from a more general concept can be overruled, "defeated" in the case of an exception), etc.

As far as the concept of subsumption is concerned a considerable generalization of the traditional approach is achieved . If any instance of the subsumed concept must necessarily be an instance of the subsuming concept in a model-theoretic sense (any *cow* is necessarily an *animal*), we obtain the traditional *extensional subsumption* (and taxonomy).

In addition to this, there are several alternative subsumption variants (see p. 68 - 69): *structural, recorded, axiomatic,* and *deduced.*- In Chapter 11 by B. NEBEL (*Terminological cycles: Semantics and Computational Properties*) a further approach to subsumption based the mapping of concepts onto their (semantic) models is demonstrated. Even though natural language modelling issues are mentioned superficially in most of the chapters, we would like to point out Chapter 18 by Paul S. JACOBS on *Integrating Language and Meaning in Structured Inheritance Networks* as an example of fine analysis of conceptual roles of the indirect object in English in terms of labelled graphs.

It is an interesting advanced-level book with bias for computer science and AI issues.   Otto Sechser

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TUFTE, Edward R.: **Envisioning Information.** Cheshire, CT: Graphics Press)Box 430, Cheshire, CT 06410) 1990.

"The world is complex, dynamic, multidimensional; paper is static, flat. How are we to represent the rich visual world of experience and measurement on mere flatland?" (p.9). Edward Tufte, a teacher of statistics, graphic design and political economy at Yale University, seeks to answer this question by describing the structures of the 'flatland'.

In the six chapters 'Escaping Flatland', 'Micro/Macro Readings', 'Layering and Separation', 'Small Multiples', 'Color and Information', and 'Normatives of Space and Time' he develops the perspectives under which 'two-dimensional' representations - mainly in books · can be systematized. On 126 pages he unfolds a host of examples of graphic representation techniques which the reader will vainly seek elsewhere in such abundance and such excellence of printing: maps of countries and cities according to a wide variety of projection techniques, sectional drawings of spaces and bodies, micro- and macroscopic models and photographs, construction plans and design drawings, timmetables, calendars, calculating tables, computer diagrams, etc. He discusses the legends of maps and schemes, the grammar of the art of dancing and other notational systems such as e.g. flag and sign language. It is in this collection and systematic listing of the representation possibilities that the strength of the book lies. What makes it particularly valuable is the host of examples from various historical epochs and practically all cultures of the world. Itr reflects pinnacles of collectioner's diligence well worth of finding acceptance into relevant

standard works, e.g. the rounding-up of ten attempts at deciphering the engravings on Dighton Writing Rock near the Taunto river in Southeastern Massachusetts (p.72/73): depending on their different theoretical preconceptions, the viewers from the 17th, 18th and 19th centuries construe the most varied inscriptions, thus also proving indirectly, among other things, how difficult it is to infer a mental representation from any given structure found in our environment.

Such epistemological questions are as far removed, however, from Tufte's interests as the formulation of clear rules of graphic representation. While showing himself convinced that the principles of information design are universal - like mathematics - and are not tied to unique features of a particular language or culture (p.10), he does not spell out these formulae for us. Nor does he as much as use them for the arrangement of his book into chapters. No, for the ordering and understanding of the material the reader remains dependent on such knowledge as he or she already has. While reference is made to an adequate body of relevant semiotic and psychological literature, Tufte does not rely on what this literature has to offer. Perception psychology, for example, has reformulated Tufte's aforecited initial question and asks it in the form: 'How does the human brain process the information it receives concerning shape, color, space and motion?' Margaret S.Livingstone and David H.Hubbel - to mention only one approach -. reply 'that visual signals are not processed within a single hierarchical system in the brain, but rather simultaneously in at least three mutually independent systems' (Spektrum der Wissenschaft, March 1988, p.114 seqq), with one of them being in charge of the perception of form, a second one of that of color and a third one of that of motion and spatial structures. Starting out from these neurological findings they then try to decide why some graphic representations are more clearly identified inter-subjectively than others - and how such representatins can be optimized. That is a possible path for a systematic approach to Tufte's questions.

Personally I already mistrust the very form in which the problem is presented: I do not believe that it is the transformation of 'multidimensional worlds' into 'two-dimensional' ones which is at issue. We can read Tufte's book only because it is *not* a two-dimensional medium. We see the letters and pictures because ink or color was *deposited* there - by whatever technological procedure. Maybe we regret the disappearance of intaglio printing precisely for the reason that the 'three-dimensionality' of the printed matter has thereby been so greatly reduced that our fingers can no longer feel the letters. And of course we love the painting of the old masters precisely because of the many layers of paint they successively spread onto the canvas, e.g. to produce an illusion of depth. No, although there certainly are differences between the 'territory' and the 'map' - as G.Bateson expressed it, whom Tufte briefly invoked when presenting his definition of 'information' (p.65) - they assuredly do not consist in the former being wide, long and high and the latter only wide and long. Information is tied to material

media, and these, without exception, are multimedia in nature. But in addition it is also tied to the observers - as the "Writing Rock' example shows -, and inasmuch ask these observe and represent their environmental information according to a culture-specific 'software', one will probably look out in vain for 'universal principles of information design'.   Michael Giesecke

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Deprecation of Terms

By Charles T. Gilreath

The preference and deprecation of terms is inherent in every nomenclature, whether it be a controlled indexing vocabulary, a terminology standard such as ISO 1087, a standard nomenclature of a science or technology, or even the individual vocabulary of a particular person.

The practice of preferring and deprecating terms is the means by which communicators pursue the ideals of mononymy (one term per referent) and monosemy (one referent per term). Since these ideals are rarely achieved, we might say that this practice helps to minimize synonymy (several terms per referent) and polysemy (several referents per term).

Here are some formal definitions from the International Standard: *Terminology - Vocabulary* [ISO 1087: 1990](1):

preferred term: Term recommended by an authoritative body.
admitted term: Term accepted as a synonym for a preferred term by an authoritative body.
deprecated term, Syn: *rejected term*: Term rejected by an authoritative body.

When there is a consensus that a given term is the best name for a given concept, that term is recommended as the *preferred* one. When another term is recognized as an acceptable synonym, it is called an *admitted term*. An example is shown in the third entry, where *rejected term* is an admitted synonym for *deprecated term*.

Going beyond the treatment given in ISO 1087, let us focus on the meaning of *deprecation* and identify three basic types. I suggest the following names for these types:

1. Absolute deprecation
2. Synonymous deprecation
3. Reserved deprecation

1. **Absolute deprecation** applies to terms which are "flawed" in some way. In the *Compilation of ASTM Standard Definitions* (2), for example, the term *fireproof* is deprecated because it is "an inappropriate and misleading term". Trademarks and other proprietary names (although not flawed per se) generally fall in this category, being deprecated in favor of preferred generic names. Emotionally charged words such as profanities and epithets also tend to be absolutely deprecated, as do obsolete

or colloquial terms. If there is a rule that goes with absolute deprecation, it is: *Do not use this term anywhere.*

2. **Synonymous deprecation** applies to a term which might be commonly used (for better or worse) as a synonym for the preferred term but which is deprecated to achieve mononymy (i.e. one preferred term). For example, the word *attribute* has a number of synonyms: *characteristic, property, aspect, feature, quality*, etc. Whatever the concept is called, to achieve mononymy all synonyms must be deprecated but one. Short of this, the recognition of *admitted synonyms* is often an acceptable compromise in the consensus process.

3. **Reserved deprecation** applies to a term which is formally assigned (reserved) as the preferred term for a different referent. Here are two examples. If my definitions are lacking, perhaps the examples are still clear.

1. **dictionary**: A compilation of definitions which reflect polysemous term usage in a given domain.
   Deprecated term: *glossary* - Reserved f. concept 2.

2. **glossary**: A compilation of largely monosemous terms and their definitions in a given domain.
   Deprecated term: *dictionary* - Reserved for concept 1.

Note that *deprecation* does not necessarily mean that a term is unacceptable in a given vocabulary. In fact *reserved* deprecation applies only to preferred terms. Instead, *deprecation* (in general) means only that a given term is rejected for a particular sense.

Let us consider two remaining questions: (a) How do we identify terms to be *explicitly* deprecated? (b) Should we not give *reasons* for deprecation?

Explicit deprecation involves singling out particular terms and marking them with caveats such as *deprecated* or *do not use*. Obviously, there are many terms that are *implicitly* deprecated for a given referent. So the key to *explicit* deprecation seems to be the extent to which the deprecated term is being *misused* in the given language community. (By *misused*, I mean: misused from the standpoint of the given nomenclature, because designations which may be deprecated in one nomenclature may be acceptable in another.) Whereas "frequently" misused terms need to be explicitly deprecated, terms rarely used for the referent need not be. Of course, there is no fine line between *frequently* and *rarely*, so it is often a judgment call.

Not all standardizing authorities cite *reasons* for term deprecation. On this issue, I come down on the side of explicitness. If a term is important enough to be explicitly deprecated, I am curious about the reason. Like most term users, I am more inclined to accept a controlled vocabulay knowing such reasons.

(1) ISO 1087: Terminology - Vocabulary. Geneva: Intern.Org.f.Standardization (ISO) 1990. 15p.
(2) Compilation of ASTM Standard Definitions (7th Ed.). Philadelphia: Amer.Soc.for Testing and Materials 1990. 554p.