Arbor, spoke on "Experiences with online catalogues in the USA using a classification system as a subject searching tool". She traced the development of online catalogues in the USA that have facilities for subject searching and browsing through machine-readable text of library classification. She dwelled upon her experiences from 1983 to 1986 developing and testing subject searching and browsing capabilities in an experimental online catalogue using the machine readable DDC-19 schedules and relative index. The results of the experiments demonstrated that the DDC provided new and fruitful subject searching capabilities that were not possible through the alphabetical and keyword searching. In the face of the new hardware and MARC format developments she suggested some improvements in the original experiments in her new and continued research.

The ninth plenary session was held with Maria DO-MOKOS, Budapest in the chair. Erich MATER spoke on "The problems of intellectual and computerized contents analysis" and stated that human intellectual capacity and language ability are only partly known. Contents analysis of documents by computer can only be done with selected strings of terms according to pre-formulated characteristics. Such algorithmic processes are to be distinguished from the mental capability for abstraction as well as for evaluation.

The 10th Plenary Session (which in a sense was the last session with an individual technical paper) had Otto SECHSER, in the chair with Hanne ALBRECHTSEN, Birkeroed, Denmark, presenting her "Software concepts" focussing on knowledge organization and retrieval of re-usable software components and concepts. Experience with a Prototype Re-use Support System (PRESS) developed at Computer Resources International (CRI) in the framework of the ESPRIT project PRACTITIONER was described. It was concluded that investigation in data processing terminology should be intensified for approaching a domain analysis on an empirical bases. The future work may include development of strategies for automatic indexing and semi-automatic thesaurus compilation as well as considerations for a faceted thesaurus approach.

In the eleventh plenary session chaired by Ingetraut DAHLBERG, Frankfurt, the chairpersons of the twelve workshops presented the summaries of the contents and issues raised of their respective sessions (given below).

The concluding 12th session was chaired by Douglas FOSKETT, Gerards Cross, UK much to his delight and happy memory of a similar occasion at the 1957 classification conference in Dorking when it also happened that Eric de GROLIER, Paris, presented - as in Darmstadt - his Synthesis of the entire conference. This time it was listed under ten points. Among the issues he emphasized the need for investigations into the basis of a universal scheme and urged liberal financial support for such a project. He also drew attention to the need for user studies in the use of classification and more investigation into the process of navigation.

In the panel discussion to follow, entitled "Recommendations for the 90ies" panelists were Ken BAKE-WELL, Liverpool; Karen Markey DARBENSTOTT; Douglas FOSKETT (chair); Winfried GÖDERT; M.A. GOPINATH, Bangalore; Eric de GROLIER; and Peter JAENECKE, Pforzheim. Their recommendations ranged from understanding the nature of thinking to the pattern of knowledge production and its assimilation in society, semantic analyses, users interfaces, and questions of terminology. Other questions concerned standardization, structure of universal systems, use of natural languages, deep structure, impact of hardware, technology in our work, user studies and their needs, user-oriented organization of knowledge in libraries, the importance of book indexes, and interdisciplinary cooperation. The panelists agreed that knowledge organization research needs inter-disciplinary cooperation. It is interesting to note that ISKO is already striving for an integration of the conceptual approaches of classification and indexing research with linguistics and AI research. A major result of the discussions: what we expect is a system where man should not consider himself the servant but the master in controlling computer work. The human mind is indispensable in information retrieval and knowledge organization. It is therefore unrealistic to strive towards

fully automated retrieval systems but instead towards Computer-Assisted Information Retrieval Systems (CAIRS). This finding justifies and strengthens at the same time the theme of the conference.

3. Other Events and Conclusion

The deliberations were unreserved and extensive. The conference not only drew scholars of outstanding merits and of notable names, but also the new breed of practitioners of hard- and software, as well as library administrators, teachers and researchers, information consultants and free-lancers in the information profession. We do not need to repeat the eminent names of colleagues mentioned already above who as early as in the thirties, fifties and sixties of this century had written the major publications in the field of knowledge organization and are now still working at the forefront of research in this field and reported at this conference about it. For many a participant it was a rewarding and satisfying experience to see and talk to these our pillars personally. One is reminded of the words in the Preamble of ISKO: The Society "provides personal contacts and opportunities of cooperation to the world-wide community of colleagues ....".

On August 15, a general meeting of the ISKO membership took place. The Scientific Advisory Council met on August 17; suggestions had been invited from the members present for the future programme of ISKO. It was decided to hold the 2nd International Conference in India in 1992 to coincide with the Ranganathan Birth Centenary celebrations in that year.

The conference was preceded by two pre-conference seminars on August 14: one on "Intelligent Interfaces for Subject Access in Libraries" conducted by Charles HILDRETH and Karen Markey DRABENSTOTT and chaired by Heiner SCHNELLING, Giessen; and one on "Thesaurus Software" with a number of papers published in this issue of International Classification (90-3/4). A third event on that 14th of August was the preconference of the SCCAC (Society for Conceptual and Contents Analysis by Computer) with some outstanding papers; Eric de Grolier in his Synthesis mentioned especially the one by Rudolf WILLE, Darmstadt, on "Conceptual knowledge systems" as of particular interest.

The participants had an equal treat of excursions and get-together events to lighten the burden of the day's work. During the meal in the "Knights Hall" of the Auerbach castle on Aug.16, Ken BAKEWELL "served well" with a hilarious talk on "Humor in Indexing".

On Aug.17 in the afternoon, many took the chances to make use of organized visits to a number of interesting places, such as the Deutsche Bibliothek, the GMD's library and documentation center on information science, the Hoppenstedt Publishing House, and also the famous Mathildenhöhe of Darmstadt with its artistic gardens and museums in Nouveau Art, a great experience for all indeed.

M.P.Satija

(1) Fugmann, R.(Ed.): Tools for Knowledge Organization and the Human Interface. Proceedings .... Frankfurt: INDEKS Verlag 1990. 280p. ISBN 3-88762-020-9. Advances in Knowledge Organization, Vol.1 (Vol.2 in preparation)

Workshop Reports at ISKO Conference 1990

The twelve workshops of the First International ISKO Conference, Aug. 14-17, 1990 in Darmstadt, were embedded into the general program of altogether twelve plenary sessions with ten invited papers. They covered on the first day fundamental problems and systems for knowledge organization and dealt with retrieval aspects and applied classification on the second day. The workshops, with four papers each, were held in parallel, three at a time. In order to offer to the participants an overall picture of the contents of all workshops the chairpersons were asked for a report of their respective sessions. What follows is the contents of the 11th Plenary Conference Session with its workshop reports.

Report on Workshop A: "General Issues"

Chair: Ken BAKEWELL, Liverpool. Rapporteur: Felizitas BELKE, Bonn.

In the first paper by J.A. BOON, Pretoria, S.A. ("The integration of technology in the organization and dissemination of information") man as well as machine are both taken as information processors. Boon argues for their sophisticated interaction. Nevertheless, he sees information systems a social systems using information technology. He assumes that some basic information problems are not yet identified, so the knowledge worker - as an information processor - has remained, until now, a somehow unknown being. How does he, in fact, collect, organize, process and disseminate information? What sorts of interrelationships are there in man's mind? Human cognition and learning has to be investigated and considered when designing information systems that will do more than organize and manipulate bibliographic records. Until now, system designers have met with individual functions of information processing only. To get integrated knowledge/information systems, there is needed the information function and related software taking care of the various correlated human activities in this field, viz. administrative functions (for example, word processing, diary keeping, scheduling); transfer functions (accessing information from distributed files, electronic communication); real information functions (create information, collect, store, analyze, organize it).

Robert FUGMANN, Idstein, (in "Unused possibilities in indexing and classification"), argued for the superiority of intellectual techniques in information processing and denied the equivalence of the algorithmic approach. The intellectual techniques still include unexploited capabilities; for instance by vocabulary categorization. Beyond this, it should be considered that algorithmic techniques still remain in an experimental stage to a good amount. Also, an unlimited variety of paraphrases for a single concept is a barrier to adequate algorithmic processing.

The contribution by Pat MOLHOLT, Troy, NY, ("Standardizing and codifying related term links for improved information retrieval") as a replacement for the paper by Vesa Suominen from Finland, previously included in the program, seemed rather specific within "General issues", however, semantic relationships belong to the core of information tools like thesauri and classification systems. Mrs.Molholt reported that for the thesaurus work she had done to design the Art and Architecture Thesaurus (AAT) of the Getty Foundation more than 100 relationships have been identified which can be reduced to 20-30 link types. Besides the taxonomic

relationship, known since Aristotle, the nonhierarchical relations became interesting since the 60s and they were examined for applicability in knowledge structuring and information retrieval. The main problem of related terms is, that we do not know what kind of relations are involved here. A further problem arises when statistical analysis puts out term associations, because co-occurence of terms does not provide a semantic characteristic. Mrs. Molholt will meet these difficulties by her research on the related term structure for the AAT. The relationships will be defined and applied to a subset of the AAT and will be tested in an information retrieval system. That system will be compared with another system using Boolean logic, but without relations. She assumes that the result will prove the superiority of the use of relationships over single termsortermcombinations.

Gerd BAUER, Schleswig, (in "Promoting creative processes by a thesaurus-like representation of knowledge structures") demonstrated his ambitious goal in supporting scientific problem solving. He has chosen multidisciplinary examples when transforming textually formulated questions in a structured form. His TGW-Method, the Structural Diagram-like Knowledge Representation (thesaurusartige graphische Wissensdarstellung) visualizes the network of concepts. By this, creative thinking is stimulated to change aspects and to find new combinations of concepts. Analogies are discovered, and unknown connections can be derived from known relations. That, of course, is a creative art!

Workshop B: "Algorithmic Text Analysis"

Chair and Rapporteur: B.ENDRES-NIGGEMEYER, Saarbrücken

This workshop had certainly the advantage of confronting us with topics currently on the top of the heads in natural language processing: connectionists models, knowledge representation and retrieval, and semantic relations. We heard four papers, the speakers being Renate DEFFNER from Unterschleißheim, Gerda RUGE from München, Richard BOUCHE from Villeurbanne, France, and Marek CIGANIK from Bratislava, Czechoslovakia.

It was Renate DEFFNER who acquainted us in her paper with Hans GEIGER with a connectionist system architecture. ("Associative word recognition with connectionist architectures"). She explained that a connectionist model follows the information processing principles of neural networks, what means in particular that retrieval happens by spreading activation. She had made good experiences with this model in a word recognition task. Some 5000 streetnameswererecognized, and the system coped well with spelling errors.

From Gerda RUGE (together with Christoph SCHWARZ) we learned (in "Linguistically based term associations. A new semantic component for a hyper-term system") about new developments in the REALIST system that helps to find good search terms for free text retrieval. The main innovation in REALIST is a semantic relation among terms which describes their semantic relatedness. It is based not on statistical cooccurrence, but on linguistic assumptions about the semantic similarity of concepts in head/modifier and conjunction relations.

R. BOUCHE, Sylvia LAINE and Jean-Paul METZGER developed a new perspective to the topic of noun phrase retrieval (in "Knowledge retrieval from a docu-

mentary set"). They argued that, in a text, noun phrases refer to objects in the world, and thus to factual knowledge. In order to accomplish knowledge retrieval from document sets, we have to switch from the intensional meaning of noun phrases in the text to their extensional reference to classes of objects in the world.

In the concluding paper, Marek CIGANIK tried to show, how "Key faceted structures in a text" can function as a background for the understanding of a text.

Workshop C: "Terminology"

Chair and Rapporteur: Yukio NAKAMURA, Tokyo

Workshop C was on terminological problems in the original sense of terminology. It included four presentations. The first one by Miss Widad MUSTAFA ELDADI from Villeurbanne, France described the contribution of terminology to the theoretical conception of classification languages and thesauri. She asks for better collaboration between linguists and information specialists. Also the need for a terminological thesaurus was mentioned. Close cooperation among terminologists and documentalists, for instance, in the field of indexing languages for the analysis of certain linguistic problems are explained. Some examples in telecommunication in a vocabulary in English and French were studied with the corresponding Arabic terms in addition. Ms.Mustafa Elhadi presented some new ideas and gave special attention to multi-referential terms - which I think is a new and important idea.

The second paper presented came from INFOTERM, Vienna. Christian GALINSKI and Gerhard BUDIN presented a new stream in the Vienna School of Terminology. The paper entitled "Specialized encyclopedias and lexicons processed on the basis of the methods of terminological engineering" uses knowledge engineering in the terminological approach. It is to be expected that much interesting work will develop in this respect in the forthcoming years.

The fourth paper was presented by Miss Elsemiek ten PAS from the Free University of Amsterdam, entitled "On the Role of definitions in terminology". This is an extension of the principles of terminology and displays different types of definitions, i.e. representations of definitions of certain terms. She distinguishes three types of definitions, the generic, partitional and the functional one. Often two or more types of definitions are used mixedly in the single definition of a term which causes difficulties. At the end the author concludes that types of information necessarily contained in the definition of a given concept should be studied further. I think this is a also a new approach for the terminological methodology.

The third paper was given by Wu GUANG-WEI from Shanghai, China. He made a detailed study of term equivalence between English, Chinese and Japanese. It showed the necessity of adding new criteria for establishing multi-lingual thesauri. He gave very detailed explanations on these problems. However, the original work is so extensive that we cannot go into details here. He sent the full paper to the ISKO General Secretariat from where a copy can be requested. One of the important remarks made by him is that the usual standard for thesauri, especially the one for multilingual thesauri prepared by Europeans are not adequate for oriental

languages, in this case Chinese and Japanese. And I myself, have the same feelings in this respect, especially when working on the Japanziation of the ISO standard for monolingual thesauri. Also we are going to establish another ISO standard on multi-lingual thesauri. We found that there are general items that cannot be applied to the oriental languages. This was also noticed by Gerhard BUDIN in his question.

These are the general streams of the terminological problems which have been dealt with in this session.

Workshop D: "Knowledge Organization by Universal Systems"

Chair and Rapporteur: Nancy WILLIAMSON, Toronto

It was a very successful session partly because of the coordination of the topics - they fitted together very well - in the session, partly because of the expertise of the speakers. It began with a presentation "On the problems - in general - of unified classification systems". Eric de GROLIER, Paris, with his usual vigourous self and with stimulating ideas set an excellent tone for the rest of the session. He presented an analysis of various views of categorization with examples of the use of these categorizations in each case. Included in these categorizations were (1) Consensus, (2) Philosophical points of view, and (3) Semantic categories. He concluded his presentation by looking at practical problems which he had identified as 1) Fundamental to categorization and to a unified classification system. These were general categories, 2) Descriptions, and 3) Notation. He feels that all of these need further investigation and studies in terms of contemporary organization of knowledge. This paper provided an excellent framework for the other three papers.

The first of these was given by Edouard SUKIASYAN of the Lenin State Library, Moscow. He described the background of the BBK, the Library Bibliographical Classification of the USSR - with its structure and its importance in science and technology. Mr.Sukiasyan concluded by saying that while this was a classification used in the USSR it could be used in other political contexts as well.

His paper was followed by the one of Gerhard RIESTHUIS, Amsterdam, and Steffi BLIEDUNG, Berlin, on a new approach to the Universal Decimal Classification. They described an experiment using the UDC in the development of a thesaurus: a very successful application, based on Class 314. It demonstrates that it could be done and showed the importance of the relationship between a classification system and a thesaurus. I think it presented an intriguing possibility for new approaches to the UDC and for new uses of the UDC in the online environment.

The final paper looked at a different aspect of universal systems. Werner BIES, from the Free University of Berlin discussed the controversy over the alphabetic subject cataloguing rules in the German library context. He demonstrated to my satisfaction the reasons for difficulty in achieving an acceptable consensus on codes of this kind. It is of particular interest to North Americans where there are no such cataloguing rules at the moment. There is a good deal of discussion about whether or not we need a code and what that code should be.

Within this single framework each paper contributed to a different aspect of universal systems. My only regret is that we did not have enough time for discussion and questions and a synthesization at the end. I think we could have worked on some interrelationships between these presentations which would have produced some rather interesting results.

Workshop E: "Knowledge Organization in Special Systems"

Chair and Rapporteur: Pavla STANCIKOVA, Bratislava

The four papers presented and discussed in this workshop focussed on four different subject fields: biology, soil protection, anaethesiology and Indology. All of these fields were looked at from the point of view of terminology, concept analysis, classification and indexing schemes.

Gerhard BUDIN, Vienna, (in "Terminological problems in the organization and presentation of biological knowledge") discussed the following main topics: Philosophy of science of biology and construction of a knowledge base for zoology; the systematic character of biological knowledge; the concept of "species" as one of the key concepts in biology; the organization of biological knowledge, mainly its problems of their maintenance from the point of view of genetics or newly discovered species. A new trend in this field was foreseen - "evolutionary classification" and its main advantage: flexibility.

The presentation of Erich WEIHS. Munich, took our attention to the Bavarian soil protection system with references to special systems as geology, water ecology. References are managed over one thesaurus and data over data banks, maps and documents. The queries can be formulated as space related with coordinates and topographic information, as e.g. village names, rivers, names of maps and administration related names and borders. Discussed were the topic of the thesaurus of the soil protection system. It is not a hierarchical thesaurus but one structured as a network. Also the problem of inverted terms was discussed.

The position and organization of subject contents of anaesthesiology was presented and discussed by Padmini RAJ, Düsseldorf, mainly from the point of view of various library classification schemes (Universal and special ones). It was pointed out that not all of the systems used are cognitive, bibliographical, bibliothecal and self-perpetuating which I consider an essential requirement in any classification scheme.

The fourth presentation of A.A.N. RAJU, Hyderabad, lead us to the problems of Indology classification and organization. It was pointed out that Indology has an important and prominent place in Indian libraries, especially in academic libraries. Most of them use the DDC, the UDC and the CC, but various branches of Indology as, e.g., philosophy, religion, language, literature, and culture are not satisfactorily elaborated in the DDC or the UDC. It was stressed that CC is in the better position with respect to various branches of Indology. The discussion focussed on a necessary standardization of the problems of Indology classification.

Workshop F: "Thesaurus issues"

Chair and Rapporteur: Robert FUGMANN, Idstein

The first of the four papers presented was read by

Alice STERN and Norbert RICHETTE from Luxembourg: "On the construction of a superthesaurus based on existing thesauri". The aim of this project is to compile several thesauri from various fields, in different languages, and in different conceptual structures and formats and of different degrees of specificity into one single master thesaurus, in such a way that the origin of each descriptor remained visible. Such a thesaurus can serve several purposes, among them are the purposes of indexing, giving aid to and providing the raw material for the construction of new thesauri, assisting in automatic translation by virtue of its multilingual character, and linguistic research.

The paper of Tim C. CRAVEN from London, Ontario, was entitled "Automatic structure modification in the graphic display of thesauri". Two-dimensional thesauri can display their relational network in greater conceptual transparency than the conventional, linearly arranged thesauri. But there are always geometrically different possibilities of arranging the mutually interconnected descriptors. These possibilities can vary widely with respect to their perspicuity. The closer the geometrical proximity into which closely related concepts are brought and the less the connecting lines between the descriptors cross over, the more does such a display serve the intended purpose. To achieve this goal purely manually would require much time. Therefore a computer program was developed which automatically maximizes the transparency of the relational network of the descriptors in a thesaurus. Sometimes, it even proves necessary to introduce dummy descriptors to achieve satisfactory transparency.

"Dynamic thesauri: The cognitive function" was the title of the paper presented by Lorna REES-POTTER, Montréal. The idea pursued in this project is to semi-automatically generate a thesaurus from the full text of documents. This approach is based on the observation that cited papers seem to influence the terminology as chosen by the authors of the citing papers. The citing papers have much in common with respect to the terminology in which they discuss the findings of the cited paper. The corresponding noun phrases were manually extracted from the citing papers and they were recognized as meaningful candidate terms, which were then organized into subgroups based on conceptual similarities. Ongoing research aims at building individual concept records for each of the candidate terms, and at noting also the related terms in these records. The relations to be taken into consideration are hierarchy, equivalence, and association, but also categorial relations such as facet relations.

In the fourth paper, Michael EISNER, Darmstadt, reported on ongoing developments of the socalled ARBOR system. It comprises a thesaurus with its typical concept relations and is applied to the recording and storing of information on objects of classical archeology or history of art. The progress recently achieved in the system is that the specific thesaurus not only serves for setting up a database but now serves also for retrieval functions. For example, several kinds of Greek temple were classified. New archeological objects can then be equated with one of the temple types in the store by a retrieval procedure.

Workshop G: "Online Retrieval"
Chair: Ingeborg STOLTZENBURG, Frankfurt; Rapporteur: Anatol VASILJEV, Delft

There were speakers from four different countries, only one paper of these has already been published in Vol.1 of the proceedings.

Winfried GÖDERT, Cologne, stressed the necessity of an interactive design of different subcomponents of any subject access facility. The four subcomponents are enumerated in his abstract (p.161 of the proceedings). He also presented a typology of users' queries, and gave examples of a number of design problems.

Hemalata IYER, Albany, NY, presented a comparative user study showing the power of Ranganathan's facets, on the verbal plane, in an online environment. The bond strength of facets was utilized and the use of Boolean operators for the different facets was standardized. The two control groups in the experiment were: (1) an unstructured quorum search, (2) a conventional Boolean search. The results indicated that the searches based on the faceted model performed much better. Precision was higher than 30%, recall was also better (ca 20%).

Anatol VASILJEV, Delft, NL, presented the human side of the human interface. He recommends a broad approach to the design or redesign of the IR system, envolving brain-mind research, computer information science and artificial intelligence, neural networks, cognitive science, etc. The ways of human thinking should be taken into consideration. The Law of Requisite Variety (LRV) is recommended as a guiding principle. In the second part of his paper he showed the differences in the syndetic structure between the conventional subject headings card catalogue and a subject heading access point file of an online catalogue being presented as a KWIC-index. He recommends the introduction of more "see" references to match the variety in users' queries better (LRV).

Mary DYKSTRA, Halifax, N.S., presented a study concerning the possibility of using PRECIS as a model in the design of an expert system for text analysis and retrieval. The analytico-synthetic rules for the formation of both the syntactic and thesaural relationships in PRECIS have potential relevance. The four parts of her project are given in her abstract on p.171. The realization of the project will be carried out with the Group Quatro, Montréal (see Abstract).

Workshop H: "Knowledge Organization in Special Systems II"
Chair and Rapporteur: Horst KÖRNER, Munich

We had one change in our program: The first paper by Pnina WENTZ was not given, instead, Annelise Mark PEJTERSEN, Roskilde, DK, came in and thus we did have four papers in our workshop. Altogether I can say that all four papers had not only theoretical approaches to their problems but they also went into practical applications. You might have seen the demonstration of Ms.Pejtersen outside with Icons of the Book House. Her paper was mainly on the subject analysis for setting up a system like that. There was a very detailed investigation of user behaviour and so on before they started out in drawing the icons for the computer and making the system work.

The second paper was by Hans CZAP of the University of Trier. He spoke about the increasing complexity of

economic and industrial documentation. For instance if a new drug is applied for commercial distribution in Germany in one case it took 200,000 pages of documentation of text. before the product could come on the market. In another case it required 70,000 pages for a new telephone system by Siemens. The problem is that the increasing complexity of these industrial products cannot be handled by conventional systems. He went into some details of the theory of information systems, especially of industrial use and came up with some first theoretical and implementational steps. He is very much interested in making contacts with whoever would like to work in the same direction.

The 3rd paper was by Josef HÖLZL of the University of Economics in Vienna on "Expert systems in product and commodity economics". Here again there was a theory which went back to Wittgenstein and others, and the practical side was whether in product and commodity information systems it is useful to have human experts or to use expert systems; or whether a combination of asking the experts to spend more of their time in developing the expert systems so that also not so expert salesmen or so could make use of expertise of the real experts. One example was that you could have an expert system on a portable computer. The salesman can take it to the customer. Even the very complicated products like radio transmitters with various frequency variables and quartz and what not the salesman can come up with a precise offer and give the prices and so on suiting thus the individual customer needs.

The last paper was by Jutta VISCHER of Hamburg. She reported on her thesis work at the Hamburg Polytechnic for Library and Information Science on the "Harmonized System for the naming and encoding of commodities of the international trade". This harmonized system took some ten years to develop and came out for a variety of countries trading with each other, it was adopted in 1988 by a lot of countries. It gives the first four hierarchical levels fixed for everyone using the system. But in the lower levels the countries can differ. She analysed this with the methods of classification theory. And in her work that she does at the University of the Deutsche Bundeswehr, Hamburg, she can also make use of her experiences.

Workshop J: "Hypermedia"

Chair and Rapporteur: Winfried SCHMITZ-ESSER
The first of our three speakers and four papers was Arek LESCH from Pforzheim, who, as a member of the SEL Alcatel, is active for the European RACE project. In his paper - together with Peter SZABO - on "Hypermedia approaches" he gave the basic definition of hypermedia and hypertexts. From this definition it became clear that hypermedia cannot only be used as a tool for knowledge organization but also that hypermedia must be regarded, and, in fact are, the set of all available media now and in the future. Both, the tool and the thing, are being brought together to form a new type of system which is capable of navigating through the world of science and make it easier and much more attractive to the users to get to the sources of knowledge. In a most impressive way he showed his charts, and how this can be done. And in fact, a new world of access to knowledge and control of knowledge was visible in his speech.

Thereafter we had two papers presented by Lisbeth BJÖRKLUND, of the LIBLAB Department of Computer and Information Science in Linköping University, Sweden. The first paper she presented was on Hyperclass. She showed four hypertext applications for a classification scheme, Storyspace, Guide, HyperCards and NoteCards. From this paper it became clear, what hypertexts can do for the creation, presentation, structuring, and interconnection of classification systems and for access to them.

In her second paper she talked of special projects within the LIBLAB Department, the "Archival Information 2000" project. It will probably become a part of the national archival data base in Sweden. The paper showed clearly that hypertext is a very useful tool to bring users far more easily nearer to archival structure which they are confronted with when looking for information.

The fourth paper was presented by Roland HJERPPE, also from LIBLAB Department of Computer and Information Science. He presented, as a special example of an application of hypertext a small section of P.M.Roget's thesaurus. Very good pictures showed not only that this thesaurus which was originally meant as a classification, once presented as hypertext was not only a possibility to get the users in, but was also a device to discern contextual structures and also some standard meanings in a word and in the clusters.

All in all it can be stated that in this workshop it was well presented how hypertext is about to open new ways for users to come to the information sources as well as a new means of discerning meaning from existing structures which may have been produced for quite other purposes.

From a technical viewpoint it might be said, one and a half hour for four of such high-calibre papers, all related to practical experience and therefore very valuable, was just too short. I had to press my speakers quite a bit. And although the papers were very well presented in written form, I wish that we had had more time to have a closer look at the charts, and ask more questions. So, next time it would be my wish to have about 2 hours or so for such a session.

Workshop K: "Retrieval from Universal Systems"

Chair: Barbara KELM, Frankfurt; Rapporteur: Nancy WILLIAMSON, Toronto
There were four speakers and three presentations each dealing with one of the major classification schemes. The first two speakers, Hannes HUG and Meta WALSER from the ETH Zürich combined their presentation. They spoke on the system ETHICS developed for the library of the Swiss Federal Institute of Technology. It is an online catalogue plus a circulation system used by a network of nine participating libraries. The interesting thing about this presentation was that it was demonstrated as a live system with the two people participating. They were actually doing retrieval for us connected with their library in Zürich by telephone and bringing the results upon a screen. It demonstrated very well the system, it provided for retrieval by keyword/subject terms and by the Universal Decimal Classification. This operating system has a parallel with the research work which Karen Markey has been doing in the USA on the Dewey Decimal Classification.

The second paper was given by myself on the Library of Congress Classification and its move toward computerization. The description of the MARC format has now been approved in principle for testing by the Library of Congress and the Dewey Decimal Classification. There is a hope that this format will be flexible enough to be used for other classification systems such as the UDC, Bliss and whatever. If this does come about, such common use of the same format would encourage the international exchange of information based on classification.

The final paper was given by M.A.GOPINATH from Bangalore. He discussed information retrieval using the Colon Classification. He described the system using an inference engine and a user interface as a filtering process and showed the importance of analytical classification in online retrieval.

The significance of this workshop was that we worked together in the discussion of the three major systems which are important in information and online retrieval and while many of us might like a new classification for information retrieval most of us know that this is not going to happen soon. So we must look seriously at making the best use of those systems we have.

Workshop L: "Retrieval Technologies"

Chair and Rapporteur: Krishan KUMAR, New Delhi

As the first of four papers Alina VICKERY, London presented hers, entitled "Knowledge organization in intelligent tutoring systems". She described EUROSAGE, an intelligent tutoring system, being developed by TOME Associates to help managers to gain better understanding of business opportunities in Europe. She discussed the ways of organizing and representing knowledge. It was mentioned that dictionary with thesaurus relations, classification, semantic categories, frames on semantic analyses, hypertext, etc. were highly suitable tools for this purpose. Use of artificial intelligent and hypertext techniques for building moduls of the system appear to have interesting possibilities when completed.

Veronika OECHTERING, Dortmund, presented the paper entitled "On the problem of transparency of individual computer technologies in subject-oriented online retrieval". She put forward a model of human-computer interaction (HCI). She had the view that transparency is a negative criterion in evaluation and manifests itself as intransparency. It was concluded that all themes showed big transparency problems. She thought that intermediaries will never get exact knowledge of the client problems. During the discussion, R. FUGMANN pointed out that an ideal combination would be that there should be a joint effort of the end users and the intermediaries. Mention was also made of the need for more research on interdisciplinary human-computer interaction.

Marlene ROCKMORE, Maynard, MA, presented a paper which dealt with "Facet analysis and thesauri for corporate information retrieval". She described TIMS, a single thesaurus system to support retrieval of corporate information. The special feature of TIMS being a set of tools for machine-assisted indexing called the indexer's workbench. She claimed that a faceted thesaurus structure is very effective in its environment and the system has proved to be simple and easy to use. She emphasized

that such systems should be built by skilled knowledge engineers.

Michael SCHOPEN's paper was on "Cross file searching of biomedical databases at DIMDI". DIMDI, the German Institute for Medical Documentation and Information in Cologne, offers sequential search of an unlimited number of files. The programming language GRIPS-L and the EXTRACT COMMAND were developed as tools for cross file searching. It was proposed that specific menu-driven systems would be designed for each data base which would prove to be extremely useful. It was pointed out that a future approach would include the transfer of user-defined concepts from one database to the other followd by translation of these concepts into a specific data base language using intelligent user interfaces.

It is a good sign that new applications are being reported in the area of retrieval technologies involving studies in information science and artificial intelligence. User friendliness is being given due consideration. Many of the systems being developed are dynamic and designed to respond to a changing environment.

Workshop M: "Indexing"

Chair and Rapporteur: Gerhard RIESTHUIS, Amsterdam

Claus POULSEN from the National Library of Education, Copenhagen, in "An indexing concept supporting subject access for innovation and creativity" reported on his project. He is experimenting with information retrieval not using classification systems, thesauri or free text. Instead, his hypothesis is that the subject indexing is already done by the author. He uses two means: (1) General review articles, (2) Tables of contents, indexes and the like. Based on this hypothesis he built an information retrieval system called PARA-DOKS.

R.G.PRASHER from the University of Saugar, India, gave a report on his research in the field of indexing journals. His research is based on the work done in the field of back-of-the-book indexing, PRECIS and POPSI.

M.PARAMESWARAN from the University of Calicut, India, spoke on the problem connected with the making of a chain index for a systematic catalogue in which the Dewey Decimal Classification is used. Most problems are the result of shortcomings in this system.

Mirja IIVONEN from the University of Tampere, Finland, reported on a study of interindexer consistency. As in most studies of this kind she found that consistency was very low. Important factors for this were: (1) the central aspect of the work was described in different ways, (2) some indexers left the central aspect out, (3) some indexers indexed peripheral aspects, and (4) central aspects were sometimes expressed in more than one way.

This ends the two reports on the First International ISKO Conference. We are very grateful for an unexpected rich result, for a real harvest of valuable contributions with new ideas and helpful methods, of new aspects and applications. They are a treasure for thorough examination, further investigation, research and development in our field of knowledge organization. The reader is invited to look into the proceedings volumes (reference above) and gain a more comprehensive survey and a deeper insight into the subject presented and discussed. May this then bear fruits in any further professional work and for the benefit of the future of the field of ISKO's concern!

I.Dahlberg