Daniela DOBOŞ, Universitatea "Al. I. Cuza" Iaşi

LEXICAL FEATURES OF SPECIAL LANGUAGES

Linguists and terminologists designate lexical subsystems intended for unambiguous communication in particular subject fields as *special languages (SLs)*:

> "a special language is a linguistic subsystem intended for unambiguous communication in a particular subject field using a terminology and other linguistic means (ISO 1087).

Longman's *Dictionary of Language Teaching and Applied Linguistics* (2002: 385) defines the concept of languages for special purposes as

> "languages used for particular and restricted types of communication […] and which contain lexical, grammatical and other linguistic features which are different from ordinary language".

Thus SLs are functional varieties of language, the main use of which is communication between experts, and which represent subsets of language characterized by three types of constraints – pragmatic, cognitive and linguistic (Swales 1990; Bhatia 1993; see also Sager 1980; 1993; Hoffmann, Kalverkaemper and Wiegand 1997). In defining the concept, the same dictionary notes that the study of SLs includes the study of terminology and register (1985: 264). At first glance, one could assume that SLs are the opposite of the so-called common/ general language; however, determining the relation between SLs and common language proves to be complicated and has constituted the focus of research for many years.

> "Explicit knowledge is formalized consensually, and is articulated in the language of a specialist domain through texts" (Al-Sayed and Ahmad 2003: 3).

Among the lexis of SLs, four more or less distinct subsets can be identified. Highly technical words, including symbols, formulae and technical abbreviations make up between 9% and 25% of the total range of lexis (Hutchinson and Waters 1997: 166): the meaning of these words is exact, specific, systematic, self-explanatory, economical and transparent. Highly technical words are terminologized, i.e. they are subjected to standardization, in an attempt to establish a one-to-one relationship between terms and concepts. Words which belong to general English, such as *reflection, resistance* or *depression,* differ from specialized ones in that their reference is dynamic, depending on context: these make up the subset of semispecialized lexis (interface terminology). Often this specialization is a reduction or narrowing of meaning, with subsequent changes in synonymy and antonymy relations, which results in a clash with the central or focal meanings of words. Semispecialized vocabulary allows semantic variation (polysemy), e.g. (4 meanings).

A further subset comprises general language words such as *note, observe, item, device,* with a relatively low priority in general language, which are frequently used in all specialist disciplines without change in meaning. Finally, the fourth subset of words which plays an important role in SLs is that of structural/ functional words, which account for about 50% of all words in specialized texts (Sager et al 1980: 233; González-Jover 2007). Among linguists, there is no agreement as to exactly which words belong to which subsets, a situation which is also due to the fuzzy margins of any such lexical subset; thus the last three categories are sometimes termed common-core vocabulary and are distinguished from specialist vocabulary (Widdowson 1984: 92-93).

It is then obvious that terms are the distinctive signs in SLs. Maria Teresa Cabré (1998: 81) notes that

> "the most salient distinguishing feature of terminology, in comparison with the general language lexicon, lies in the fact that it is used to designate concepts pertaining to special disciplines".

According to ISO/TC 37, a term is

> "a designation made up of one or several lexemes/ words which represent a concept, part of a specialized language".

Unlike words of common language, terms are much more closely related to the other terms in the same discipline, with which they form specific structures. Terms, as lexical support for SLs, are characterized by monoreferentiality, i.e. only one meaning is allowed in a given context; thus, the biunique word-meaning link makes for conciseness and reduces ambiguity to a minimum. Terms only have a denotative function (no connotations) and are transparent, i.e. the form identifies the concept. Terms also make for objectivity, abstractness, impersonality, logical consistency and density of information in SLs. Concept-term monosemy involves the single-concept principle, according to which terminologists deal with one concept at a time, which is the exact opposite of the principle of polysemy, applied in general language dictionaries, where the lexicographical entry comprises a series of senses, each reflecting a different concept. Terms are to a larger extent context-independent in comparison with general vocabulary, because as units of knowledge their content is stable. According to Al-Sayed and Ahmad (2003: 5), specialist languages are

> "an excellent example of parsimony that hallmarks human cognition: a small set of keywords is used to represent a large body of knowledge".

This conciseness is in direct contrast to the sheer size of the terminologies, which comprise most of the English vocabulary (Crystal 1994: 372).

Concepts, as "abstract notions/ mental constructs/ thought units which link objects/ definitions to their names/ designations" (ISO 704), play an important role in the structuring of human knowledge and in specialized communication. What all theorists would agree on is that concepts are "cognitive representatives" for objects (Felber and Budin 1989: 67) that arise out of the fact that humans recognize the common characteristics that exist in a majority of individual objects of the same type, and then store such characteristics and use them to impose order on the world of objects. ISO 1087-1 (2000) defines a concept as

> "a unit of knowledge created by a unique combination of characteristics".

Nevertheless, modern cognitive science and neuroscience are not in agreement on precisely how concepts are generated or stored in the brain, nor is it clear how they come to be associated with specific terms. A further point of debate is whether a concept can indeed be satisfactorily described by its characteristics (see for instance Smith and Medin 1981). The same Standard, ISO 1087-1, defines a term as "a verbal designation of a general concept in a specific subject field". It is important to point out that terms always designate class concepts. Verbal representations of individual concepts (specific objects) are called 'names', e.g. *The Empire State Building* (name) as a specific *skyscraper* (term).

It would appear then that the typical trait of modern terminology inheres in its removal of surface distance, such that the words of common language are readily available for specialized usage. Thus, words used daily such as "frequency", "success" and "solution" have specific connotations in given contexts. What, for example, counts as "success" for stock brokers and experimental psychologists are two different things. However, beyond obvious differences, the unexplored use of common words by different groups can lead to unwarranted assumptions and groundless agreement.

Acronyms and **blends** are particularly characteristic of modern scientific and technical terminology, e.g. *bit* (*b*inary dig*it*); *ethacrynic acid* (*eth*ylene + *ac*etic + buty*ryl* + phenol*ic acid*); *intron* (*in*frared + spec*tr*um + *-on*, as in prot*on*); *gluon* (*glu*e + *-on*); *pulsar* (*pul*se + qua*sar*); *wimp* (*w*indow *i*con *m*ouse *p*ointer).

Direct analogy between the genetic code and the alphabet, initially made because letters were used to classify gene types, has led to a series of terms in the field of genetics which draw on the terms of an already established field:

morphology, punctuation, word, sentence, synonym, error, instruction, marker, insertion and *deletion.*

Antibodies and interferons (a protein that interferes with the virus's attempt to reproduce inside the cell) are compared to a "defense system" that "attacks" an "invading virus." To extend the metaphor and the impressions it leaves, the virus is "bad" because it "attacks" the human body when its "defenses" are "down." To "combat" this "invader", you devise a "battle plan" that may include rest, aspirin and lots of fluid. Doctors describe viruses as "sneaky" "tough" and "resilient." Of course, the virus itself does not embody these characteristics, but the treatment of viruses and diseases follows from a model of "attack" and "defense." In computer science, storage backup procedure follows the genealogy of *grandfather, father* and *son*, while the analogy to disease is evident in *bug* and *virus;* it would thus appear that computers are thought of as living beings (consider also terms such as *infect, client, refresh, clinet, compatible*). The computer screen is thought of as an office,

e.g. *Microsoft Office, clipboard, bin, desktop, wallpaper, notepad, folder.*

Compounds and their latent metaphors frequently occur as tools of terminology in specialized fields which explore tentative and mysterious phenomena, such as astronomy and particle physics. For example, a number of observed and hypothetical phenomena in space have been vividly described by compounding colour and other physical attributes, the colours normally suggesting qualities of light, heat, absorption or emission, activity or inactivity, while other words suggest aspects of size or appearance,

e.g. *red giant* (the phase of a star when intense reactions cause it to puff up its size by several hundred times); *black dwarf* (a dense matter phase when no light is emitted); *black hole* (a hypothetical region of intense gravitational field which engulfs everything, resulting from the collapse of a star; also called *collapsar*). "It is the profusion of subject-related nouns that distinguishes special text from a text written in general language" (Al-Sayed and Ahmad 2003: 6).

Chomsky (apud McGilvray 2000: 20) talks about two different forms of understanding found in fundamentally different mental capacities that yield the different cognitive domains of science and common sense, a point which is central to his thinking. In his discussion of the contrast between common sense and science, McGilvray 2000: 20 maps the differences between the concepts belonging to the two domains as follows:

Common sense concepts	**Scientific concepts**
1. Intrinsically rich	1. Austere
2. Anthropocentric	2. Objective
3. (Apparently) domain-general	3. Domain-specific
4. A priori (innately specified)	4. Artifacts (created)

McGilvray (2000: 21-24) further identifies categories of scientific concepts: noun (*kaon, H2O, lepton, phonological feature*), verb (*bond, reduce, Spell-Out),* and magnitude (*Hertz, electron volt*), plus some sentence ($E = mc^2$) ones. Scientific concepts are extrinsically specified by appeal to their roles in the theories of which they are a part and limited in their combinatorial properties by the theory. These concepts, which do not figure in common sense understanding, are understood by very few people. Nevertheless, in view of the work of authors such as Isaac Asimov, who have gone a long way towards popularizing the words of science and increasing awareness of their ever-expanding character, one might be led to question suggestions by Knorr and Knorr (1978) among others, that scientific language serves to establish and maintain the authority of science, largely through exclusion and intimidation.

In 1651 in *Leviathan,* Thomas Hobbes rejected the use of metaphor "in all discourse whose end is the rigorous search for truth". More recently, Edward Sapir urged that

> "the rigorous spirit of modern science should transform English into a language with the formal precision of mathematical symbolism" (apud Van Dyke 1992: 393).

Far from rejecting it however, modern science has completely embraced metaphor, turning it into its key cognitive instrument.

In an engaging account of metaphor in the language of science, Khurshid Ahmad (2006:198) describes the way

> "scientists literally and metaphorically create a world of make-believe through a web of words – some borrowed, some invented, endorsing self-belief here and suppressing the belief of others there".

Beyond make-believe, however, science metaphors can also

> "make extremely complicated molecular processes intelligible by highlighting their functional components in a human, or rather, semiotic reference frame" (Chew and Laubichler 2003: 52, apud Ahmad 2006: 198).

Jacob Bronowski too (1978: 89) asserts that

> "the whole of science is shot through and through with metaphors which transfer and link one part of our experience to another, and find likenesses between the parts."

More recently, particles have been studied with the help of cosmic rays and accelerators, also called *atom smashers: mesons* (intermediate *meso-* particles), between the heavier *nucleons* and the lighter *electrons, K-mesons* and their antis, called *strange particles* because of their actual behaviour, while a fundamental property of matter was thought up by physicists – that of *strangeness.* As the number of particles grew (*baryon, fermion, hyperon, hadron, lepton* …),"there was a need to categorise the growing *zoo"* (an affectionate term actually used in the particle physics literature), which was ultimately classified in *families.* Thus

> "the family metaphor led to the elementary particle *zoo* in the 1960's: the zoo metaphor was complete with the announcement of particles' *births* and *deaths* (Ahmad 2006: 209).

Ahmad subsequently remarks that "the terminology used by the new physicists had 'an element of parody and subversion' and quotes the scientist Murray Gell-Mann, the inventor of the concept of *quark* (yet another elementary particle), who, in naming his invention, turned to James Joyce's *Finnegans Wake*, in which he came across the phrase *'three quarks for Muster Mark'*; nevertheless, a *quark* is also the cry of a gull, besides being intended to rhyme with 'Mark'. Thus naming combines with having fun.

Scientific inquiry is hampered without good terminology, and good scientific terminology is itself an achievement of inquiry, dense with theory: a non-proteinaceous substance in the nucleus of cells is dubbed "*nuclein*", and later comes to be known as "*nucleic acid*"; then "*desoxyribose nucleic acid,*" later called "*deoxyribose nucleic acid,*" then "*deoxyribonucleic acid,*" or just plain "*DNA,*" is identified; then "*pentose nucleic acid*" is specified as "*ribose nucleic acid,*" then "*ribonucleic acid,*" subsequently acknowledged to be acids, in the plural (and to be found mostly not in the nucleus but in the cytoplasm); and then—almost a century after "*nuclein*" was coined—we have "*transfer RNA,*" "*messenger RNA,*" and so on (Haack 1999).

In *Illness as Metaphor*, Susan Sontag (1978) notes that in the 18th and 19th centuries tuberculosis was associated with romantic metaphors of delicacy and sensitivity, while military metaphors in medicine "first came into wide use in the 1880s with the identification of bacteria as agents of disease. Bacteria were said to "invade" and "infiltrate." But talk of siege and war to describe disease has now, with cancer, a striking literalness and authority."It is Sontag's contention that

> "illness is not a metaphor, and that the most truthful way of regarding illness–the healthiest way of being ill–is one most purified of, most resistant to, metaphoric thinking."

But the very pervasiveness of the metaphors she describes makes this unlikely.

Figurative language, the language of metaphor, is often constitutive. In other words, figurative language shapes the conception of the field in which it exists, often producing an immediate and profound effect. One example is the metaphor of the gene as a "master molecule" which is the key to controlling human development. Although the metaphor may or may not accurately represent its subject, its rhetorical power is undeniable: the metaphor helped persuade Congress to funnel huge sums of money into the human genome project (Collier and Toomey).

At the beginning of the 21st century, surgeons do not speak of human organs being cut from a body; rather, they are harvested. Public aquariums are careful not to say their large marine mammals were captured; rather they were acquired, and hospitals tell the heart attack victim not that he will require operation -- but a procedure. Are such metaphors comforting and merely polite? Are they deceptive? Are they in some sense both? Scientific metaphors run the gamut from merely picturesque speech to serious speculative instrument. The cognitive usefulness of metaphors, in scientific inquiry as elsewhere, is to direct speculation into new avenues; their worth, therefore, depends on the fruitfulness of the intellectual territory to which those avenues lead (Haack 1999).

REFERENCES

Ahmad, Kurshid. 2006. 'Metaphors in the Language of Science?' in Gotti, M. and Vijay Bhatia (eds.) *New Trends in Specialized Discourse Analysis.* Bern: Peter Lang, pp. 197-220.

Al-Sayed, Rafif and Khurshid Ahmad. 2003. 'Special Languages and Shared Knowledge'. *Electronic Journal on Knowledge Management,* Vol.1, Issue 2 (2003), pp. 1-16.

Barnhart, Clarence L., Sol Steinmetz and Robert K. Barnhart. 1973. *The New Barnhart Dictionary of New English Since 1967*. Bronxville, NY: Barnhart Books.

1980. *The Second Barnhart Dictionary of New English.* Bronxville, NY: Barnhart Books.

Bhatia, Vijay. 1993. *Analysing Genre: Language Use in Professional Settings*. London: Longman.

Bronowski, Jacob. 1978. *The Visionary Eye*. Cambridge, MA: MIT Press.

Cabré, Maria Teresa. 1998. *Terminology – Theory, Methods and Applications.* ed. by Juan C. Sager. Amsterdam/Philadelphia: John Benjamins.

Chew, Matthew K. and Manfred D. Laublicher. 2003. 'Perceptions of Science: Natural Enemies – Metaphor or Misconception?' *Science* 301/5629, 52-3.

Collier, James H. with David M. Toomey. *Scientific and Technical Communication: Theory, Practice and Policy* www.faculty.english.vt.edu/Collier/stc/htm

COTSOWES. 1990. Recommendations for Terminology Work. Bern: Swiss Federal Chancellery.

Crystal, David. 1994. *The Cambridge Encyclopedia of the English Language*. NY: Interscience.

Felber, H. and Budin G. 1989. *Terminologie in Theorie und Praxis*. Tübingen: Narr.

Flannery, Maura. 'Of Chaperones and Dancing Molecules: The Power of Metaphors' http://www.public.iastate.edu/~donpayne/314/Flannery.htm

Gómez González-Jover, Adelina. 2007. 'Léxico especializado y traducción' in Varó, Enrique A., José M. Martínez y Francisco Y. Ramos (eds.) *Las lenguas profesionales y académicas.* IULMA, Barcelona: Ariel, pp. 27-40.

Haack, Susan. 1999. 'Science, Literature and the "Literature of Science"'. American Council of Learned Societies. Occasional Paper No. 47. Philadelphia, PA.

Halliday , M.A.K. and J.R. Martin. 1993. *Writing Science: Literacy and Discursive Power*. Pittsburgh: University of Pittsburgh Press.

Hoffman, L., H. Kalverkaemper and H. Wieland (eds.). 1997. *Fachsprachen/Languages for Special Purposes/ An International Handbook of Special Languages and Terminology Research*. Berlin: De Gruyter.

Hoffmann, Robert R. 1985. 'Some Implications of Metaphor for Philosophy and Psychology of Science' in Papproté, Wolf and René Dirven (eds.) *The Ubiquity of Metaphor. Metaphor in Language and Thought*. Amsterdam: John Benjamins, pp. 327-280.

ISO 1087-1. 2000. *Terminology work – vocabulary – part 1: theory and application.* Geneva: ISO.

Knorr, Karin D. and Dietrich W. Knorr. 1978. 'From Genes to Scripts: On the Relationship between Laboratory Research and Published Paper in Science'. Vienna: Institute for Advanced Science Memorandum 132.

Lerat, Pierre. 1993. *Las lenguas especializadas.* Barcelona: Ariel.

McGilvray, James. 2000. *Chomsky, Language, Mind and Politics.* UK: Polity Press.

Richards, Jack C. and Richard Schmidt. 2002. *Dictionary of Language Teaching and Applied Linguistics.* London: Longman.

Richards, Tim. 2009. 'Cool Narrative; Cruel Metaphor?' http://serendip.brynmawr.edu/exchange/node/3833

Rondeau, Guy. 1984. *Introduction à la terminologie*. Québec: Gaëtan Morin.

Sager, Juan C. 1980. *English Special Languages*. Amsterdam/Philadelphia: John Benjamins.

Sager, Juan C. 1993. *Language Engineering and Translation.* Amsterdam/Philadelphia: John Benjamins.

Sager, Juan C., David Dungworth and Peter McDonald. 1980. *English Special Languages. Principles and practice in science and technology.* Wiesbaden: Oscar Brandstetter.

Smith, Edward E. and Douglas L. Medin. 1981. *Categories and Concepts.* Cambridge, Mass.: Harvard University Press.

Swales, John. 1990. *Genre Analysis: English in academic and research settings.* Cambridge: Cambridge University Press.

Sontag, Susan. 1978. *Illness as Metaphor*. New York: Farrar, Straus & Giroux.

Van Dyke, Carolyn. 1992. 'Old Words for New Worlds: Modern Scientific and Technological Word Formation', *American Speech* 67.4 (192), pp. 383-405.

Widdowson, Henry G. 1983. *Learning Purpose and Language Use.* Oxford: Oxford University Press.

*** *Terminology Work. Principles and Methods.* 1997.

ABSTRACT

Specialized languages (sublanguages) play an important role in the present-day Knowledge Society, while the typical trait of modern terminology inheres in its removal of surface distance, such that the words of common language are readily available for specialized usage. Thus, words used daily such as "frequency", "success" and "solution" have specific connotations in given contexts. The paper discusses some contemporary trends of term-formation, including figurative language.