

# Editorial

## Knowledge Organization and Numbers

Was 'thinking' invented by man? I don't think so. Were numbers invented by man? Again, I don't think so, although there are still mathematicians such as *Georges Ifrah* - cf. e.g. his magnificent *Universal History of Numbers* (1) - who believe this to be the case, even if they presumably assume that counting and numbering must be just as 'innate' to man as thinking. But, able as we are to recognize in nature and in ourselves relationships which call our attention to numbers and ratios (including symmetrical ones) of numbers, we may assume that these faculties, together with our thinking and judging capacities, were bestowed upon us by our Creator. Yes, it is GOD himself in Whom numbers find expression: for instance in His Trinity of Love, Wisdom and Power of Will, and in His Seven Cardinal Virtues.

And besides numbers we also have pre-assigned structures, e.g. the fact that in the entire mineral realm only 6 primary crystalline forms exist, as was empirically determined 200 years ago by *Haiüy*, which fact once induced *H.-W. Schütt* to explain the change of paradigms connected therewith along Kuhnian lines (2); for it is only on the basis of these pre-assigned crystalline structures in combination with the various chemical substances that our material world exists: there is a one-to-one correlation between crystallographic form and chemical content!

Undoubtedly the scientific discoveries by *Peter Plichta* - vide his article 'Chaos and Order: The Prime Numbers' in this issue - will one day likewise function as and lead to a 'disciplinary matrix' according to *Thomas Kuhn*.

We therefore would like to accord our readers a somewhat deeper insight into Plichta's works by calling attention to this article of his from 1994 (3) which has been translated into English, as well as to his books (4, 5). In addition to that, an earlier issue - 95-2 of KO - already contained a brief passage on Plichta's revolutionary discoveries on and through the prime numbers, namely in *H. Löckenhoff's* review of *R. Matheis' book 'Leadership Revolution'* (6).

Knowledge organization is not conceivable without numbers, through whose figures concepts and their interrelationships may be encoded, and the most striking invention, recently also retraced by *Bernd Lorenz* in an article devoted to its application in library classification (7), consists in the possibility of representing and encoding hierarchical concept relationships by decimal numbers. This is true not only of the hierarchy of generic relationships, but also of that of partitive relationships, for decimal numbers are used e.g. in the UDC also for the encoding of individual geographical concepts, and in the same manner did *Ranganathan*, with his facets and their concepts, inventory all component parts of his knowledge fields by means of decimal notations.

According to Plichta, prime numbers are able to unravel many of nature's present secrets, e.g. still unsolved questions about the nuclei and electron shells of atoms as well as those pertaining to the chief physical constants in nature and the basic mathematical constants, which can now be described by a precise mathematics. In his work "Das Primzahlkreuz" (*The Prime Number Cross*) (4) he states e.g. that the number of amino acids, the DNA structure, cell division as well as the entire secret of life can be traced back to and solved by a four-dimensional concept of space in conformity with the given physical realities.

This confronts us now with the question of in what way these new facts can be inventoried by knowledge-organizational means, of how they will e.g. change our world-picture, too, and how they are to be represented conceptually.

Take e.g. the so very important number 81, representable by  $3^4$ . Now, curious though this may seem to the reader, I have been happy to find out, as far as our ICC (*Information Coding Classification*) is concerned, that its  $3^4$  subject fields correspond exactly to the number of 81 stable chemical elements Plichta arrived at in - please note! - the year 1981, as well as to the 81 octaves into which the entire spectrum of electromagnetic radiation can be subdivided, as was already pointed out by *Isaak Asimov* as far back as 1969 (4, vol.2, p.49). This, of course, I did not even dream of when devising this scheme a quarter of a century ago. It just came about naturally by applying a  $9 \times 9$  matrix.

But what is likewise surprising in connection with the decimal notation is the fact that the number 81 makes the structure of the decadal numbers become apparent. For if one divides 1 by 81, one obtains, as Plichta showed, the number sequence 0.0123456789(10)(11)... - the sequence of natural numbers.

It may well be that one day we will be able to do our classifying work much more easily, namely once we have mastered and correspondingly utilize the laws and conditions valid for the models and patterns naturally held out to us, just as e.g. the airplane designer orients himself to the flight of birds and the cartwright to the quadrupeds. Now this of course involves a profound preoccupation with the possible architectonics of our knowledge and conceptual worlds. But it should lead to this: that our conceptual systems can be represented correspondingly more clearly, lucidly and understandably so that, above all, they may become easier to handle and to apply.

Thus I would like to invite every reader to embark upon the adventure offered him or her in getting familiar with Peter Plichta's discoveries. His essential conclusion reads: Pure chance does not exist; the world has come into being according to a divine plan in which numbers, and particularly prime numbers, play the main part. In what may present itself to our unknowing eyes as chaos, a wonderful order is hidden nevertheless which we need to discover and to communicate.

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- (1) Ifrah, Georges: Universalgeschichte der Zahlen. Übers. v. A. von Platen. Frankfurt-New York: Campus Verl. 2. 1987.
- (2) Schütt, Hans-Werner: Die Geschichte des Relationsatzes als Beispiel für die Entstehung und Auflösung einer wissenschaftlichen Konzeption. In: Diemer, A. (Ed.): Die Struktur wissenschaftlicher Revolutionen und die Geschichte der Wissenschaften. Meisenheim/Glan: Verl. A. Hain 1977. p. 49-60
- (3) Plichta, Peter: Ordnung im Chaos: Die Primzahlen (I). Raum & Zeit (1994) No. 72, p. 12-20
- (4) Plichta, Peter: Das Primzahlkreuz. Bd. I: Im Labyrinth des

- Endlichen. Bd. 2: Das Unendliche. Düsseldorf: Quadropol Verlag 1991. 469+206 p.
- (5) Plichta, Peter: Gottes geheime Formel. Die Entschlüsselung des Welträtsels und der Primzahlencode. München: Langen Müller Verlag 1995. 3302 p.
- (6) Matheis, Richard: Leadership Revolution. Aufbruch zur Weltspitze mit neuem Denken. Frankfurt: FAZ Verlag and Wiesbaden: Gabler 1995. 414 p.
- (7) Lorenz, Bernd: Notizen zur Geschichte dezimaler Klassifikationen. Biblos 43(1994)p. 29-43

## Call for Papers - TKE'96

The 4th International Congress on Terminology and Knowledge Engineering, TKE'96, organized by the Association for Terminology and Knowledge Transfer (GTW) together with TermNet and the Vienna Technical University will be held from August 26-28, 1996 at Vienna, Austria.

### Objectives

In continuation of the first three TKE Congresses in Trier (1987 and 1990) and Cologne (1993) the 4th one will

- Address world-wide interests in the inter-disciplinary methods of
  - Terminology Science
  - Information Science
  - Computer Science
- Help achieve the "universal availability of information and knowledge" via computerized methods and tools
- Open new horizons for more efficient applications based upon this integration of methodologies
- Elicit the interest and participation of experts working in the fields that are gradually drawing nearer from the point of theory and methodology such as
  - Terminology research
  - Knowledge engineering
  - Language engineering
  - Computational philosophy
  - Classification theory
  - Information & Documentation
  - Computer-assisted instruction/learning
  - Specialized translation
  - Technical writing

duly taking into account recent developments such as multilingual information processing, new media and multi/hypermedia, the emerging information highways, new pedagogical and didactic requirements in multimedia, legal aspects of information interchange, etc.

### Planned Sections

- 1 **Terminology and Philosophy of Science** (Science theory, logic, epistemology, ontology, cognition)
- 2 **Terminology on the Information Superhighway: Internet and World Wide Web** (Representation, distribution and marketing of terminological and knowledge through wide area networks)
- 3 **Terminology and Language Engineering** (Lexicography, text and speech corpora, term extraction)
- 4 **Terminology and Knowledge Data Management** (In-

formation management, terminology interchange, data categories)

- 5 **Terminology and Documentation** (T&D) (Terminology documentation, documentation languages, classification)
- 6 **Terminology and Translation** (Human translation, translation tools, machine/assisted/translation, translation memory)
- 7 **Terminology and Knowledge Transfer** (Knowledge and technology transfer, terminology planning)
- 8 **Terminology and Cooperative Writing** (Cooperative work, technical documentation, text management, cooperative terminology work, internationalization and localization, quality management)
- 9 **Terminology and Knowledge in Multimedia Applications** (Multi/hypermedia searching and training, specialized languages, CALL)
- 10 **Reports: Demonstration models for terminological knowledge engineering** (Reports on practical approaches and systems)

### Practical Information

**Workshops/Tutorials:** It is planned to organize a number of Workshops and Tutorials in conjunction with TKE'96 on 29-30 August 1996.

**Exhibition:** Within the framework of TKE'96 an exhibition (26-28 Aug. 1996) will present systems, services, institutions, projects and publications in the fields discussed. To receive further details on the exhibition conditions, please contact TermNet.

**Languages:** The working language of the congress will be English. This refers both to the written contributions and their oral presentation.

**Organizing Committee:** K.-D. SCHMITZ (Cologne, Germany), C. GALINSKI (Vienna, Austria), G. BUDIN (Vienna, Austria), N. KALFON (Madrid, Spain), H. NAKAMOTO (Tokyo, Japan), M. SCHAAR (Stuttgart, Germany), A. M. TJOA (Vienna, Austria)

**Call for Papers:** The organizers are calling for papers on substantial research and development as well as on interesting applications of all aspects of terminology, language and knowledge engineering including, but not limited to, the topics specified under 'Objectives'. Abstracts of some 600 words should be sent until February 28, 1996 to:

TermNet, Grüngasse 9/17, A-1050 Vienna, Austria, Fax +43-1-56 77 64.