Editorial

Classification and "The Tree of Cognition"

In 1979, the German Society for Classification organized its 3rd Annual Conference on the topic "Klassifikation und Erkenntnis", which was translated into English as "Classification and Cognition". Some of its results were reflected in the Editorial of Int.Classif.1979-2 under this heading. At that time we assumed among other things that the knowledge of basic concepts could become a key to basic comprehension of our knowledge in general thus leading us also to the necessary cognition of our professional task. "Basic concepts not only govern and build up the keystones of natural language but enter also into all branches of learning respectively their languages and terms - with artificial languages (e.g. classification systems and thesauri) presupposing natural languages for their adaptation and interlinkages as well as for their creation". The papers "Geometry of basic concepts" (W.Dahlberg), "Reverse retrieval: Towards analogy inferences by mechanized classification" (R.Fugmann, J.H.Winter), and "Representation of sets: The role of number" (A.J.N.Judge) showed essential possibilities which "classification opens up for the rest of our cognitive endeavours" (1).

Now, eight years after this event, we realize that at many places a lot of thinking is going into the computerization of human expert knowledge; the construction of expert systems has become a challenging task in many a field. The papers of the recent "International Congress on Terminology and Knowledge Engineering" at Trier (2) (see also the short report in this issue) are likewise evidence of this development. Another theoretical approach in this direction can be found in the article by W.Lex ("A representation of concepts for their computerization"), p.127 of this issue.

The chairman of the new "Society for Terminology and Knowledge Transfer" and co-organizer of the Trier conference, Prof.H.Czap, dwelled in his summary paper (3) mainly on concepts regarded by him as "units of cognition" (Erkenntniseinheiten) as against "units of knowledge" (Wissenseinheiten) as which they were formerly defined (4, 5). It seems that with his new approach Czap tries to think along the lines of those who call for a new science termed "Cognition science", on which Z.W.Pylyshyn (6) and Winograd/Flores (7) have already written books and on which C.Lischka and J.Diederich recently published an article ("Object and methodology of cognition science") (8).

Now what, precisely, is "cognition" (Erkenntnis)? Webster's dictionary defines:

> "the act or process of knowing in the broadest sense; an intellectual process by which knowledge is gained about perceptions or ideas - distinguished from affection and conation", also "a product of this act, process, faculty or capacity: knowledge, perception" (9).

In German dictionaries, however, we find quite different definitions. Thus Wahrig (10) says:

> "insight into experienced events, observed facts with the aim to find out the truth, also the result of cognition, the recognized, the knowledge about truth; I recognized that it was wrong what I did".

Herder's lexicon (11) says:

> "the insight into the essential qualities of a being or a subject found to be true; also the result of this procedure, the recognized". There are three kinds of cognition: "a) sensual cognition (of outer and inner experience) which is perception, observation of outer events and comprehension of internal states of the soul; b) intellectual cognition which is generated from single perceptions of which it grasps the external relationships and laws; c) cognition by understanding, the actual knowledge which relates to the necessary, generally valid and always comprehensible inner reasons of the essence of a being and to being itself".

It seems that in the Webster definition "cognition" and "knowledge" may be regarded as almost synonymous, whereas in the definitions by Wahrig and Herder we find connotations with "insight", "truth", "comprehension", "understanding", which rather belong into the realm of human personality, of human mind. Is it not so: While knowledge can be made explicit by statements, by judgements and their verification, which could as such also be fed into a computer, it seems rather impossible to do the same with insights. Comprehending and understanding acts escape such explicitness, they usually cannot be anticipated and they are subjective and dependent on the changing clarity of a human mind, its openness to new insights and its willingness to give up former positions and beliefs; in one word: they are properties of the wisdom of a person.

When I looked into the Bible for the English term of the German "Baum der Erkenntnis", I found in Genesis 2,9 that it was translated as "The tree of knowledge of good and evil". In verse 3,7 it is told, when Adam and Eve ate from this tree they "k n e w that they were naked" - in German: "sie e r k a n n t e n, daß sie nackt waren". Would not a modern translator rather use the term "tree of c o g n i t i o n" and "they r e c o g n i z e d that they were naked"?

Now, a book with the title "Der Baum der Erkenntnis" by H.R.Maturana and F.J.Varela (12) reviewed in this issue by H.Löckenhoff, states at one place: "life is nothing but cognition" (p.191 of the book), and at another: "cognition is acting, and acting is cognition" (p.35). This simplified aspect of cognition nevertheless helps to r e c o g n i z e (sic) that "cognition" is very intimately connected with life and the experience of living beings, with their insights and their reflections of what they know and experienced. Therefore - it seems to me - "units of cognition" (H.Czap) could hardly be suitable for computer processing and manipulation. I would rather advise to stay with our former definition of concept, viz.:

> a concept is a knowledge unit comprising verifiable statements about a selected item of reference represented by a verbal form (13)

which includes A) the reference to an item (of reality), B) the statements on the item of reference yielding the knowledge elements or characteristics of the concept unit and the necessary verifiability (or controllability) by others of these statements, and C) the designation by a term representing a synthesis (inner or outer) of the knowledge elements, the characteristics. By these latter ones the wealth of conceptual relationships of a concept

is established and the structural elements of its respec tive concept system are generated.

If all concepts contained in a classification system, thesaurus, terminology database, or used in expert systems comply with this concept definition, I cannot foresee any problems as to their applicability. Nor should any difficulty arise for such concepts in the practical field of socalled Artificial Intelligence, viz. Knowledge Engineering, nor for its theoretical field with the - to me - inadequate name "Cognition Science".

Let us turn again to The Tree of "Knowledge". Why was it that God asked Adam and Eve not to eat from this tree? He had provided his human beings with a splendid brain, why should it not be used in acquiring as much knowledge or cognition as possible? We do not find an answer to this question by mere thinking. Fortunately we are provided with a most adequate answer by the New Revelation given by the Lord in the last century. As there were two trees in the Center of the Garden of Eden, the "Tree of Life" and the "Tree of Knowledge of Good and Evil" (as an opposition to Life therefore a "Tree of Death") Adam and Eve had the freedom to choose their tree for their food and to obey God's word not to eat (prematurely) from the latter one. For those who can accept I should like to quote the following (my own translation) (14):

> "Verily I say unto you: He who eats from The Tree of Life will reach the true Life of the Spirit of ME and he will never become hungry to eat from the Tree of Death! For whosoever is in the Life of the Spirit of ME, is also in all its Wisdom and only by this Wisdom the Tree of Knowledge will be blessed and the soul will recognize in one moment more than by its external and silly intellectual striving in thousand years".

This means in our words: we will not get anywhere by using only our brains and not also our hearts. The fruits of the "Tree of Life" are the acts of true love. Whoever "eats" these, opens himself for the Spirit of God which is Love. If we love and above all love God, proving this by obeying His commandments, we can be sure to start to receive more and more from His divine wisdom. By this wisdom we will easily acquire the blessed knowledge which we need on this earth to fulfil all our tasks.

In their book on "The Tree of Knowledge" mentioned above, the authors Maturana and Varela consider "cognition as efficient action" belonging to man's biological area (p.261), however, they see it realized in a cultural sphere. They state in their last chapter that every human being with a cognition of his cognitive nature becomes responsible for its realization. It "demands that we recognize that the world can only change for the better if we change ourselves" (p.264). The authors conclude: Without love, without accepting others and letting them live with us, there is no social process and no humanity.

Perhaps with this their plea to activate more and more the feeling and, consequently, the actions of true, unconditional love among human beings, it seems to me that their "Tree" must have received already some of the blessings from above. Is this something to consider?

Ingetraut Dahlberg

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