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CONTENTS

GENERAL FOREWORD

This issue of the Journal of the International Institute for Terminological Research consists of two parts.

The first 6 contributions have been submitted to the editorial board during the past couple of years and do not as such have a specific theme in common. We regret that it has taken some time before they could finally be published.

The last 6 contributions form part of the proceedings of the colloquium ***Comparison of the theoretical foundations of terminology in Eastern Europe and the Western countries,*** held in Surrey in August 2003 in conjunction with the 14th European Symposium on Language for Special Purposes 'Communication, Culture, Knowledge'. Heribert Picht's foreword of the proceedings can be found immediately before the first contribution.

The last 9 contributions to this colloquium will be published in Vol. 15 (2004), no. 1-2, which will contain only those papers.

I wish to thank all contributors and welcome new contributions for the next issue of the journal in 2005. Please send a mail to my adress, found below, or to one of my fellow members of the editorial board.

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A THEORETICAL NOTE ON APPLIED CONCEPTOLOGY: CONCEPTUAL CATEGORIES AS AN ANCILLARY TO METHODS OF DATA ANALYSIS AND INTERPRETATION IN SOCIAL SCIENCE-ORIENTED RESEARCH

0. ABSTRACT

Concepts have again been on the front-burner of theoretical discussion within terminology, as witnessed by conference workshops dedicated to this topic at the 1997 European Symposium on Language for Special Purposes (Copenhagen) and at the 1999 Conference on Terminology and Knowledge Engineering (Innsbruck), among other fora. Without prejudice to whatever new perspectives are brought to bear, preoccupation with the same old issues (what a concept is, whether it can be used for anything practical, etc.) has the potential of preventing research from going in new directions that have applications and implications outside the narrow circle of 'buffs' of recondite theory. This article suggests one such direction. Taking its point of departure from *conceptual primitives* or *categories* such as underpin the organization of language thesauri, this article demonstrates how work on concepts may be applied to text interpretation in domains of socially inflected discourse, particularly in those contexts where robust interpretation requires the elevation of specific facts to the level of symbols (thus allowing for generalization) and a probing of the relationship between what is stated in a piece of discourse and its opposite in some conceptual scheme. Because both of these activities make it possible for a piece of discourse to transcend its immediate context, they may be said to constitute disarticulations from the specific facts that are articulated. Articulation is synonymous with discursification and textualization. This contribution is in the tradition of Khurshid Ahmad's research programme which employs heuristics derived from terminology to account for the evolving discourse of scientific communities.

1. INTRODUCTION

Philosophers of science, sociologists, political scientists, public policy makers, historians, literary critics, mass media analysts, among other social scientists, are all interested in the construction and/or evolution of 'consciousness' – whether this is seen in terms of scientific facts, collective representation (in an identity defining and contrasting sense), world view, or general awareness of products, policy, etc.: what is the accepted position on x in our field and how did we get there? As an ethnicity (recognised or previously marginalised): who are we? How do we distinguish ourselves from our neighbours? How do we institutionalise our uniqueness and convey same to our offspring? As a country or an alliance, why should we

attack x now when we could have done that y years ago? Why is x the cure-all wonder drug? Etc. These are all questions dealing with the construction and/or evolution of consciousness.

Somewhat more specifically, the interests of the aforementioned groups of social scientists may be said to cluster around two poles. One constellation of interests is oriented towards the relationship between a set of non-linguistic facts (e.g. acts of an enemy that are believed to justify an attack) and the mobilisation of public opinion through the discursification/textualisation of those facts. Discursification is the means by which consciousness/ideology of a particular community is created, recorded, transformed or evaluated. Calhoun (quoted by Chang 1997) notes that '[p]ublic discourse (and what Habermas later and more generally calls communicative action) is a possible mode of coordination of human life, as are state power and market economies...'.

It is central to the second constellation of interests that discursification simultaneously possess a projective/creative function (in the sense of actually creating a set of facts, creating/inventing reasons for an attack, offering a product to the market) and invite a perlocutionary analysis of the discourse (in the sense of examining intended/unintended effects). In speech act theory an analysis of the perlocutionary effect of an illocutionary act involves determining the act's effects relative to an original intention.

These constellations of interests are of course a matter of degrees. The first would clearly be associated with philosophers of science interested in scientific (r)evolutions, besides being identified with other social scientists concerned with how specific social experiences (e.g. current corporate scandals in America) are articulated in discourse and yet disarticulate from, or transcend, these specific experiences (corruption everywhere else). The second thrust would be associated with legislators, other public policy decision makers and, say, product manufacturers and their market analysts who are keen to obtain feedback on their offerings (product or policy) to the public.

What is common to both thrusts is the appeal to communities of discourse, or the invocation of discourse in the spheres corresponding to their respective interests. Books and other kinds of literature are written to create, document, but also to transform a given set of facts. Newspapers are founded to record and influence public opinion. Manufactured products are accompanied by some documentation giving information on usage, benefits, warranty, etc. – all crafted in a manner to elicit positive response from the target audience. Questionnaires are administered to ascertain the possible effect of these attempts to influence public opinion. It is one thing to obtain or to create all of these evidence sources, and another to obtain consensus on what they say.

2. PROBLEMS OF INTERPRETATION IN SOCIAL SCIENCE RESEARCH

There has been some concern about the methods used in analysing socially-inflected discourse, and consequently about the interpretations they allow for. To illustrate this, four dif-

ferent kinds of supporting evidence are cited from, respectively, the intersection of political science, sociology and mass communication; literary criticism; music; and finally the philosophy of science.

Our first example comes from the intersection of political science, sociology and mass communication. After World War II, the ideological component of U.S. foreign policy in its zone of occupied Germany called for a thorough programme of re-education of Germans in American values, particularly those values associated with democracy. This was the context for the Joint Chief of Staff's 4D agenda on denazification, democratisation, demilitarisation and decentralisation (cf. Gienow-Hecht 1997). On the basis of its conviction that a local news medium was an ancillary to the success of this programme, the Information Control Division (a unit of the U.S. Office of Military Government in Germany) founded the newspaper, Die Neue Zeitung. The paper would be run by Jewish émigrés who, after their flight from Germany, had become citizens of America - where they served in the U.S. Army's Psychological Warfare Division (cf. Gienow-Hecht 1997). According to Gienow-Hecht, the U.S. Office of Military Government (OMGUS) were quite negative in their evaluations of the work of the editors of Die Neue Zeitung. This was on account of the paper's emphasis on art, and scant reference to democracy or to America. In titling her discussion Art is Democracy and Democracy is Art, Gienow-Hecht catches and makes the point so sorely missed by the OMGUS and other U.S. political scientists: that is, that the conceptual categories of tolerance, diversity, respect, consensus, etc. developed by the editors in an artistic context were precisely the same that underpin democratic culture.

Our second example comes from African literature of French expression, from the era of anti-colonial protest literature. When the eminent Guinean novelist, Camara Laye, published his classic L'Enfant noir (most commercially successful English translation: The African Child) as a student in 1950s France, he was attacked by another celebrated novelist, Mongo Beti. The Marxist oriented Beti, putting the hat of a critic, wondered if Laye had not in the least been affected by the evils of colonialism. He wondered why Laye would indulge in the luxury of a nostalgic recollection of an idyllic, pre-European contact, Africa. This at a time when all creative and non-creative hands were on deck in the attempt to dismount colonialism. Now, only later did a general critical perception of Laye come to accept the theory of causality, which saw in Laye's apparent disarticulation from colonialism a most creative articulation of the negative effects of this system.

Our third example comes from music. Prior to the dramatic changes in South Africa culminating in the inauguration of the African National Congress (ANC) administration, Yvonne Chaka Chaka was one of the better known musical artists from that country in Nigeria. This was of course besides the legendary Miriam Makeba. A plan for her to visit Nigeria for a concert did not materialise because of what was reported as the uncooperative attitude of staff at what was then the ANC Office in Lagos, Nigeria. The official who was to serve as facilitator reportedly explained the attitude of his office by their commitment to only ambassador-artists who would articulate the sufferings and aspirations of the oppressed black majority in South Africa, and not some artist singing about male-female relationships and locally brewed beers. I cannot ascertain if at the time Yvonne had recorded the song Freedom, but the point is that her line of musical expression was perceived as far removed from

the front-burner existential concerns of the majority of her race. As in the Camara Laye case, it did not really occur to this self-appointed regulator of creative expression and of its interpretation that Yvonne's articulation of seemingly irrelevant issues could have been her own way of painting her dream society – one in which revolutionary rhetoric, killings and psychological torture would give way to family and socialisation as issues of the day. In other words, in Chaka Chaka's alleged disarticulation from the pressing issues of the day we find an articulation of the conceptual category of peace – also the destination of the fire-spitting activists.

Our final example, which is from the philosophy of science, serves to underscore the importance of concepts as a method of interpretation. Thagard (1992) contrasts belief revision approaches to knowledge change with conceptual approaches. The former, in their use of discursified community facts, operate with sentence-like propositions, while the latter operate with concepts. Thagard cites evidence in support of the claim that contemporaneously philosophy is oriented towards sentences. Sentences are contemporaneously the object of epistemological investigation. The consequence of slighting conceptual approaches is that it has not been possible to come up with a 'finer-grained theory' of knowledge change that employs tools that differ from the 'vague historical ones' (Thagard's description) used by Thomas Kuhn. More specifically in terms of results, Thagard notes that propositional approaches to knowledge change are ill-equipped to 'account for why some revisions are harder to make than others and why some revisions have more global effects.' It is hypothesised that these are issues that are best understood by 'noticing how beliefs are organised by concepts.'

3. DISCOURSE INTERPRETATION WITHIN TERMINOLOGY

Terminology focuses on specialised or specific subject areas within which it studies knowledge (units [e.g. concepts], structure, representation, evolution, acquisition, use, etc.) in its relation to expression (cf. Antia 2000:1). Conceptology, or the study of concepts, is well-developed within terminology because terminology approaches knowledge from the standpoint of conceptual logic, as opposed to propositional logic. Concepts (to which labels – linguistic or non-linguistic would normally be assigned) are the building blocks of knowledge. The difference between a sample of textualised specialised knowledge and a sample of general knowledge text lies in the type-token ratio of concepts, more commonly referred to as lexical type-token ratio. The specialised knowledge text would have a higher concept type-token ratio than the general knowledge text. Seen in terms of concepts, the lexical closure hypothesis simply means that, in a statistical analysis, a specialised text reaches closure or enumerates itself conceptually faster than a general knowledge text. The foregoing explains why terminology sees knowledge in terms of concepts, and also why the terminology framework is chosen as context for this study, involving conceptual categories.

Now, within the terminology community, Khurshid Ahmad's research programme is easily the closest to the issue at hand in this study. Ahmad has been keen to interpret scientific or knowledge discourses from the standpoint of conceptual change. This change is studied in

texts, in the representative works of the knowledge universe of interest. The heuristic for the analysis is the terminology dynamic in evidence, in other words, the empirically attested patterns of term use or the competing term preferences in the carefully constituted text corpus. These terms are believed to index stages, researchers, etc. within the knowledge space studied. Illustrative data have come from nuclear physics, philosophy of science, mathematics and linguistics. We shall use the latter (cf. Ahmad 2002).

In support of the movement in Chomskyan thought, from the perception of grammar as description to grammar as rules, the following are observed in Ahmad's Chomsky sub-corpus: from a combined frequency of occurrence of 1.68% in (and relative to the words in) Syntactic Structures (1957), the term Grammar and its variants (e.g. grammars, grammatical, grammatically, etc.) drop to 1.58% in Aspects of the Theory of Syntax (1965), then to 0.64% in Government and Binding (1981). These observations are further buttressed when it is known that in the corpus under analysis terms like grammar, sentence and language which were leitmotifs in Syntactic Structures – with a very high frequency comparable to that typically associated with the determiner the (5%) – lose about 2% frequency in Aspects of the Theory of Syntax, and have only 1% left in Government and Binding. From a frequency analysis of compound terms, Chomsky is seen as heading conceptually towards core grammar, case filter, structural case, case theory, etc. – apparently leaving behind generative grammar.

Ahmad's studies of specialised discourses, for which a semasiological or term-driven approach is most appropriate, even supports the kinds of onomasiological or concept-driven interests (conceptual relations, concept branch jumping, etc.) which Thagard has in his analysis of conceptual revolutions in Geology, etc. The lexicogrammatical dimension in Ahmad's analysis of terms makes this feasible.

The data Ahmad uses are from specialised fields. That is of course what terminology studies. It however seems that in the application of insights on concepts in terminology to the interpretation of discourses in less structured (i.e. the one-off type or more general knowledge-oriented) contexts, as is the case particularly with the first three of the four examples cited earlier, a device or framework complementary to Ahmad's is required.

Below we suggest a complementary conceptology-inspired framework, but the presentation is preceded by some theoretical scaffolding derived from discourse research in the social sciences.

4. A THEORETICAL FRAMEWORK

Articulation is a construct that has been used (by Wuthnow 1989) to describe the relationship between discourse and the social environment that produces it. Simply put, articulation is a socially conditioned illocutionary act. For our broader purposes we might replace social environment with community. Articulation, if it is not to be adjudged too parochial to be self-commending, or too abstract to be relevant, must necessarily involve a balancing act; in other words, it should imply a measure of disarticulation. According to Wuthnow, '[s]ome

features of an ideology resonate closely with the social context in which they appear; others point towards context-free concepts and generalizations.' The latter would be disarticulations of experiences of community facts. The idea of disarticulation being ideally embodied in articulation is taken by Wuthnow to suggest that the 'search for features of ideology [read 'consciousness'] that resemble features of the social milieu [read 'community'] must also include an account of ways in which an ideology becomes at least partially free of contextual determination.' Among other distinctions which Wuthnow makes in connection with articulation (context, manner), there is the one that discusses what is actually articulated. Three 'whats' are identified.

The social horizon [read community] provides the facts from which a consciousness eventually emerges through the selective and transformational process of textualisation or discursification. The discursive field gives a structure to the consciousness, and specifies the conceptual categories to be employed in talking about this consciousness. Articulation here involves mapping onto this structure specific facts from the community, while disarticulation involves, in Wuthnow's words, 'identifying ways in which the discursive field provides contrasts with features of the social horizon itself, thereby evoking a conceptual space in which creative reflection can take place.' Figural actions or actors, in the slot and filler terms of frame descriptions (in the field of Artificial Intelligence), are the fillers of the discursive field slots. Articulation here involves identifying prototypical facts (behavioural modes or personages) from the social horizon (as it is structurally mediated by the discursive field). Disarticulation or the transcending of specific behavioural modes and personages means increasing the metonymic function of such modes or personages. We have here something of an algorithm for creative/poetic writing, which invites interesting comparisons with stages of discourse production in text/discourse linguistics (cf. discussion of Frederiksen's model in Antia 2000: 156).

The implications of the foregoing need to be stated. The creation of the discursive field, just like disarticulation at the level of this field and of figural actions, calls for operating with conceptual categories. Operating with conceptual categories may involve operating with a system of contrasts, e.g. affirmation and negation, where either can serve as articulation and the other as disarticulation. From the standpoint of the analysis of evidence sources, concerns obviously relate to reconstituting the social horizon, identifying the structure of the discursive field, and finally assigning to figural actions and actors dimensions which, while not necessarily being universal, have fewer spatio-temporal constraints.

5. TOWARDS COMPLEMENTARY DIRECTIONS OF INTERPRETATION

Let us attempt to first work out the methodological implications of the examples we provided in section 2 above. From these four examples, particularly the first three, we draw a number of implications concerning the use of conceptual categories. Without it amounting to seeing facts where they do not exist, the use of conceptual categories (within the theoretical framework sketched earlier) to interpret evidence sources has vertical and horizontal implications.

Vertically, conceptual categories or probes of various degrees of specificity or depth are called for. For instance, to retrieve the structure of a discursive field and to allow figural actions and actors assume their full metonymic functions, it should be possible to map concept tokens to concept types or primitives. American social scientists and the OMGUS were clearly unable to disarticulate, to go beyond tokens.

Horizontally, because articulation necessarily involves disarticulation, the presence of a conceptual category would perhaps be as significant as the absence of another with which it correlates (to form a pair) along a certain dimension (e.g. opposition) and in a certain logical, axiomatic, system. This is as evident in the literary example as in the OMGUS and Yvonne Chaka Chaka examples. What these three examples share with the philosophy of science example is the fact that in all four cases propositional approaches to evidence sources make it difficult to retrieve important subtleties in community facts.

If we saw the above as specifications for a conceptology-inspired or -associated framework of general knowledge text interpretation, then a thesaurus would seem to meet them. This would be particularly true of a computerised thesaurus.

6. THESAURUS MODEL OF CONCEPT CATEGORIES FOR INTERPRETATION

A language thesaurus is a resource that enters words, not according to the alphabet, but conceptually or according to ideas. For instance, an entry in a language thesaurus would list words that are more or less synonymous. The pre-modifier ‘language’ seeks to alert to the existence of another type of thesaurus meant for documents, but using the same basic principle of organisation.

One of the best known thesauri in the English language is Roget’s eponymous thesaurus, Roget’s Thesaurus of English Words and Phrases, which first appeared in 1852. Among the many motivations for this (and similar resources in other languages), there is the one on knowledge classification (cf. Antia 2000). It was Roget’s hope that his work would contribute to the search for a universal scheme for classifying general or pre-scientific knowledge. In setting for himself this goal, Roget was going back to a 17th century research concern of philosophers like Descartes, Leibniz, Dalgarno, Wilkins, and the like.

The point in our discussion being that the articulation of a conceptual category can simultaneously read as disarticulation, and that at the discursive field the relation between articulation and disarticulation can be one of affirmation and negation, it is easy to see how Roget’s thesaurus might support such a reading. Table 1 is the plan of classification of the thesaurus, but Table 2 (synopsis of a class of categories) is perhaps more revealing.

Figure 1: Roget's Plan of classification

Class	Section	Heads
1 Abstract relations	1 Existence	1 - 8
	2 Relation	9 - 25
	3 Quantity	26 - 59
	4 Order	60 - 84
	5 Number	85 - 107
	6 Time	108 - 142
	7 Change	143 - 155
	8 Causation	156 -182
2 Space	1 Space in general	183 - 194
	2 Dimensions	195 - 242
	3 Form	243 - 264
	4 Motion	265 - 318
3 Matter	1 Matter in general	319 - 323
	2 Inorganic matter	324 - 357
	3 Organic matter	358 - 446
4 Intellect: the exercise of the mind		
Division one: Formation *of ideas*	1 General	447 - 452
	2 Precusory conditions and operations	453 - 465
	3 Materials for reasoning	466 - 474
	4 Reasoning processes	475 - 479
	5 Results of reasoning	480 - 504
	6 Extension of thought	505 - 511
	7 Creative thought	512 - 513
Division two: Communication *of ideas*	1 Nature of ideas communicated	514 - 521
	2 Modes of communication	522 - 546
	3 Means of communicating ideas	547 - 594

Class	Section	Heads
5 Volition: the exercise of the will		
Division one: Individual volition	1 Volition in general	95 - 616
	2 Prospective volition	617 - 616
	3 Voluntary action	676 - 699
	4 Antagonism	700 - 724
	5 Results of action	725 - 732
Division two:	1 General social volition	733 - 755
	2 Special social volition	756 - 763
	3 Conditional social volition	764 - 770
	4 Possessive relations	771 - 816
6 Emotion, religion and morality	1 General	817 - 823
	2 Personal emotion	824 - 879
	3 Interpersonal emotion	880 - 912
	4 Morality	913 - 964
	5 Religion	965 - 990

Table 2: Extract from Roget's Tabular synopsis of Categories

Class one: Abstract relations		
1 Existence		
Abstract:	1 Existence	2 Nonexistence
Concrete:	3 Substantiality	4 Insubstantiality
Formal: (internal / external)	5 Intrinsicality	6 Extrinsicality
Modal: (absolute / relative)	7 State	8 Circumstance

Table 2 amplifies Class 1 and section 1 (Existence) in Table 1. Table 2 shows the heads in a section as being presented in contrasting pairs (existence-nonexistence, etc.). This pattern is replicated in the text of the thesaurus. In his introduction, Roget writes:

For the purpose of exhibiting with greater distinctiveness the relations between words expressing opposite and correlative ideas, I have, whenever the subject admitted, placed them in two parallel columns in the same page, so that each group of expressions may be readily contrasted with those which occupy the adjacent column, and constitute their antithesis (p. xxix).

This layout has regrettably been changed in several revised editions (e.g. in the 1982 edited by Lyold used here).

How might this work in light of the vertical and horizontal methodological implications of the examples studied as stated in section 5 above? Recall that, vertically, conceptual categories of various degrees of specificity were called for, so as to make possible the mapping of concept tokens to concept types; this was said to be important in retrieving the structure of a discursive field while allowing figural actions assume their metonymic function. Horizontally, it was a case of correlating conceptual categories (to form a pair) along a certain dimension (e.g. opposition) and in a certain logical system.

In a computerized thesaurus environment, there could be developed for a conceptual category (e.g. a Roget 'head' or simplification/refinement thereof) an archive of lexical types. These lexical types would be possible verbal manifestations of the category. A lexicalised concept token occurring in text gets matched with a corresponding entry in the lexical archive, from where mapping onto the parent conceptual category (i.e. a Roget 'head') takes place. The result of this matching would be what is articulated. Now because this 'head' or conceptual category is related to another category, the next step in processing would be to connect to the opposite or correlative category. The outcome would provide the basis for a disarticulated reading.

This author welcomes views on the use of general language ontologies (e.g. WordNet) for man and machine text interpretation within the framework described here.

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ON THE UNITS OF SPECIALISED MEANING USED IN PROFESSIONAL COMMUNICATION

INTRODUCTION

It is well known that the professions involving terminology are many and varied, and that each one of them requires terminology in order to perform its different tasks. Thus, technical scientific writers (be they specialists or linguistic mediators) need terminology to produce their texts adequately, and documentalists in order to construct comprehensive thesauruses and to contribute to efficient information access.

It is indisputable that all of these groups need training in terminology to carry out their respective functions adequately, and so today many courses are given in terminology training aimed at different professional groups, and many of these courses focus the knowledge they teach on the practical skills that it is hoped the learners will acquire.

However, even if many of the terminology training programmes which are widely offered have this practical focus on the performance of tasks, there are very few which have decided whether the base unit of the terminology training should be the terminological unit strictu sensu in all professional situations. It is taken as given that to train in a terminology means starting from a terminological core, which is presumed to be cognitively perceived, professionally required and used operatively by whichever professional group.

A first analysis of our training of translators on the one hand, and terminologists on the other, reveals that this is not so obvious as it might seem at first sight. An experimental trial conducted subsequently across four groups (specialists, documentalists, specialised translators and terminologists) shows that our first impressions do not seem to be mistaken. In fact, different professional groups do not only have different terminological needs as a result of the tasks they perform, but their training needs are also conditioned by their objectives and level of knowledge of specialised themes and professional language, as well as by those needs pertaining to the relevant types of units.

This situation has led us to attempt to find out and hopefully establish the different relationships existing between specific professional groups and the specialised terminological units they employ.

In this report we propose to present the results of our research and to outline an initial proposal regarding the types of relevant terminological units correlating to different professional profiles.

1. STARTING POINTS

The assumptions upon which we have based the focus of the experimental trial are founded upon the communicative approach to terminology stated in Cabré (1999) that considers its base unit to be

- a multidisciplinary object, cognitive, linguistic and communicative
- an object which is employed in specialised texts.

From the point of view of knowledge, we consider that specialised texts contain Units of Specialised Knowledge (UCE[1]) which act as vehicles for specialised knowledge. These units, which form part of the units of general knowledge, formally include a whole range of units, from one simple lexical item up to a group of phrases, as well as linguistic units and non linguistic units.

From a linguistic point of view, we assume that these UCE have specialised meanings which are varied in terms of their nature, structure and grammatical class. Thus, we will call Units of Specialised Meaning (USE) all the signs found in specialised texts which are used in a specialised sense. Within USE we have units of different grammatical classes. Between them, nouns are the most prototypical item of terminological units.

From the communicative point of view, the object of the analysis is communicative situations where UCE become Units of Specialised Communication (UCOME) and they can also be of a linguistic or non-linguistic nature[2].

Finally, from a functional point of view, we consider that not all the Units of Specialised Knowledge (UCE), Units of Specialised Meaning (USE) and the Units of Specialised Communication (UCOME) that are contained within specialised texts are relevant for each and every professional activity. As a result, the relevance of a unit depends upon the professional activity being carried out; a specialised text may well contain units which are thematically relevant but which from a functional standpoint are not.

2. PROFESSIONAL GROUPS AND PROFESSIONAL NEEDS

Description of the experimental trial

1 In this paper we use acronyms in Spanish.
2 For more information you can see Cabré (1998/1999 and 2001).

In order to demonstrate that texts contain many units with relevant specialised meaning which are not units of terminology, and that these units vary according to their professional function, we carried out an experimental trial. This consisted of giving the same medical text to four different professional groups and asking them to extract from it relevant specialised units relating to a specific professional activity.

We selected four groups of users; specialists, documentalists, specialised translators and terminologists as being closely involved with the four activities below:

The transmission of specialised knowledge	———	Specialists (doctors)
The indexing of specialised texts	———	Documentalists
The translation of specialised texts	———	Specialised translators
The production of specialised dictionaries	———	Terminologists

Each group comprised three participants who took part in the experimental trial.

The corpus of extracted units was taken from the reference work Medecina Interna by Farreras i Rozman (1997). Specifically, the participants reviewed the text "Enfermedades infecciosas por Ricketsia" comprising 10,069 forms. It is a text written for specialists or students who are specialising in this field and is itself highly specialised.

Quantitative presentation of results

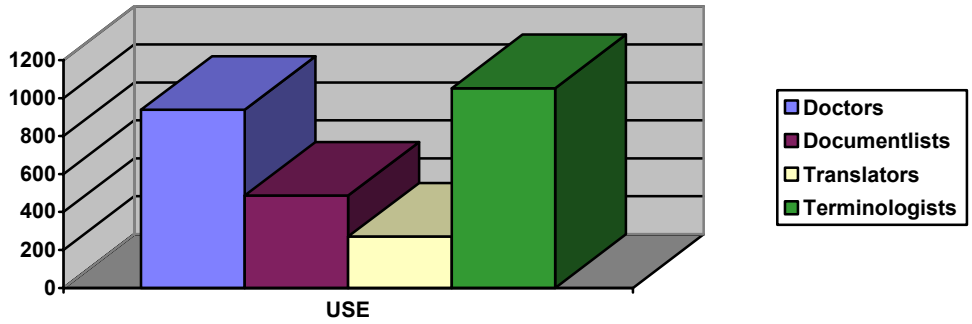
In order to make the analysis of the results easier, we have grouped the statistics according to the following four categories:

Units selected by each professional group
Units selected by all the professional groups
Units selected by only some of the professional groups
Units selected by only one professional group.

Units selected by each professional group

The overall statistics from all four groups of participants demonstrate a considerable diversity both in the number and type of USE selected.

Concerning the number of USE selected, it is clear that the different groups' selections do not coincide. The translators and documentalists indicated fewer units and the doctors and terminologists selected more. This observation supports the theory that from the functional point of view, the USE (and consequently the terminological items) of an environment or of a theme are not pre-established but rather vary in accordance with the user's professional needs.



Concerning the types of USE selected, we can note a range of possibilities, from considering only USE of noun class to selecting a broad diversity of USE in terms of their nature, structure and grammatical class. In general, the terminologists, followed by the specialists, have marked a greater and more varied number of units whereas the documentalists and the translators have indicated fewer. This is demonstrated in the table below:

	doctors		documentalists		translators		terminologists	
	Number	%	Num-ber	%	Num-ber	%	Num-ber	%
noun	824	87,84	426	87,65	211	78,14	900	85,56
verbs	17	1,81	0	0	1	0,37	49	4,65
adjectives	28	2,98	5	1,02	27	10	35	3,32
adverbs	5	0,53	0	0	2	0,74	4	0,37
abbrevia-tions	13	1,38	12	2,46	5	1,85	12	1,13
symbols	6	0,63	3	0,61	0	0	6	0,56
scientific names in Latin	44	4,69	22	4,52	0	0	45	4,27
proper nouns	0	0	18	3,70	1	0,37	0	0
phrases	1	0,10	0	0	23	8,51	1	0,09
total	938	100	486	100	270	100	1052	100

2. UNITS SELECTED BY ALL THE PROFESSIONAL GROUPS

The group of USE selected by all four groups is very small. In fact, of the 1,268 different items, only 119 were shared by all four groups. We note that these shared units were all noun units and that the noun class is classically considered to be the class of terminological items. There were no other coincidences across all four groups as far as items of other grammatical classes were concerned:

	doctors, documentalists, translators, terminologists
noun monoword units	59
noun multiword units	57
abbreviations	3
total	119

Units selected by only some of the professional groups

The statistics also show that there are USE which, whilst not having been selected by all four professional groups, were shared by two groups:

	doctors & docu-ment.	doctors & translators	doctors & terminol.	document. & transla-tors	docu-ment. & termi-nol.	Transl. & termi-nol.
simples nouns	6	1	100	1	7	5
multiword nouns	9	4	207	4	8	3
verbs	0	0	13	0	0	0
adjectives	1	2	10	1	0	1
adverbs	0	0	4	0	0	0
abbrevia-tions	0	0	1	0	0	0
symbols	0	0	3	0	0	0
scientific names in Latin	2	0	18	0	0	0
total	18	7	356	6	15	9

In this table, what stands out is the insignificance of the majority of coincidences across pairs of professional groups with the exception of the pair doctors/terminologists. This is explained by their common interest in selecting units which transmit specialised knowledge

due to the fact that they work using concepts, in the case of the specialists, or via meanings in the case of the terminologists.

We also find some units shared by three groups, those of doctors/documentalists/translators and doctors/translators/terminologists. We did not record any units selected only by the group doctors/documentalists/translators or by the documentalists/translators/terminologists. The following statistics also reinforce the similarity (in a quantitative sense) between the selections of doctors/terminologists, most noticeably in the UT3:

	doctors, documentalists & terminologists	doctors, terminologists & translators
simples nouns	124	0
multiwords nouns	116	23
verbs	0	0
adjectives	1	2
adverbs	0	0
abbreviations	9	0
symbols	3	0
scientific names	18	0
total	271	25

Units selected by only one professional group.

In contrast to the low level of coincidences between the professional groups, we find that there are many USE that have been selected by only one group. These units are quite varied in terms of their nature, structure and grammatical class:

	doctors	documentalists	translators	terminologists
simples nouns	32	11	11	48
multiwords nouns	70	20	14	117
verbs	3	0	1	34
adjectives	5	3	13	10
adverbs	1	0	1	0
abbrevia-tions	1	0	0	0
phrases	1	2	23	1
symbols	0	0	0	0

3 Acronym in Spanish corresponding to terminological unit or TU.

scientific names	1	3	0	3
proper names	0	18	1	0
total	113	57	65	213

3. SYNTHESIS AND EVALUATION OF RESULTS

The statistics generated by the selections of the four professional groups reinforces the idea that each group is using its own criteria in the selection of units, and that this diversity of criteria implies a wide variety of units in terms of the following parameters:

Nature of unit
Grammatical class
Structure of unit
Number of units selected
Variation
Frequency of use

Nature of unit

Analysis of the selections show that three of the groups, doctors, documentalists and terminologists, selected different types of units, both linguistic and non-linguistic units. The translators on the other hand indicated only linguistic units as relevant in the preparation of translations because non-linguistic units such as symbols and Latin scientific names do not usually present problems to the translator.

In contrast to the rest of the participants, the documentalists also indicated proper nouns as useful units. In the indexing of a text they are valuable because they permit a more precise definition of potential searches.

Grammatical class

All the groups of users analysed selected linguistic units from a variety of grammatical classes. From this it can be stated that the group of units of specialised meaning in specialised texts is irreconcilable with the idea put forward by the classical theory of terminology which postulates the term, which by its grammatical characteristics is always a noun unit, as the only unit of note.

Whilst the documentalists selected a vast majority of noun units (they also selected a small quantity of adjectives), the other three groups considered other grammatical classes as relevant, including nouns, verbs, adjectives and adverbials. However, it is possible to observe

from the tables above that, on the one hand the predominant category is that of nouns, and on the other that the percentages for each grammatical class vary considerably from one professional group to another.

It follows then that the statistics show a lack of an overall pattern in relation to the number of units selected from a specific grammatical class. To give an example, we can cite the case of verb units. The documentalists were the most systematic because they did not select any. The terminologists were the group which indicated most units as being relevant, both lexical and phrase USE (49 units, 4.65%). The doctors only selected a few (17 units, 1.81%) of which not all coincided with the lexicographer's selections, and finally the translators only selected one which did not form part of any specialised base as it was a verbal phrase unit whose syntactic nucleus was not specialised.

Structure of the unit

Regarding the structure of the USE selected by the different groups, we can see that the documentalists indicated only lexical units. In contrast, the other three groups indicated syntactic units, phrase units and various typical specialised combinations as being relevant, in addition to lexical units.

Moreover, when it came to lexical noun USE, the documentalists tended to select multiword units of terminology, as the ones most able to help a precise definition in potential searches of a document.

It is also important to note that at times the translators only selected certain parts of multiword units of terminology. In general we are speaking here of non-specialised units that are integrated within more complex syntactic units. These selections are justified because the translators' selections are conditioned by what elements might prove problematic during a translation and this is of course highly subjective.

Besides USE, the translators and the doctors also selected some non-fixed discursive phrases. These units convey specialised knowledge and fall outside the boundaries of lexicon or phraseology.

Number of units selected

The results obtained point to a wide diversity in the quantitative criteria employed in the selection of units. Some groups were in general very exhaustive in their selections whilst others were very restrictive.

The doctors and the terminologists selected all the units which conveyed specialised knowledge. Their selections were both quantitatively, and in terms of type, very similar even if their objectives and the use to which they would put the units subsequently were very different.

In contrast, the documentalists, in only selecting units which identified the information contained in the text, considered very few units to be relevant. It is possible to define the units they selected as those which appeared most frequently and/or those which appeared in key places in the document such as in the title, in a subtitle, in the summar, in a diagram, or in the conclusions.

Finally, the number of units selected by translators will always be very subjective, depending as it does to a large extent on the translator's level of knowledge of the text and on their personal experience of translating texts on the subject in question. The translators who took part in the trial, being experienced in translating medical texts, selected very few units: a mere 20% of the number selected by the terminologists.

Variation

From an analysis of the results of the selections we can see that all the groups have, for some units, selected examples showing variation. Their selections are telling in that again the most thorough were the terminologists whereas the documentalists only selected variants of the most frequently appearing units.

The translators also considered various variants of discursive units to be relevant as these may well offer elements in the preparation of a translation, in clarifying the meaning of certain units as well as in suggesting alternatives.

Frequency of use

Frequency of use is not a parameter which affects the selections of either specialists or of translators. Neither is it a factor in the generic selections of terminologists, though it could well be so in the context of a selection with a specific terminological application in mind. However, it is one of the basic parameters to decide whether a unit is important or not in the indexing of a text so that for a text editor the most frequently occurring noun USE in a text are usually those which are relevant in the identification of the text's content.

4. PROFESSIONAL PROFILES

From the selections of the different groups of users and taking into account the preceding parameters, we can establish a professional profile for each of the participating groups with respect to their needs regarding a specialised text:

Profile 1 DOCTORS: USE relevant in the transmission of specialised knowledge

For doctors, relevant USE are ones which convey specialised meaning on the subject of the text and, by definition, all USE fulfil this function:

- all the units of specialised knowledge:
  - Noun lexical USE (that is to say Terminological Units)
  - Verb lexical USE
  - Adjective lexical USE
  - Adverb lexical USE
  - Symbols
  - Scientific names in Latin
  - Noun phrase USE
  - Noun collocations USE

Profile 2 DOCUMENTALISTS: USE relevant for text indexing

For documentalists, relevant USE are those which are capable of identifying the information content of a text and which allow description, indexing, organisation and information retrieval from a specific specialised text. Normally, the most frequently occurring USE possess these characteristics and are to be found in key parts of the text such as the title, summary, subtitles and conclusions:

- USE for identifying information content
- Frequently occurring USE
- Discursive distribution of units
  - Noun lexical USE (preferably polylexical terminological units)
  - Adjective lexical USE
  - Symbols
  - Scientific names in Latin
  - Proper nouns

Profile 3 SPECIALISED TRANSLATORS: USE relevant for specialised translations

The only USE of interest to translators are those which may cause difficulty during a translation, either those whose meaning is unknown or those which they imagine could be problematic in some way. For this reason they often only select segments of polylexical terminological units rather than the whole unit as frequently the context helps the translator to resolve doubts over the meaning of the unit as a whole:

- USE that might cause problems for the translator
- Context of USE usage
- Possibility of having morphologically related units
  - Noun lexical USE
  - Verb lexical USE
  - Adjective lexical USE

- Adjective lexical USE
- Abbreviations
- Noun phrase USE
- Noun collocations USE
- Verb phrase USE
- Adverb phrase USE

Profile 4 TERMINOLOGISTS: USE relevant for terminography

In principle, terminologists consider that all USE in a text are significant because all of them convey meaning. However, for a selection focusing on a terminologically specific type of work, the context and frequency of occurrence of USE become relevant factors that restrict the number and type of USE selected in a first analysis. It is also important for terminologists to be able to relate linguistic and non-linguistic USE:

- USM selected according to a job profile (context of unit usage, commonly occurring USM)
- Morphologically related units

  - Noun Lexical USE (or Terminological Units)
  - Verb Lexical USE
  - Adjective Lexical USE
  - Adjective Lexical USE
  - Abbreviations
  - Noun Phrase USE
  - Noun collocations USE
  - Verb Phrase USE
  - Adverb Phrase USE

5. CONCLUSIONS

The evaluation of the results of the analysis of a text conducted by four three-person groups from four different professions has served to confirm that:

The users are interested in units of specialised meaning that are not restricted to terminological units. We have demonstrated that in specialised texts there are, in addition to terms, other types of units that convey specialised knowledge including not only linguistic units of various grammatical classes but also non-linguistic units, and that within the former group exist both lexical and syntactic units. These results allow us then to analyse units that do not fall within the boundaries established by classic terminological theory and consequently open up the field of analysis in terminology.

Professional ends and objectives condition the relevance of a unit of specialised meaning. We have proved that for the transmission of specialised knowledge, the significant units are those which convey specialised knowledge, whilst in indexing a text those which represent

the information content and allow its identification are the most relevant. In preparing a specialised translation, those units which might present problems to the translator become the most significant and finally, in the production of specialised dictionaries, relevant USE are those specialised linguistic units which are representative of a specific specialised environment.

Not all the USE contained in a text are relevant for every professional activity as it is the professional activity itself which conditions the user's terminological needs with respect to the text.

It is possible to draw up a profile of the specialised needs of each professional group. Accordingly, we have made a preliminary proposal regarding the most general needs of each activity studied. These profiles contain the types of USE relevant for the performance of each activity and additional information relating to these units.

Thus, the results from this experimental trial permit a more accurate orientation of terminological applications and a clearer focus in the teaching of professional languages, whilst at the same time questioning the objective uniformity of a terminological base.

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LSP PLANNING AND THE ESTONIAN LANGUAGE IN THE EARLY 21ST CENTURY

The key to the present often lies in the past. A historical perspective is particularly appropriate if the spiral movement seems to have completed another cycle. This means that the question "To be or not to be?" faced by the Estonian special language at the turn of the past century, has recurred to us now, a hundred years later. Of course, no end of changes have meanwhile taken place in the world, in Estonia as well as in the Estonian language, and yet – there it is again, the old question. And like a hundred years ago, it is not one for the LSP planners alone to answer, but for the Estonian people. The answer depends on just what language policy and what national policy the people will choose in the new situation.

FORMATION OF THE NATION AND THE NATIONAL LANGUAGE

The Estonian people (then calling themselves maarahvas 'country people') experienced its national awakening in the 1860s – 1870s. In Western Europe nationalism had become a politically motive force in the late 18th century. Soon those processes spread to Russia and to its Baltic provinces (Estonia, Latvia). Yet even the early 19th century knew but a couple of German Estophiles who sufficiently respected the language and culture of the Estonian people to believe in its future as a nation. It took the agrarian reforms of the 1840s – 1860s to prepare the ground for what had seemed unbelievable before.

Estonian life in the 19th century was characterised by strong cultural ties with Germany. The intellectuals of Estonia and Latvia received considerable increment in the person of young learned men out of German universities. In 1802, a university was re-established in Tartu (first working period 1632–1710). Little by little Estonians also began to be enrolled among its students. The years of the National Awakening (1860s – 1870s) are also the period when the Estonian intelligentsia was formed. Previously, when the social barrier used to run across the ethnic boundary, almost anybody starting up from the peasant class was assimilated by Germans, even though according to Russian intellectuals it would have been more natural for the population of a Russian province to become Russified.

The key to national self-identification was the Estonian language. The Estonians were fortunate in that language issues were topical in the major national states in Europe, incl. Germany. The efforts to develop the Estonian literary language drew on the Herderian mother-tongue ideology, which appreciated language as a manifestation of the spirit and character of the nation.

In the early 19th century there were still two literary Estonian languages – those of Tallinn and Tartu, or the North-Estonian and South-Estonian languages. (The oldest printed text is known to date back to 1525). In the early 1830s public discussion reached the conclusion that a common literary language was necessary. The 1850s – 1860s saw an upsurge of debates leading to the substitution of a new, more Finnish-like orthography for the old German-like one in the late 1860s. This meant that the time had arrived for language planning proper: in 1872 the first resolutions on the unification of the literary language were passed in the Society of Estonian Writers. By that time Estonian had already been discovered as an object of linguistics and by the mid-1880s the Estonians could boast three doctors, promoted in Leipzig and Helsinki, to take the lead in the research and development of Estonian. The most outstanding of them was Jakob Hurt, who did everything to persuade the 'country people' that the Estonians need not assimilate either with Germans or with Russians, as neither the Estonian language nor the people would certainly not disappear if only they could produce their own intelligentsia, Estonian-speaking and nationally spirited. His big project of the early 1870s of a vernacular school envisaged three stages: village school – parish school – county school, to be followed, if necessary, by an Estonian university in the future. (At the time the latter idea seemed crazy, yet it took less than 50 years to realise.)

The rise was followed by an interregnum of a score of years as the Russian tsarist government decided to take its Baltic provinces into a firm hand. Fortunately for the Estonians, the metropolis had grown too weak to achieve its aim, so that after the revolt of 1905 the situation eased off again. Note that this was accompanied by a liberation of the Estonian press and literary activities, which led to their rapid development.

EVOLUTION OF MODERN LITERARY ESTONIAN AND THE ESTONIAN LSP

In the early 20th century, the Estonian intellectuals perceived the abyss between the modern requirements and the homespun Estonian language even more clearly. The first to raise protest were writers. Soon the linguistically sensitive authors of the new generation formed a grouping. In 1911 Johannes Aavik designed a grandiose linguistic reform concerning both lexis and grammar. J. Aavik was a great idealist, whose fervent wish was to improve the Estonian language so that it would become more beautiful and thus worth standing as an equal among the civilised European languages. And once again the impossible became true. The neologist movement, which was at its height in 1912 – 1924, succeeded. This was due to (1) the favourable (revolutionary) social situation, (2) the youthful flexibility of literary Estonian, (3) the expediency and linguistic fitness of the neologisms, and (4) the powerful promotive effort of the initiator. True, J. Aavik considered himself a loser as half of his suggestions were rejected. And yet, the other half was accepted. The book "Introduction to a theory of language planning" (Uppsala, 1968) by Valter Tauli made the Estonian neologist movement known internationally. Note that, as we know, nothing can ever be obtained free of charge, at least in the long run. Some modern linguists consider that the resulting structural complication of the Estonian language was perhaps a little too high a price to pay for the successful innovation.

In parallel with J. Aavik, the other great man J. V. Veski was active in Estonian language planning. Although his views differed from Aavik's, they both had the same aim and thus, often similar results. It is certainly not correct to oppose them entirely as has sometimes been done. There is no doubt, however, that J. V. Veski's services to Estonian terminology stand towering high above the rest.

In the 19th century Tartu University taught in German. In 1889 (Russification time) it was replaced by Russian in all departments except Theology. It was not until the revolutionary year 1905 that better times arrived for Estonian-speaking societies, education and scientific research. In 1907 J. V. Veski issued a call for terminology development, adding the principles of how it should be done. As a response, several terminology commissions set out working. The first terminological dictionary was published in 1909 on mathematics. During the next decade, it was followed by dictionaries on geography, chemistry, medicine, botany, and physics (The process of the creation of basic terms had, after all, been going on since the 18th century).

The emergence of the Republic of Estonia brought a sudden awareness of the necessity of a vernacular university. How could a politically independent nation do without its own national university? So, on 1 December 1918 the university was taken over from the Germans. Owing to the war, however, lectures did not start until October the next year, and the official opening of an Estonian-speaking university took place on 1 December 1919.

Naturally, in the first years lectures were still allowed to be held in German or Russian as well. In ten years' time however, most of the lecturing was done in Estonian. The formation of a vernacular university went hand in hand with the development of the Estonian science language and this is exactly where the merits of J. V. Veski can hardly be overestimated. He was on all terminology commissions and participated in the compilation of 30 terminological dictionaries. This guaranteed the basic harmony of the terminology created. By the 1930s Estonian had become a genuine science language providing for research papers as well as an 8-volume encyclopaedia.

LANGUAGE PLANNING AND TERMINOLOGY IN THE PERIOD OF SOVIET OCCUPATION

World War II brought the Estonian Republic half a century of Russian occupation. Now, language planning is a field rather sensitive to social fluctuations. In the 1930s, it was developed in at least three directions, being rich in ideas as well as productive. The war meant a backlash. During the 1940s and 1950s, the aims of Estonian language planning dwindled down to a single requirement – the principle of popularity. The vulgar materialism of the interpretation of the requirement was due to the human resources left to keep language planning alive, as well as to the slogans of the time, such as "Down with the bourgeois linguistic innovation – it is hostile to the people!", "Soviet language planning should serve the people!", "Our linguistics should get a new foundation!" The loosening (however relative) of the grip of the occupation in the late 1950s and early 1960s was immediately reflected in language planning. The principles, methods, and expressions meanwhile forsaken were

highlighted again, the forgotten innovations were re-introduced, other methods than the previous ones of monopolist word-compounding were re-introduced into word-creation. The new wave was particularly fruitful in terminology and in LSP in general. Since the mid-1960s various terminological dictionaries, different in form and content, began to be published again.

The occupation had not been able to entirely erase the achievements of the two decades (1918 – 1940) of independence, especially the fundamental principles worked out then. Even though at times the pressure of Russification (Sovetisation) was particularly high, it served to unify the nation rather than split it up. The feeling of a common opposition helped to clarify the Estonian identity, the cornerstone of which was the Estonian language struggling to retain its specific features. This was the prime issue in the self-identification of the Estonians against the rest of the world, especially the Soviet Union. This is also why the Estonian terminologists never adopted the "principle of least differences" which was the main principle recommended to the Soviet terminologists, reading: the terminology used in the Soviet republics should sound as close to the Russian terms as possible. This was to work for the development of a unified Soviet terminology. The Estonian terminologists, however, based their work on another principle, notably: the best possible correspondence should exist between the planes of content and expression. This is why no move was to be made without considering the potential and specificity of the Estonian language. This did not mean, however, any scorn for other languages or borrowing as such. On the contrary, it was recommended expressis verbis to look at German, English, Finnish, Russian and other languages for loans as well as ideas for term creation. What was important was the principle that several languages to were to be followed as examples, not just one. In 1969 Uno Mereste formulated the following principles:

(a) A language adjusting the terminology of a specialism later than some other has done enjoys the advantage of the opportunity of discovering inadequacies and thus avoiding them.

(b) It cannot suffice to translate terminology word by word; one should proceed from the conceptual system of the specialism, making full use of the creative capacity of the language in question, as well as borrowing where appropriate.

At the same time, linguists kept reminding everybody that the expressive means of Indo-European languages differ considerably from those of Estonian. True, throughout history Estonian has picked up a remarkable amount of Indo-European elements, and yet it has retained its Finno-Ugric nature.

LANGUAGE PLANNING AND TERMINOLOGY AFTER THE RESTORATION OF ESTONIAN INDEPENDENCE

Thus armoured, Estonian terminology passed through the occupation, perhaps not quite pure and undamaged, yet sound and capable of development. The Estonians used their chance in 1991, when the Soviet Union was in the process of disintegration, and restored their own statehood. The event and the Estonian language policy of the time have been described in

the 1991 issue of the present journal (Vol. 2, No. 2). A Language Law for the transition period had been passed in 1989, to be replaced by a new Language Law of the Republic of Estonia in 1995. Yet, the amendment and implementation of the Law is focused on the guarantees for the linguistic rights of non-Estonians and on teaching Estonian to them. This is the continuous concern of the EU officials, this is also what Russia is constantly keeping a vigilant eye on. How (and if) the Estonian language is recovering from the occupation seems marginal in this context. This is probably why a mere group of five, working at the Institute of the Estonian Language, Tallinn, is responsible for general language planning as well as for name planning and LSP planning.

In spite of that, the Estonian language planners have quite a few achievements to be proud of. The major effort of late is the normative dictionary published in 1999 (over 1000 pages, big format, ed. by Tiiu Erelt (Erelt 1999)). This result of ten years' work can be characterised as (1) a dictionary of literary language (dialect, slang etc. is little represented), (2) a dictionary of modern language (of the 1990s), (3) a recommending dictionary, and (4) a universal dictionary. Universality here means that the dictionary contains information on orthographic, morphological, and semantic issues as well as on the syntactic valence of words, their stylistic and terminological use etc. The user is invited to consult the dictionary in parallel with the Handbook of the Estonian Language), the 2nd revised edition of which was published in 2000 (Mati Erelt, Tiiu Erelt, and Kristiina Ross 2000).

World level in name planning is represented by Maailma kohanimed 'Place names of the world' compiled by Peeter Päll (Päll 1999). There is only one answer to the question which place names should be considered internationally commendable. It follows from the natural and indivisible right of every country to act independently in naming its own places. This is why the names used internally are also correct to use internationally. Estonia respects this principle, voiced at the 1967 UN Conference of Toponym Planning, as well as the place names current in other countries, hoping that our names will similarly be respected by other countries. In 1940 – 1990 names (like most other information from Estonia) reached the rest of the world via the Russian language. But on their way, they got distorted owing to the phonetic and alphabetic differences of the two languages (e. g. Khiuma pro Hiiumaa, Pjarnu pro Pärnu, Tallin pro Tallinn).

Terminologists have also been quite active. True, in the early 1990s there was some reason to fear that the young and poor state that had just regained its independence would perhaps consider terminologists not nationally important enough to be financed. Another realistic-looking fear concerned terminological commissions: would the work previously done out of enthusiasm, national spirit, opposition to Russian influence etc. still be able to continue, or would specialists from now on demand money for it, as for any normal piece of work done in a market economy. Such a course of events would have been fatal for terminology. Fortunately, it did not turn out that way. This is proved, for example, by the average 15 terminological dictionaries published annually over the past 10 years. True, not all of them qualify for a rich dictionary to advance its special field. And yet it is a clear sign of terminological work going on.

LSP SITUATION IN THE EARLY 21ST CENTURY

What is the situation of LSP today? Present-day Estonian life is dominated by the following factors: (1) Estonia is a country once again open to the rest of the world and living its own life together with other countries; (2) Estonia is working to join the EU and thus trying to meet its requirements in every walk of life; (3) Estonia has passed from a socialist planned economy to a market economy.

These circumstances have done the Estonian people a lot of good – but a number of grave social problems have also arisen. Leaving aside the latter, let us concentrate on linguistic problems, particularly those of LSP. Although those are not insoluble from the linguistic point of view, the solutions require a favourable social background depending on the language policy and national policy in general. Some problems just cannot be solved without some general terminological background, which is not always sufficiently available to this or that specialist, and even more so to the translators and editors.

The pattern of donor languages for the Estonian LSP has not always been the same. In the beginning, the Estonian LSP emerged and developed in the spheres of German and Russian influence. Of those two, German seemed particularly well suited for the purpose, first because its influence had long traditions, second because its way of expression is compact and clear, it is rich in compounds and derivatives, while the terms used are traditionally unambiguous. Throughout the second half of the 20th century Russian influence dominated. Although Soviet pressure was strong enough, the Estonians retained their sober mentality. Of course we could not help copying from the term systems (the level of expression) coming along with the notional system (the level of contents). Translation loans are, after all, quite popular in LSP as the motivation of the terms created is often the same.

Today we find ourselves amidst a pan-English influence. The massive advance of English influence began no later than the 1970s, when it became the world leading language of several special fields. Estonian has been exposed to the totality of English influence since the 1990s, while a few fields (pedagogy, local administration) fell under the influence of Finnish. In LSP, however, the Finnish influence has been surprisingly small, especially considering its extent in the common language. The present pressure of English is hard to bear mainly because of its different way of putting things, its different style of expression. This is particularly strikingly manifested in legal language, but many linguistic problems also appear in such a concrete and practical field as construction, for example. And yet, at present the necessity to translate from English is formidable, or to write on the basis of English documents. It is not impossible that even French would be more suitable for us, but the world-wide influence of English is much stronger than that of French and the number of Estonians competent in French is much smaller than of those working with English.

Again, the EU Directives, Regulations, Treaties etc. should be translated following the same old principle pointed out above, i.e. striving for a maximum possible adequacy between the planes of expression and contents, which requires a constant consideration for the potential and specificity of the Estonian language. This is really topical in the new situation. This is where we should put our foot down quite firmly, but instead we can see cases of careless

copying of English words practically every day. This can happen in two ways: either by (a) literal translation, or by (b) producing pseudo-foreign terms in the form of transcriptions from English. This proves that one should never stop repeating the fundamental principle of terminology: start from the concept, i.e. look at the thing, get the notion clear in your own mind and then say it in your mother tongue. Every language has its own ways and means of expression. Who could have anything against borrowing from other languages – after all, half of our terms are loans anyway. Yet, every case of "implementation", "creativity", or "cohesion" (an EU term) need not be translated as kreatiivsus, implementatsioon, or kohesioon, respectively. Instead, we have such nice Estonian words as rakendamine, loovus and ühtekuuluvus, understandable to every Estonian, translators and readers included. During the 20th century, Estonian terminology has developed its own rules and principles as to when and from what language to borrow. Thus, it is recommended to follow the good tradition in borrowing (as is done in bookkeeping, or in construction, for example), leaving room for neologisms as well.

At every stage of language development, language planning needs tactical flexibility to adapt to the situation. At present, our activities should be focused on the general attitude of the Estonian intellectuals. The Estonian language planners just cannot afford to complain that the Estonian language has been contaminated by Russian and English influences, that it is corrupt and bound to become extinct sooner or later etc. On this basis every man of reason would conclude that the solution is in the use of some other language. What the language planners should do is to explain and demonstrate the strong potential of the Estonian LSP, its readiness to meet any challenge of to-day, thus instilling ever more confidence in the people in that their mother-tongue will not let them down.

The question may arise why we Estonians, living in a country with an advanced literary language, should face the same problem of independent existence as we did a hundred years ago? The answer can be found in world history and is probably known to my readers, whatever their country of origin - Sweden, Denmark, Finland, Germany, or some other country. Estonia is just a small country, one of the smallest in Europe to have vernacular culture and science. Where should we find the strength to stand up to the dominance of English, while even the big powers are beginning to give way? It is common knowledge that in order to survive, smaller nations need a stronger sense of identity and a mission to live with. For us, the only guarantee would be the Estonian language and culture. At that, matching the Estonian identity with the European one is no problem for us, as throughout our national history – as I have been trying to explain above – our attitudes have been Europe-oriented.

GLOBALISATION OF HIGHER EDUCATION – LANGUAGE ISSUES

As has been mentioned above, our vernacular university was founded in the early 20th century, to be more exact in 1918, when the War of Liberation was in full swing. If the foundation had not taken place, where would we be now? This is a question hardly ever asked, for who, indeed, could even imagine the full answer. Instead, we have been discussing the future. Throughout the year 1999, the problem whether we still need Estonian in university and in science was a serious topic of discussion. Many articles were published in various

sources until, towards the end of the year, two international conferences were held. The first was a language planning conference organised in Tallinn by the Institute of the Estonian Language. According to most of the talks, the pressure of English tends to overshadow the other language planning problems. The language planners from Finland, Sweden, Denmark, Latvia and Russia all spoke of the unsparing influence of English on their respective vernaculars and of a restriction of their sphere of use. Against the background of their own negative experience, they sincerely recommended that we had better develop a clever policy against Anglicisation at once.

On 30 November 1999, a conference on "Globalisation of Higher Education – Language Issues" was held at Tartu University. In addition to the Estonian scholars, speakers had been invited from Finnish, Latvian, Russian, and German universities. How to keep up one's own language without losing close communication with other nations? This seems to be the common problem of many European countries.

The spectrum of opinions was very wide. Here I would like to point out a few ideas from those papers that supported my own identity as an Estonian terminologist and language planner. Prof. Els Oksaar from Hamburg, who has devoted her whole life to the studying of language contacts, invited the listeners to think about the mutual relations of language, science and society. Language is a part of culture, while its function is to verbalise this culture. Science is not indifferent to the language used to fix its results in. Globalisation of higher education does not mean that vernacular culture and science should be thrown overboard. One must not cut one's roots, which are inseparable from one's mother tongue. The spiritual atmosphere of universities should be based on the vernacular. The solution lies in multilingualism, as this stimulates the development of the vernacular as well. Always looking at the world through one and the same pair of spectacles, we may easily miss something.

Prof. Kari Sajavaara from Jyväskylä dwelt on the increasing role of English in the globalisation processes, as well as on the fact that an overriding of the vernacular will result in a poorer understanding of the contents of the subject. Academic education should provide professional competence, including adequate proficiency in those languages in which the best special literature of the field is available. As a professor of English, Kari Sajavaara criticised "Euro-English" for being superficial, at times even incomprehensible. He considered that the use of the vernacular in scientific research and publication serves state support.

Mati Erelt, Professor of Estonian, Tartu University, focused his talk on the necessity of higher education being still administered in the Estonian language. Like in the times of Humboldt, it is still important that science, teaching and learning should form an integral whole, i.e. it should still be possible to teach and learn by studying as well as to study by teaching and learning. If we want to train our youth to become really competitive in the modern world, they should naturally be taught their foreign languages well. Yet, out of pragmatic considerations the use of English should not cross certain reasonable limits. The University should be able to continue teaching students in Estonian, if they so wish, as receiving vernacular education is a constitutional right of Estonian students. The dangers requiring us to set a limit on the use of English in Estonian institutions of higher education are as follows:

Estonian might be banished "back to the kitchen". Being one of the most essential parts of a literary language LSP also provides for its other sublanguages (press, fiction etc.). Together, however, the sublanguages form an integral whole, so that if one part were cut off, it would inevitably maim the rest of the subsystems. Now, if we worked for the extinction of university language, it would lead to the extinction of other sublanguages as well. (This is also why Estonian language planning has always striven for a harmonious development of both LSP and language in general.)

The quality of education may decrease. The quality of learning largely depends on whether the teaching is done in the students' mother tongue or in a foreign language. Different languages, as we know, classify reality differently, the polysemy of words differs across languages, the metaphors used are different, etc. A full comprehension of what is being taught requires perfect competence in the language of teaching. The problem is obviously less disturbing in science that in the humanities.

Democracy may suffer. A democratic country should avoid situations in which its citizens are deprived of the opportunity to receive higher education and to have access to scientific results in their mother tongue. It is still less democratic if part of the people are deprived of the opportunity to have a say in issues concerning them all, like public health, environmental protection, etc. This will lead to the emergence of a bilingual Euro-élite who will decide practically every important thing for the people.

The conference stirred a lively discussion, which was dominated, after all, by the idea that one should not give up the use of the Estonian language, either in science or in higher education. We had better go on cultivating the Estonian spirit as well as sustaining and cultivating the Estonian science language.

DOES THE ESTONIAN LSP HAVE SUFFICIENT POTENTIAL TO HOLD OUT?

Do we have enough strength to resist the advance of English – that is the question. A revision of the state of the art seems to support a positive answer to this one. Most special fields have an advanced Estonian terminology to go by. Linguists together with specialists of other fields have developed an original LSP theory. Productive terminological work is going on, yielding both terminological dictionaries and term standards. The Estonian scientists are not indifferent to the Estonian language, which is a strong argument for the survival of Estonian in scientific research. However, it is necessary to study the linguistic processes going on in the Estonian society, the possible changes in the linguistic attitudes, how well Estonian copes with this or that function, what is the Estonian people's level of foreign language proficiency, etc.

A step towards the clarification of the Estonian LSP situation was the LSP conference organised by the Mother Tongue Society in Tartu, June 2000. Of linguists I was the only one to talk there, as it was much more important to give the floor to other specialists, who do the main job in LSP cultivation anyway. The invited speakers had been chosen very carefully to

provide for the representation of traditional as well as newer specialities, more stable specialities vs. those considerably affected by social changes, both sciences and humanities. None of the fields chosen was any too specific or self-absorbed; on the contrary, their terminology usually reaches the public at large. Those fields were ornithology (Estonian names for the birds of the world), pharmacy (Estonian equivalents for the European pharmacopoeia), politics and political science, jurisdiction (esp. legislation), and computer science. All speakers gave a survey of the LSP situation in their own field and they all stated that Estonian is not at all inadequate for any of the fields represented; on the contrary: where there's a will, there's a way.

The following is a brief summary of the main points made by Arvi Tavast, who spoke about computer science. This field differs from many others by its having no long-standing traditions. Rapid changes in the field necessitate rapid lexical reaction. As computer science is one of the key fields of the information society, the state of its terminology is pretty eloquent as to the state of LSP in general. In computer science the name of the object is often written right on it and often the two cannot even be differentiated from one another (e.g. menu commands). This makes the English language visually present much more than in any other field. The problem is that many translators cannot actually comprehend the text to be translated. As a result, some user manuals consist of nothing but linguistically correct nonsense. Recent times, however, have witnessed a rapid spread of Estonian-language software: information systems of enterprises, freeware, a number of Microsoft products for the general population, and software for mobile phones, cash dispensers, and self-service gas stations. Now that the translation of software packages has begun, it is necessary to agree not only upon terms, but also on some other LSP issues. It is time to decide, for example, whether it is fit for a computer to be addressed familiarly as sina (2nd person singular), and the user more formally as teie (2nd person plural). The number of those people who agree that some things can never be translated into Estonian is decreasing, though. According to A. Tavast, the linguistic situation in the field of computers is improving slowly, but consistently.

Beside the LSP conference just mentioned, there is an annual Day of legal Language held alternately in Tallinn or in Tartu. This event is a joint effort of the Ministry of Justice and several institutions dealing with language, and its aim is to keep an eye on what is going on in legal language.

From May 2001 to April 2002, the Tallinn House of Scientists, in collaboration with the Mother Tongue Society, organised a series of discussions "Estonian scholarly language and the European Union". Seven discussions and a conference were held focusing on different fields of science. This series of events was organized by Elsa Pajumaa, secretary of the House of Scientists.

The current situation was analysed in the following fields: technical sciences, medicine, natural sciences, information technology, the humanities, economics and law, and agricultural sciences. All these fields of science have contemporary Estonian terminology. It was concluded that the situation was not critical. However, work has to continue to maintain and develop Estonian scholarly language; further collaboration between subject and language

specialists is necessary. It is important to establish a reasonable ratio for publishing one's research findings in English and in Estonian. Research papers should be assessed on the basis of their substance and not only on the basis of whether the journal is listed in CC (Current Contents).

A language forum was held on 13 December 2002. This event was organised by the Estonian Language Council, which presented the preparatory work on the Estonian language strategy to the public at large for the first time. The Estonian language, as the most important component of the Estonian national identity and the guarantee of the unity of the state, needs systematic care and development. Its action plan is "Strategy for the development of the Estonian language for 2004–2010", which proceeds from the current state of the Estonian language. In order to assess it, language surveys were compiled, which cover law and administration, science and higher education, schools, journalism and entertainment, information technology, banking, advertising, dialects, sign language, the language of Estonians living abroad, and the foreign languages used in Estonia. The preparatory work for the language strategy also includes surveys on the study of the Estonian language, language planning (including LSP planning), language technology, and language collections. The strategy will be completed in 2003, after which it will be open for public discussion with a subsequent approval by the Estonian Parliament.

ESTONIAN TERMINOLOGY SOCIETY (ETER)

The most serious drawback of Estonian terminological work is its vagueness, scattered nature, and isolation. However, it should be possible to improve the situation a small country as Estonia. For this purpose the Estonian Terminology Society was set up in 2001. Its aims are as follows: 1) to co-ordinate terminological work in Estonia; 2) to assemble the existing terminological collection, having in mind their integration and future development; 3) to offer terminological services (terminological advice, translation and editing of LSP texts); to spread information about LSP; 4) to further the development of terminological theory; 5) to offer LSP training; 6) to organise or to co-ordinate domestic and international terminology projects; 7) to join the international network of terminological organisations; 8) to publish terminological dictionaries and literature.

The most urgent task is to join international co-operation. In the computer era this should not be a problem even for a country that is located in Eastern Europe. Until now the main hindering factor was our own inertia, which has been overcome by now. Arvi Tavast, the chairman of ETER, has participated in international terminological events, and ETER has become a member of the European Association for Terminology. Much work has been done during this short period to make LSP training more efficient, both in the master's programmes of universities and the in-service training of persons involved in term standardisation. The evening discussions held on a regular basis by the society serve the same purpose.

ETER has launched an extensive terminology survey in order to obtain a more accurate picture of the state of terminological work in Estonia by different specialities (and even institu-

tions or societies). The results of this survey will be used for the co-ordination and guidance of terminological work as well as for the Estonian language strategy.

CONCLUSION

The first half of the article was an attempt to demonstrate how some hairbreadth miracles were made to happen: the Estonian nation was formed together with its own intellectuals, in a few decades an advanced literary language was developed together with LSP and a vernacular university. Hundreds of enthusiasts have been cultivating the Estonian LSP for a whole century by now. What a a pity should all this turn out to have been in vain at the turn of the 21st century, now that the foundation for progressive development has been laid. Now everything depends on the young generation with their hierarchy of values. The dominating educational ideal is everyday success. The educational expectations of young people are more concerned with how to be better off in future than with mental and spiritual development. Of course, there is nothing new in the problem. Albert Schweitzer, in his time, also expressed his concern over cultural ideals being confused by ephemeral interests. Cultivation of the spirit is pushed aside by worldly worries. Many young people take education as a mere means to success in the everyday struggle for existence, while national ideals are regarded as old-fashioned abstractions. This should prove the paramount importance of the state policy practised by the Republic of Estonia in the domains of culture, science and education, as well as the necessity of emphasising spiritual values in social life.

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TERMINOLOGICAL FOUNDATIONS OF REASONING: TOWARDS THE GENERAL THEORY OF EVOLUTION OF HUMAN KNOWLEDGE

Beginning with the end of the 1980s a new approach to the study of relations between language and knowledge appeared in Russia, which quite soon became one of the leading directions in the study of language and was called cognitive linguistics. This reflects the general growth of the interest in the problem of discovering the main principles of thinking and knowledge organisation which results in revealing new aspects of this problem and an increase in the number of corresponding sciences, beginning with the traditional philosophical disciplines – gnoseology and epistemology, traditional logic, followed by later disciplines, such as semiotics, anthropology and history of science and technology, science of science, artificial intelligence, heuristics, creative logic (a new trend formed with the aim of overcoming the limitations of the classical formal logic), age psychology, pedagogical psychology (because learning can be viewed as the specific process of knowledge growth) and ending with the latest comers – cognitive psychology, national psychology and culture studies (though there are reasons to suspect that this list is incomplete).

At the same time it should be mentioned that none of the above-mentioned sciences tried to consider the process of evolution of cognition, the development of human thinking from the point of view of reflection of this process in language, especially in vocabulary. This aspect of cognitive studies becomes especially important in connection with the latest findings in general anthropology and the subsequent need for the revision of the evolution theory.

The widely known theory of evolution which is presented even at the secondary school level which deals with the history of humankind beginning with the simplest one-cell organisms through the intermediate stages of fishes, lizards, birds and mammals and finally coming to anthropoid apes. According to this theory ontogenesis repeats the phylogenesis, i.e. every human being in his prenatal development repeats the similar stages. Theory of evolution also presents evidence of the close relation of apes with humans, but here it stops, as if there was no further development of human beings. Therefore in our opinion the existing theory of evolution which is in fact reduced to embryogenesis leading only to anthropoids may be viewed rather as a theory of evolution of apes, and not humans. To be applied to human beings it should be made complete and deal with the further development of man, resulting in increasing differences with the apes.

Now, it was always considered that the main difference between human beings and even the most highly organised apes lies in the human ability of reasoning, which is based on the usage of language. Experiments with apes, especially teaching American Sign Language to a chimpanzee named Washoe, showed that the apes can acquire more than one hundred signs,

may produce sensible combinations of two and even three signs and may teach other apes to use sign language. That seems to point to the fact that anthropoids are capable of combining ideas and producing utterances, i.e. they are capable of some sort of reasoning. Therefore it becomes essential to establish a more detailed picture of human reasoning; the history of its development, with the aim of establishing precisely whether there still remain any differences between animals and human beings and whether there was any evolution of the human species proper. It would also be advantageous to determine the present state and perspectives of human evolution. In our opinion all this could be accomplished on the basis of the already existing linguistic data.

In traditional linguistics there are many publications dealing with the problem of relations between language and thinking. There are also the latest works in cognitive linguistics of N.D. Arut'unova and Je.S. Kubrjakova. Beginning with the end of the 1980s cognitive linguistics, which studies relations between language, cognition and knowledge growth, became one of the leading directions in linguistics. But in the general linguistics the denomination of this problem – "language and thinking" - somehow excludes the possibility of the diachronic approach, because thinking is traditionally regarded as belonging to the present time.

At the same time, due to the fact that in the process of cognition as well as in scientific and technical thinking, mainly special vocabulary is most actively used (first of all terms), the cognitive approach in terminology science became one of the most promising and leading directions of Russian linguistics (the term "kognitivnoje terminovedenije" (cognitive terminology science) was introduced in the 1989 by Prof. Olga Akhmanova; also "gnoseologicheskoje terminovedenije" (gnoseological terminology science) by Sergei Grinev [Grinev, 1990a]).

A number of gnoseological functions of terms and terminologies was discovered beginning with the heuristic function of the term [I. Dolgopolova, 1980; V. Leichik 1986], and also including diagnostic and prognostic functions of terminology [Grinev, 1991 and 1993], simulating function of term [Grinev, Leichik & Nalepin, 1987]; the function of fixation of knowledge [V. Leichik, 1980; 1986; Grinev, Leichik & Nalepin, 1987] and instrumental function [N. Sljusareva, 1982].

There are a number of successfully defended Dr. Sc. dissertations (M.V. Volodina, L.A. Aleksejeva, G.A. Dyanova); at one of the last annual international conferences, organised by the Russian terminological society in June, 2001, quite a number of presentations dealt with various problems of this direction of terminology science.

One of the first problems formulated as early as 1984 by H. Felber in his "Terminology Manual" was determining whether a term is the name of a concept viewed as a unit of cognition or a unit of knowledge. In the first case we should study the general process of development of the systems of scientific knowledge; in the second case rather the isolated act of reasoning. Lately the complex character of the problem of relation between language and knowledge induced the necessity to recognise the triple nature of the concept in terminology: as a unit of knowledge, cognition, and thought [Picht, 2002]. Difference in approaches

may determine methods of investigation – in the case of cognition there are reasons to view the diachronic approach as the most effective, while in other cases synchronous approaches may be preferable.

In Russian tradition the problems of knowledge, cognition and thinking are closely connected with the general theory of consciousness and perception of the surrounding world (the reflection theory). It deals with the multi-level scale of consciousness known since Aristotle and based on the ways of our perception of the surrounding world.

It starts with a sensation – an impression received with the help of one of our senses. This type of consciousness serves as a basis for our reflexes and is characteristic for the lower type of organisms. The next step is perception – an impression of a complex type that comes as a result of the sum total of sensations and gives a fuller impression of some object or a phenomenon of the environment. It is associated with the organic life of a higher order. Still the next step is associated with the ability to form mental images received in perception so that they could be retained in their absence, so it is connected with the memory and notions. Notion is a sensory-direct (vivid, obvious), generalised image of objects and phenomena of reality, which is preserved and reproduced in memory and without the direct influence of those objects and phenomena on the sensory organs. The last step, which presumably separates human beings from the rest of the living entities, is thinking proper that operates with concepts. The concept is an idea which mentally separates objects of a certain class according to their specific features. Concepts are denoted by terms – special lexical units. In our everyday life we use notions, not concepts, so ordinary words denote notions.

Now some of those features we share with other organisms. Despite all the nice words being said about homo sapiens, we are still animals and share with other creatures some essential features in perceiving the surrounding world. We share sensations with all of the other living organisms, beginning with the simplest, like unicelullar, bacteria and fungi, also plants, insects, arachnids, reptiles, amphibians, etc. We share perceptions with fishes, amphibians, reptiles, birds and other mammals; and we share memories with mammals. But somehow we are not worried about our differences with bacteria while we feel it essential to separate ourselves from the apes (they say that the most harsh feelings exist between the closest relations).

It is difficult to scrutinize the historical development of the whole picture of the world in the human mind, but quite possible to get insights by studying small separate parts of it. During the last fifteen years in Russia there has been a number of investigations of the evolution of various fields of knowledge as reflected in the historical development of respective terminologies.

It was based on the assumption that practically all historical changes in human mentality, progress of culture and knowledge growth are reflected in changes in the lexical system. From the point of view of terminology science, knowledge growth is accomplished by the development and consecutive replacement of conceptual systems – paradigms. In our opinion the most universal means of manifestation of the conceptual paradigm is the corresponding terminological structure, i.e. the particular terminology. Every change of conceptual

paradigm is inevitably reflected (though it may take some time) in respective formal or semantic alteration of terminological structure which provides evidence of the high degree of isomorphism between them and also of the manifestation of terminological function of establishing the level of knowledge [Grinev, 1994]. Consequently an opportunity arises to implement the analysis of transformations of terminological apparatus of a definite field of knowledge in obtaining a relatively accurate notion of the specific features and tendencies of evolution of theoretical thought.

Diachronic investigation of terminologies, which serves as a means of manifesting conceptual paradigms in national languages, also makes it possible to simulate the evolution of virtual historical conceptual paradigms, because all their transformations would find formal expression in the quantitative and structural changes of respective lexical systems (terminologies). The use of the attribute "virtual" is motivated by the fact that the result of such reconstruction is a speculative system, supposedly but not necessarily coinciding with the real historical state of the respective field of knowledge. Sufficiently well-known to historical terminologists facts of incomplete correspondence of terminologies and respective systems of concepts to a considerable degree could be explained by the fact that quite rarely the sole aim of the scientist happens to be a formulation of the system of concepts. In the majority of cases, classification schemes of the concepts where the concept systems are represented in a perfect way are elaborated only as part of terminology ordering. In many cases the system of concepts is not present explicitly in the consciousness of the scientist and the incompleteness of terminology that he uses reflects the state of the respective system of concepts.

This approach has been elaborated during the last fifteen years of studies and creates the opportunity to reconstruct the historical states and tendencies of development in material culture as well as in scientific outlook; to determine the most possible time of formation of various specialised fields of knowledge and also to discover specific features of formation and evolution of particular scientific disciplines. By means of comparison of synchronic sections of terminologies viewed as a means of formalising respective systems of concepts attributed to various chronological epochs, we obtain the possibility of estimating the tempo of development of a chosen conceptual fragment of the picture of the world, its quantitative and qualitative historical variations, stages of specialisation and filiation (branching) of particular scientific sub-disciplines. In general it might be used as a relatively reliable basis for research aimed at discovering the causes and conditions of accelerating knowledge growth.

Some of the oldest fields of knowledge, in many cases - parts of everyday life requiring little professional knowledge, such as buildings, rooms, dress, furniture, pictures, weather, drinks, windows, ornaments, stairs, etc. were chosen as objects of the study. A number of thematic dictionaries and dictionaries of synonyms (such as Longman Synonymy Dictionary (1986), Roget's Thesaurus of English Words and Phrases (1987), Webster's New Dictionary of Synonyms (1988), Chambers Thesaurus (1991), The Cambridge Thesaurus of American English (1994), The Oxford Thesaurus (1997)) were used to collect the necessary materials. The Oxford English Dictionary was used in tracing semantic changes in the history of words. The information collected as the result of research in this direction (resulting in suc-

cessfully defended 14 Cand.Sc. and some 35-40 MA dissertations2) points to the following considerations:

It was found that the character of human reasoning was not the same during various stages of development of human mental abilities. In the history of development of any field of scientific knowledge we can observe a number of stages and, first of all, we can distinguish the scientific stage which is based on the predominant use of concepts and terms and the prescientific stage which is based on the use of special notions and proto-terms. In a number of cases, especially when analysing terminologies of the oldest fields of knowledge, we can single out three stages in their development.

Thus, investigation of English and Russian terminologies of meteorology revealed three chronological layers. The oldest layer consists of names of precipitation (or hydrometeors) and was formed by borrowing from the common everyday vocabulary words (like rain, snow, hail, dew, mist, drizzle, etc. and their Russian counterparts) that mainly already existed in respectively Old Teutonic and Proto-Slavonic languages. The next chronological layer attributed to the period, beginning in the 15th Century and up to the 18th Century, consists of names of local winds (such as tramontana, phoen, surazu, hamsin, ventania, barguzin, coche, hava janubi, etc.). Those words already denote special notions; they are mainly borrowed from various languages and already belong to the specialised vocabulary. The third layer, formed in the 19th and the 20th Centuries, consists of constructed scientific latinised terms (like cumulus, cirrus, humilis, capillatus, stratocumulus, etc.) denoting concepts (M.A.Lazareva). A similar arrangement was found in a number of other terminologies.

It follows that in the process of development of scientific knowledge we can single out several historic types of reasoning used in various stages of evolution of man and in our opinion determining the character of cognition.

The oldest, initial type of reasoning that we called the naive type, uses common everyday words and word-combinations, which testifies that it was based on worldly wisdom and common-sense and operates with everyday general notions. Those notions, judging by the meanings of these words, had a fuzzy character: for example the Old English snow also meant snowflake, blanket of snow, snowfall, snowstorm; the word dew also meant dewfall, moisture, humidity. Another example is the word mood which had the meanings mind, intellect, reason, common-sense, heart, thought, feeling, soul, spirit, inclination, view, anger, courage, stoutness, pride, passionate grief, disposition, humour, temper, state of mind.

Besides fuzziness, another typical feature of early words was their general character. The word apple at first was used to denote also any kind of fruit, or even vegetables, which is still reflected in words like pineapple, Apfelsine, Pomeranze, pomme de terre, pomo d'oro, pomarancza (Polish). This may be explained by the fact that apple was the first fruit discovered by early man and subsequently any kind of fruit or vegetable was apprehended as an apple; discrimination came much later and required a search for new names. Such facts could also be used to reveal the order in which various objects and activities were discovered and mastered by man when there is no other evidence.

A number of other typical characteristics of early words was discovered, such as their random character, wide variation of form, predominantly simple formal structure, absence of motivation, comprehensibility to everybody, looseness (lack of systemic relations), presence of synonyms, etc.

This is a pre-scientific period, which according to M.W. Wartofsky is associated with the three main sources of knowledge – mythology, everyday experience and technology of materials processing (M.W. Wartofsky, 1968). This period may be attributed to the epoch from the appearance of the homo sapiens species till the Middle Ages. It is characterised by domination of manual labour in production and usage of primitive tools. In language we notice first of all syncretism of meaning when a word may correspond to up to a hundred contemporary words. The words used in reasoning belong to everyday language and denote general notions.

The next, the proto-scientific period is characterised by the appearance of specialised words – proto-terms, which signifies the appearance of the special notions and special (professional) activities – first of all crafts. The meanings of such special words are known only to the persons belonging to a certain profession. This is obtained either by borrowing from other languages, as it was, e.g. with English and Russian names of winds, Latin medical proto-terms borrowed from Greek (in Greek they had a general universally understandable meaning which was quite inconvenient) and Russian names of wood-cutting tools (planes), that were borrowed from German, or by the so-called internal borrowing, that is from regional dialects (as with Russian names of insects used by gardeners) or from other subject fields. Other features of lexical units of this period are random character, regional variation of forms, structural diversity, absence of systemic relations, narrowness and concreteness of meaning often achieved by specialisation of meaning in borrowing from other languages or different layers of the same language, abundance of synonyms, etc.

The corresponding trade type of reasoning uses special notions and is based on commonsense. This period may be attributed to the epoch beginning in the late Middle Ages and New Time – till the 18th Century, though in some fields of special knowledge where there are no theoretical foundations, this type of reasoning still dominates. In production culture there is a gradual transfer from individual manual labour to manufacture and the beginnings of industry.

The third, contemporary stage of cognition is characterised by scientific thinking, which is based on the use of scientific theories and systems of concepts. At this period terminologies proper are formed or constructed, concepts are defined, methodology of research is elaborated and scientific equipment is introduced. Only at this stage do we deal with terms proper which have precise meanings, and are consciously chosen or constructed (sometimes as a result of long and heated debates). They also form a system, are usually motivated, uniform, esoteric, are predominantly devoid of synonyms, and standardised. There is also a tendency towards lengthening of their form, reflecting constant specifying of the content of ideas (be they notions or concepts) by the adding of attributes to their nominations, which results in the growth of word combinations (in both their amount and length).

The general tendency in knowledge growth is specialisation when new sciences and scientific disciplines appear in geometrical progression. According to the data presented in the Encyclopaedia Britannica more than two thousand new scientific disciplines appeared in the 20th Century. Specialisation of knowledge is reflected in constant specialisation of the meaning of words by introducing new lexical units. Generally speaking, the process of civilisation (or human evolution proper, or knowledge growth) could be viewed as a constant overcoming of syncretism. Like galaxies that comprise our universe and move apart at unbelievable velocities, thus widening the space of the void, our awareness of the surrounding world is constantly growing, broadening the space of the known. With the deepening of knowledge, every semantic field is dividing into sub-fields which gradually become independent fields of knowledge. It is assumed that every 25 years the number of scientific disciplines doubles and that leads to a geometrical progression in growth of number of new concepts and terms.

There are reasons to believe that the general rule that ontogenesis repeats philogenesis could be applied to both the evolution of human reasoning and mentality, and its reflection in language. It can work two ways: on the basis of philogenesis we can (more or less roughly) predict the development of a child; at the same time we can project some of the characteristics of child development on the possible features of man at various stages of his evolution. High emotionality coupled with a simple mode of thinking, rapid transitions from one emotional state to another - all of this we can witness in the behaviour of quite grown-up people in the Middle Ages and during the Renaissance, judging by contemporary literature and chronicles.

In ontogenesis, starting with one small semantic field of extremely fuzzy notions that we exploit in early childhood, we eventually come to the awareness of the highly sophisticated system of the vast amount of scientific knowledge in our grown-up years. Of course, the question remains whether that is knowledge of the surrounding world or knowledge of our imagination of the surrounding world. In some aspects that would be the same or perhaps we can ignore the difference.

There is a number of implications of the results of this investigation.

We can try to estimate the average general age of intellectual development, or the level of mental maturity (in comparison to the present age of maturity) of human beings at various historical periods. Then we may establish more precisely their motivation, and the reason for their actions and behaviour. We can discover the true meaning and message of historical texts, for there are reasons to believe that in many cases we understand the words the ancient authors use in their modern sense, within the framework of our contemporary knowledge and mentality, and we subconsciously substitute the contemporary ideas for their real ones, which leads to overestimating their achievements and misinterpretation of their thoughts.

In research concerned with the simulation of human reasoning in artificial intelligence systems we may either concentrate on the third, really scientific period of human thinking and ways of establishing the contemporary overall system of declarative knowledge and then

transfer to procedural knowledge, or try to imitate the mental development of humankind starting with the naive mental activities of the first period.

We can work out some principles of reasoning, including a general strategy of reasoning, methodology, methods and techniques of reasoning. We may presume then that, as in computers, thinking consists of two general elements – declarative and procedural knowledge, and power of reasoning depends on the amount of what is known (which we would call profoundness of thinking) and the ability to associate (in the case of simple reflections) and to bring together parts of the future systems – in the case of more complicated reflections (which we would name elasticity of reasoning).

We can also predict some features of the next stage of human mental evolution. Some features – such as rapid growth of vocabulary and specificity of meaning of new words - we may take for granted. For example at the beginning of the 19th century according according to our calculations there were about 10,000 building terms, at the beginning of the 20th century their number grew to 30-35,000, while at the present time it may amount to 250,000. Along with this, we can observe the growth of personal vocabularies. According to our estimates, at the end of this century an average educated person would know some 150-160,000 lexemes.

Eventually we can try, on the basis of comparing some features of national mentality, to establish language peculiarities responsible for the differences in human attitudes and behaviour.

Generally speaking, a whole new direction of terminology science is emerging nowadays that may greatly improve the contemporary theory of evolution and would let us get a better understanding of human reasoning.

[1] It is quite demonstrative that according to Ahmad Khurshid [TKE, 1998?] in the latest works of Th. Kuhn the term “conceptual paradigms” is substituted by the term “lexical systems”

[2] see for example the following theses (all in Russian):

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ALEXEJEVA O.B. (1994) Cognitive aspects of diachronic research of terminology of cuilding materials. M., MSU

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FILIPPOVA JE.V. (1996) Evolution of the English oncological terminology. M., MSU.

ILCHENKO JE.V. (2000) Comparative analysis of English and Russian lexics of the semantic field “swords”. M., MPU.

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S.D. Shelov

ON GENERIC DEFINITION OF TERMS: AN ATTEMPT OF A LINGUISTIC APPROACH TO TERM DEFINITION ANALYSIS

Recent publications in terminology research remarkably demonstrate constantly growing interest in the problem of term definition analysis (Meyer et al. 1992; Sager, L'Homme 1994; Sager, Ndi-Kimbi 1995; Shelov 1996; Jose, Finatto 1995; Pozzi 2001; Shelov 2001). Definitions outline the semantics of terms and set up their logical and semantic relations. According to A. Rey, term definition is probably the very centre of terminological problems (Rey 1979, p. 39).

In some of our recent publications, we endeavoured to outline a method of term definition analysis which enables us to determine 1. what part of a Dfn denotes the nearest generic concept and 2. what parts of a Dfn denote differentiating characters (Shelov 1996) (here and below, according to the tradition in logic, we denote the expression to be defined as "Dfd" and the expression by means of which it is defined as "Dfn"). Basically, this method was oriented towards more or less refined systems of definitions developed for some computer applications since "the relatively free-text form of most definitions is not normally suitable for effective use in a database environment" [Sager, L'Homme, p. 352].

So we just took it for granted that a consistent, logically and linguistically irreproachable definition system exists for terms of a given domain. This assumption involves that any ambiguity or synonymy of the Dfn expressions is eliminated. It also implies that every common word of the Dfn expression has one and the same meaning, that every syntactic relation sticks to one and the same semantic relation only, that not a single meaning is expressed in different ways, etc). Thus, applied to this normalised definition system (or at least similar to it), a rule that enables us to parse the Dfn text into the nearest generic term and phrase/phrases denoting differentiating characters runs:

The nearest generic concept is denoted by a minimum (if counted in autonomous words) semantically accomplished and syntactically independent part of the Dfn which includes maximum (if counted in autonomous words) a term already introduced in a subject field. The rest of the Dfn denotes differentiating characteristics of this generic concept; there is only one differentiating characteristic if the rest of the Dfn is syntactically related to only one word, and there are 'n' (conjunct) differentiating characteristics if the rest of the Dfn is syntactically related to 'n' different words.

Later there turned out to be an extra argument in favour of this view, since information on the term through which a term is defined is necessary to classify definitions into different types. To demonstrate the importance of "term definability" I shall analyse a few definitions and discuss some implications of the analysis below, referred to as classification of term definitions. I shall use definitions borrowed from the following sources: 1. Rosenberg, J.M.: Dictionary of Computers, Information Processing & Telecommunications / 2nd ed. – V. 1 –

5. – N.Y., John Wiley & Sons, 1987 (in abbreviated form below – COMP); 2. Glossary of Heat Treatment /Swedish Centre of Technical Terminology. TNC 57E. – Stockholm: TNC, 1974. – 88 p. (in abbreviated form below – HEATTR).

Here are some definitions from the sources (Dfd of the definitions below is printed in italics, Dfn is printed in ordinary font):

1. Parallel computer. A computer having multiple arithmetic or logic units that are used to accomplish parallel operations or parallel processing [COMP].
2. Computer micrographics. Methods and techniques for converting data to or from micro-form with the assistance of a computer [COMP].
3. Computer architecture. The specification of the relationships between the parts of a computer system [COMP].
4. Computer-assisted management. Management performed with the aid of automatic data processing [COMP].
5. Austenitizing. Heat treatment for the purpose of altering a structure to a more or less pure austenitic state [HEATTR].
6. Blue brittleness. Condition caused by embrittlement in connection with the precipitation of foreign phases in a material of given composition and given temperature [HEATTR].
7. Critical cooling rate. The lowest cooling rate at which undesired transformation will not occur [HEATTR].
8. Equilibrium diagram. Graphic representation of the range of occurrence for a balanced system's phases expressed as a function of temperature, pressure and composition [HEATTR].
9. Soaking time. Period of time during which a material subjected to heat treatment remains at the required temperature [HEATTR].
10. Heat treatment. Application of a combination of heating, holding and quenching (or cooling, holding and heating) to a solid material below its melting point in order to affect the properties of the material in the manner desired [HEATTR].

Definitions 1 – 10 seem generic, but how can we make sure that definitions 1 – 10 are really generic?

It is worth mentioning that in the sources under consideration 1. the term parallel computer is defined through the term computer; 2. the term computer micrographics: through the terms data and micro-form; 3. the term computer architecture: through the term system; 4. the term computer-assisted management: through the term data processing; 5. the term austenitizing: through the term heat treatment; 6. the term blue brittleness: through the term embrittlement, 7. the term critical cooling rate: through the term cooling rate; 8. the term equilibrium diagram: through the term phase; 9. the term soaking time: through the term material; 10. the term brittleness: through the term material.

So according to the rule above, for definitions 1 – 10 we end up with the following results of the Dfn analysis:

1. ‘computer’ – THE NEAREST GENERIC CONCEPT, ‘having multiple arithmetic or logic units that are used to accomplish parallel operations or parallel processing’ – DIFFERENTIATING CHARACTERISTIC;
2. ‘methods and techniques for converting data to or from micro-form’ – THE NEAREST GENERIC CONCEPT, ‘with a computer assistance’ – DIFFERENTIATING CHARACTERISTIC;
3. ‘the specification of the relationships between the parts of a system’ – THE NEAREST GENERIC CONCEPT, ‘computer’ – DIFFERENTIATING CHARACTERISTIC;
4. ‘management performed with the aid of data processing’ – THE NEAREST GENERIC CONCEPT, ‘automatic’ – DIFFERENTIATING CHARACTERISTIC;
5. ‘heat treatment’ – THE NEAREST GENERIC CONCEPT, ‘for the purpose of altering a structure to a more or less pure austenitic state’ – DIFFERENTIATING CHARAC-TERISTICS;
6. ‘condition caused by embrittlement’ – THE NEAREST GENERIC CONCEPT, ‘in connection with the precipitation of foreign phases in a material of given composition and given temperature’ – DIFFERENTIATING CHARACTERISTICS;
7. ‘cooling rate’ – THE NEAREST GENERIC CONCEPT, ‘the lowest’ and ‘at which undesired transformation will not occur’ – DIFFERENTIATING CHARACTERISTICS;
8. ‘graphic representation of the range of occurrence for a system’s phases’ – THE NEAREST GENERIC CONCEPT, ‘balanced’ and ‘expressed as a function of temperature, pressure and composition’ – DIFFERENTIATING CHARACTERITICS;
9. ‘period of time during which a material remains at the required temperature’ – THE NEAREST GENERIC CONCEPT, ‘subjected to heat treatment’ – DIFFERENTIATING CHARACTERISTIC;
10. ‘application of a combination of heating, holding and quenching (or cooling, holding and heating) to a material – THE NEAREST GENERIC CONCEPT, ‘solid’ and ‘below its melting point in order to affect the properties of the material in the manner desired’ – DIFFERENTIATING CHARACTERISTICS.

This analysis proves definitions 1 – 10 to be generic.

At the same time some questions arise as soon as we come across definitions in which Dfn does not contain a single term of the subject domain. The situation may be exemplified by the following definitions 11 – 15:

11. Coalescence. Merging of particles or drops [HEATTR];
12. Cooling. Departure of heat accompanied by a reduction in temperature [HEATTR];
13. Deformation. Alteration of an object's proportion [HEATTR];
14. Heating. Application of heat accompanied by a rise in temperature [HEATTR].

In fact the notions ‘merging’, ‘departure’, ‘alteration’, and ‘application’ are not subdivided into specific notions by means of differentiating characteristics “of particles or drops”, “of

heat accompanied by a reduction in temperature", "of an object's proportion", and "of heat accompanied by a rise in temperature". Taking things as they are, definitions 11 – 14 do not classify specific notions (or objects) at all, since the corresponding Dfn contains no nomination of specific objects. Accordingly, no specific generic notion for Dfd is proposed by definitions 11 – 14, and since there is no classification of notions (or objects) one can not treat definitions 11 – 14 as generic. Within the specific notions of the domain of HEAT TREATMENT, 'coalescence' is not a kind of 'merging' in 11; 'cooling' is not a kind of 'departure' in 12; 'deformation' is not a kind of 'alteration' in 13 and 'heating' is not a kind of 'application' in 14.

Definitions 11 – 14 do not fix explicitly notional relations between terms for the simple reason that their Dfn does not contain a single term at all. Their function is very different from that of generic definitions: it is to introduce basic terms and notions and to establish a "first notional level" of terminology. They set up the notional contents of a term to be defined wholely, en bloc, by means of common words and only common words. If a term to be defined is itself a common word, the corresponding definition is usually specified in logic as a stipulative definition.

Thus definitions 11 – 14 are not generic. We should call definitions in which Dfn does not contain a single term of a subject field common definitions (independently of whether Dfd is a common word or a highly specific word).

The analysis presented above highlights the fact that in order to detect a conceptual structure of terminology one should not examine individual definitions but definitional system as a whole. Thus, in analysing definition 14, one should keep in mind that the word heat is not considered a specific term in HEATTR and has no separate definition. If the word heat had a separate definition of its own, definition 14 would immediately become a generic definition with 'application of heat' being the nearest generic concept, and 'accompanied by a rise in temperature' being differentiating characteristic!

Accordingly, definition 15 can be analysed differently depending on how the word 'transformation' (and the notion signified by it) is treated:

15. Athermal transformation. Transformation independent of the application or removal of heat (HEATTR).

If transformation here is a common word and not a special term, then definition 15 is a common definition and the Dfn text is not to be parsed into a fragment denoting the generic concept and a fragment or fragments denoting differentiating characteristics; if transformation here is a term, then we have a classic generic definition with 'transformation' being the nearest generic concept and 'independent of the application or 'removal of heat' being differentiating characteristic. Actually, the latter applies here since according to HEATTR, transformation has its own definition, thus becoming a term of the corresponding subject field.

Analyzing the conceptual structure of terminology turns out to be not a static but a dynamic procedure. The genus-species structure of terminology is detected by means of a procedure that deals not with separate definitions as they are, but with definitions closely tied together; it operates at the global level of all definitions scrutinized simultaneously, tout à coup, and not at the local level of a single definition.

Let us now analyse definitions 16 – 19, in which the Dfn includes at least one term of the subject field, whereas the nearest generic concept is denoted by the whole of the Dfn text, meaning that the Dfn text has no expression to denote differentiating characteristics.

16. Embrittlement. Increase in brittleness [HEATTR];
17. Heating time. Length of time required for heating [HEATTR];
18. Cooling rate. Quotient of temperature reduction and time in cooling [HEATTR];
19. Computer centre. An office or establishment providing computer services [COMP].

Here we have the terms brittleness, heating, cooling, and computer as part of the Dfn text, but according to the rule above, only the Dfn text in full may be considered as denoting the nearest generic concept, and there is only a "null part" of the Dfn left to denote differentiating characteristics. The reason why the Dfn lacks whatever expression to denote differentiating characteristics is quite clear: the term within the Dfn text takes too low a syntactic position to leave any part of the Dfn text to denote differentiae specificae. Again, we have to state here that some definitions looking very much like generic definition actually are not. Since we have no differentiating characteristics in 16 - 19, we cannot regard these definitions as generic. Definitions of this type conceptually equal Dfd to Dfn, but no generic concept (genus proximus) and none of its differentiating characteristics (differentiae specificae) are fixed, and therefore they cannot be specified as generic either. We call these definitions non-specified definitions.

The function of non-specified definitions is different from that of both generic and common definitions. Common definitions do not fix explicitly notional relations between terms, they just introduce basic terms and notions in order to establish a "first notional level" of terminology. Non-specified definitions, as well as generic definitions, stamp down explicit conceptual relations between a term to be defined (Dfd) and term/terms within the Dfn text, but in contrast to generic definitions, they do not specify a genus-species relation between them.

Thus rules and procedures involved in the definitional analysis also contribute to the proper classification of term definitions. A good deal of verbal definitions can be classified into the following types: 1. generic, 2. enumerative (extensional, denotative), 3. operational, 4. contextual, 5. non-specific, and 6. common definition, of which 1 is essentially refined and only 2, 3 and 4 correlate with the traditional classification of definitions in logic.

What has been said above suffices to put the property of term definability under more detailed analysis than it usually deserves. Moreover, we have already discussed the claim that this property underlies the idea of a conceptual level of terms which can be generalised to take into account totally different conceptual terminological structures (Shelov 2001). The

idea of the conceptual level of terms seems to be a good generalisation of the conceptual level of a term in monohierarchical structures of the genus-species type. Future investigations will contribute to the assessment of this concept if applied to some wider sphere of term definitions, including so--called contextual definitions.

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H. Picht

FOREWORD OF THE PROCEEDINGS OF THE COLLOQUIUM "COMPARISON OF THE THEORETICAL FOUNDATIONS OF TERMINOLOGY IN EASTERN EUROPE AND THE WESTERN COUNTRIES"

The aims of former workshops and colloquia arranged by the IITF have primarily been to clarify theoretical positions in terminology in the Western countries. Under this heading the proceedings of the following events have been published in this journal:

'Sign Models in Terminology and LSP' (Vol. 8 (1997) no. 1/2)
'New trends in Terminology teaching and Training' (Vol. 8 (1997) no. 1/2)
'New Approaches to Research into the Concept within Terminology' (Vol. 10 (1999) no. 2)
'Terminology Science at the Crossroads?' (Vol. 12 (2001), Vol. 13 (2002)

Taking a look at the lists of participants of those events, it is striking that East European researchers have been very poorly represented. In the past, this was to a great extent due to the restrictions and other problems, especially of a financial nature, which our Eastern colleagues have had to cope with.

Fortunately, things have changed, and therefore the IITF have considered it of paramount importance to re-establish, intensify, and strengthen the contacts and the interchange of results with a very important part of our research community.

Whether we as linguists like it or not, we have to admit that the language barrier between Eastern and Western European languages has considerably hampered our contacts, interchange and co-operation, especially at a more informal level, even though institutions such as Infoterm, the IITF, the IULA, and others have made a remarkable effort to publish translations of works written in languages inaccessible to most of our Western colleagues. However, the fact that knowledge about recent developments in terminology research in Eastern Europe is still insufficient or even non-existent in Western countries can be very clearly deduced from the references quoted in monographs and articles.

In order to change this lamentable state of affairs, in October 2002 the IITF, in co-operation with our Eastern colleagues especially in Moscow, took the initiative to a first colloquium within the framework of the "2nd International Conference on Terminology in Commemoration of E. Drezen's 110th Anniversary" in Riga. The subject of the colloquium was "Intensification of Co-operation in Terminology between East and Central European Countries". This conference may be considered a forerunner of the colloquium ***"Comparison of the theoretical foundations of terminology in Eastern Europe and the Western countries"*** held in Surrey in August 2003 in conjunction with the '14th European Symposium on Language for Special Purposes "Communication, Culture, Knowledge"'.

This colloquium, of which the proceedings are published in this and the following issue of the IITF Journal, is to be considered within the framework of the above-mentioned initiatives and events. It is therefore not surprising that the main aims of the colloquium were the following:

- To offer our Eastern European colleagues the opportunity to present the results of their basic research in terminology
- To contrast their research results with those from colleagues of the Western countries in order to elucidate differences as well as common basic foundations.

It is commonly agreed that any serious research work requires a solid theoretical foundation. In other words, if we want to create the basis for comprehensive and sound co-operation in terminology research, three preconditions have to be met: we must obtain knowledge about existing results, we must establish and ensure continuous knowledge transfer, and we must be prepared to share knowledge. Apart from these basic preconditions, personal contacts are indispensable. Consequently, we have to add to the above general aims the establishment of personal contacts as the real prime mover of any efficient collaboration.

Obviously the very tight timetable of the colloquium did not allow the commentators – who had only 15 minutes each – to go into detail in their oral presentations. Therefore, they have been allowed more space for their written comments in order to make them more comprehensible for those who could not attend the colloquium.

It is our hope that these proceedings will contribute to establishing a more intensive dialogue between our research communities in future.

Last, but not least, I would like to thank all colleagues for their efforts and dedication, without which such an event cannot be successfully realised.

H. Picht

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INTERACTION OF TERMINOLOGY AND PHILOSOPHY

1. INTRODUCTION

The question of philosophical concern with terminology is old enough. Now we may discuss the great role of this interconnection due to the comprehension of the influence of philosophy on terminology. My presentation is aimed at two main goals:

1. to prove that terminology and philosophy have deep historical interconnection, modifying the concept of the term and the theory of the term,
2. to discuss the content of Philosophy of Terminology.

Our discussion will be centred on the concept of philosophy of terminology and on what it depends. Philisophy of terminology may be regarded as an attempt to understand the nature of the term and its relationship with the intellect and the world. Philosophy of terminology considers the fact that terminology, like any other science, was formed by the efforts of philosophers. It was philosophy where the first terms, such as idea, form, etc. appeared. Philosophers started to examine the interconnection between language and thought by focussing on the role of language in shaping and communicating human thoughts. Although philosophy did not solve the problems of terminology directly, its importance for terminology is that it has brought together significant theories of the term, which put forward the following issues: What is a term? What is the connection between terms and objects? Does terminology describe the world, or does it construct a picture of reality? The attempts to answer these questions lay in the basement of further theories of the term.

The main question which arises in this respect is related to the role of philosophy in the development of terminology. We believe that philosophy has helped terminology to achieve the status of science. Philosophy put terminology in conceptual order and gave the possibility to view its historical development. We also believe that philosophy has contributed to clarification of the three fundamental questions put up by Herbert Picht (2003:109-110):

1. Is terminology an autonomous discipline or just a craft?
2. Is there a coherent theory of terminology at all?
3. What is a term?

In this way, the philosophical aspect of terminology is a study of the term from the scientific point of view. It means that philosophy of terminology formulates and solves fundamental theoretical issues, and works out ontological problems in this field. However, we also meet a different point of view about the idea of an interconnection of philosophy and language, e.g. J.L.Austin (Austin 1961) rejected the attempts of philosophers to theorize about language and called for “linguistic philosophy”. He advocated a common-sense and anti-

philosophical realism, and argued that linguistic analysis could free linguistics from philosophical "pseudo-problems".

2. A BRIEF HISTORICAL BACKGROUND

From its birth and until the present terminology has been conditioned in large part by philosophy and logic, whose claim was that universal and general definitions of truth were applicable to all languages (including special ones). A brief historical background would be to the point. Ancient philosophers established a tradition of metaphysical speculation. They concerned themselves with the categories of things existing. This tradition continued through the Middle Ages. With the works of René Descartes the focus of philosophical concern changed from the issue of what things are to how we know, in other words, to epistemological questions. In the 17th century, knowledge of terms was characterised by the reaction against the rationalist approach to terms. This was noticable in Port-Royal logic (the dual theory of the sign) which regarded the nature of the sign, including the term, from the point of view of the integrity of two ideas: the idea of things which stimulated the second – the idea of presentation of things.

At the beginning of the XXth century preoccupation with language began to dominate philosophy and caused its linguistic turn. This change involved a great interest of philosophers in linguistic matters. This was a period when the theory of terminology was enriched by a genious conception of Eugen Wüster (1935) of the interconnection among language, terminology and thought. Philosophers of the beginning of the XXth century (analytic philosophers such as G.E.Moore, G.Frege, L.Wittgenstein, B. Russell) tried to replace Neo-Kantianism and idealism by philosophical realism. They were primarily concerned with the nature of truth, with reality, and with the connection between thought and the world.

L.Wittgenstein discussed the therapeutic role of philosophy, i.e. the role of philosophy in the overcoming of confusions and incorrect understanding of language. As for language, it was regarded as the medium for thinking about and describing reality. Analytic philosophers relied on formal logic as a methodological tool and were concerned mainly with formal linguistic elements. They assumed that language had a perfect structure which, if analysed correctly, could reveal the structure of reality. These logical innovations led to the idea that logically perfect and ideal languages (clear, precise, free of ambiguities of natural language, able to express scientific truth), could be constructed. Important figures of the Vienna Circle (O.Neurath, H.Hahn, R.Carnap) assumed that all sciences could be unified under a single discipline, physics, and that there were no distinctions between natural and human sciences. Here is a list of works on private philosophy which had a great impact on the development of philosophy of terminology and set up the foundations of further discoveries of the term:

1892 G.Frege On Sense and Reference, Concept and Object
1905 B.Russel On Denoting
1914 B.Russel Our Knowledge of the External World

1915 Ferdinand de Saussure Course in General Linguistics
1918 B.Russel The Philosophy of Logical Atomism
1921 L.Wittgenstein Tractatus Logico-Philosophicus
1925 O.Jespersen The Philosophy of Grammar
1928 R.Carnap The Logical Structure of the World
1928 D.Hilbert Principles of Mathematical Logic
1928 H.Reichenbach The Philosophy of Time and Space
1929 R.Carnap, H.Hahn, O.Neurath The Scientific World: the Vienna Ciecle

in Russia

1862 A.Potebnya Thought and Language
1911 N.Berdyaev Philosophy of Freedom
1913 P.Florenski Thought and Language
1914 G.Shpett Phenomenon and Sense: Phenomenology as the Main Science and its Problems
1915 P.Florenski Dialectics
1916 P.Florenski Science as a Symbolic Description
1922 P.Florenski Term
1923 G.Shpett Esthetic Fragments
1927 A.Losev Philosophy of Name
1928 E.Drezen For the Unified Language

In the context of such philosophical ideas, terminology was formed as a separate branch of knowledge. Most of those philosophical theories have been adopted by terminology. Therefore, it was quite natural that at the period of its generation, terminology came under the influence of logic and remained an applied and practical science. This may be seen from the following: terminologists mainly described the object of their research. This method convinced them that the main property of terms is their reference to real things. As the result of explorations in this field, numerous terminological systems of various branches of science were described. However, as has been stressed by many scholars, terminology of the beginning of the XXth century followed the formal course and was deprived of a real philosophical and methodological foundation.

For a long time the question of interaction between terminology and philosophy was not seen as essential even though it had roots in classical works on philosophy and terminology. Recall René Decartes, who believed in the existence of a universal language, and T. Hobbes and J. Locke, who were interested in the relationship between language and ideas. B. Russell, who never saw himself as a philosopher of language, proved that the apparent grammatical form of a sentence could mislead us about the hidden logical form of proposition expressed by the sentence. In order to demonstrate this, he distinguished between names and descriptions, and between definite and indefinite descriptions. These arguments were closely connected with the concept of term and its definition (the term is the name of a definition).

3. P. FLORENSKI AS THE FOUNDER OF PHILOSOPHY OF TERMINOLOGY IN RUSSIA

In Russian terminology the following names, best known for their contribution to terminology, should be marked. The first important step has been made by P. Florenski (1998), who concerned himself with the questions *how do science and terminology correlate? how to define a special word ?* Discussing the first question, he suggested that the sense of science was in constructing terminology. As for the term definition, he was of the opinion that to define a term was to reveal its truth. He was also the first philosopher to notice the influence of terminology upon philosophy itself. In order to show this, he used the phrase *"the stop of a thought"* in the meaning of "the product of thought", or the term. He suggested that the term, fixing a certain item of scientific knowledge, rythmically cut the dialectical and progressive movement of philosophy, and thus provided this flow with stability. D.S. Lotte (1961) advanced the idea that terminology developed in two ways: by means of evolution and by means of revolution. G.O. Vinokour (1939) distinguished between a common word and a term – a common word is the name of an object, while a term is the name of a concept. He also provided terminology with a theory of the term as a function of the word.

4. TERMINOLOGY AND LOGIC

As we have stated above, at the initial stage of its development, terminology as a branch of science was under a strong influence from logic, which provided it with a possibility to establish strict and determined relations between objects of reality and terms. The term at first seemed most naturally definable by appeal to the realm of abstraction, rather than to living phenomena. The main idea of terminological research of that period was to put terminology in order. It should be noted that the influence of logic was common to most sciences, e.g. Gottlob Frege (1984) was concerned with the question of the logical, secure and evident foundations of mathematics. He advocated the thesis known as logicism. One of Frege's philosophical aspirations was to construct a perfect language by means of logical notation, which would make it possible to express one's thoughts in an accurate and exact manner. B. Russel (1972) was also known for his attempt, together with A. Whitehead, to establish secure logical foundations for mathematics.

On such a theoretical basis the research of definite terminological systems got an additional impulse. Applied terminology based on logical methods has succeeded in the description of sublanguages of various branches of science. We should stress that the use of logic as the basis for terminological study caused not only unification of domain terminologies, but also unification in methods and ways of terminological research. In a philosophical sense, standardization and unification of terminology dealt with simplified objects (taxons) and this, by all means, was the reason for terminological uniformity. Traditional terminologists regarded unification and standardizaiton to be quite real and natural. However, the method of empirical description caused some difficulties, for they could not describe terms which revealed such qualities as alogism, openness, and discrepancy. Although the meaning of terms seemed to be clear and understandable, still all attempts to characterize the meaning of

terms as they were used in texts failed. It became clear that even the most strict and determined terminological systems could not fix terms in a single meaning.

Seen from the descriptive point of view, there was an obvious difficulty in telling why lines of demarcation among terminological systems appeared to be diffused and movable. Consider: the terms *abstract, action, addition, aggregate, aid, analogy, area, balance,* etc. were used in various branches of science – biology, chemistry, physics and others. Sometimes it was quite difficult to state what branch of science they belonged to. Consider: *classification, behaviour, element, feature, form, material, measure, period, standard,* etc. What is more, logic dealt with questions of truth and falsity, which were believed to be objective, independent of individual human mental processes and therefore common to all rational beings. Thus, an attempt to study terms on as logical basis has not attained its aim, since the term has revealed features not of a strict language unit, but of rather a puzzling thing. As a result, we are beginning to think that the subject of terminology gives the researchers dealing with unification a slip.

5. MODERN TERMINOLOGY AND PHILOSOPHY

Perhaps it is not fair to discuss only the sources of philosophy. From the very beginning terminology has been involved in a very complicated philosophical problem: the discrepancy between the desire to obtain definite and truthful data and the impossibility to attain this aim. The main problem to be solved by terminology is to consider the adequacy of a descriptive method, since on the one hand, it really provides terminology with numerous descriptions of terms systems, but on the other it does not solve the problems of standardization and unification of terms. In such a situation, terminology has to start a dialogue with other sciences and to begin constructing theories.

In our view, modern terminology has taken a philosophical turn since its aims have been replaced by the questions of the relationship among mind, language and knowledge. This means that in a philosophical interpretation, the term as the object of terminology has the potential of being regarded as an idea or an element of a theory. It is the theory of the term which has replaced an empirical study of isolated terminological systems. Empirical descriptions were characterized by their endless search and unobservable varieties. In contrast to these, philosophy has created the world of theories which assists in systematizing numerous descriptions and makes it possible for terminologists to scrutinize them with renewed care and by means of new ideas. This scrutiny has resulted in a new interpretration of the object of terminology. In other words, the object of terminology has been changed in such a way that it has become orientated to man, who is considered to be the creater of terms. The theory of the term has also changed – terminology comes close to a philosophical view of its role in the process of world cognition. Terminology starts to concern itself with such questions as *in what way is man connected with the world*, *how does he feel the reality of science?* Formal and logical aspects of terminology are gradually substituted by theoretical and cognitive ones.

6. THE RELATION BETWEEN TERMINOLOGY AND SCIENCE

Now it is necessary to define what we mean when we suggest that the object of terminology has been changed. We still have to explain what is the modern object of terminology. When we discuss its modern role, we mean the way it fixes knowledge, in other words, the relation between terminology and science. The term may be regarded as an element of the information system which is created by science. Terms are also integrated into a certain system by means of internal regularities. Science is an external factor as far as terminology is concerned. Science and the system of terms are interconnected. This means that there are periods when the tempo of their development is the same, in which case terminology keeps pace with science. Following this, we may say that the object of terminology has come closer to that of scientific philosophy, since terminology duplicates the sciences whose languages it studies. To paraphrase a well-known saying of M. Foucault (1966), it is possible to say that terminology has become a twin science, occupying a metaepistemological position.

However, there are periods when the internal development of terminology may not satisfy the demands of science, and in such cases terminology does not interpret science. In those cases we may say that terminology does not duplicate science, or that it loses its metaepistemological position.

To the theory of terminology, a conspicuous question is the nature of the term. Although the term has been used by terminologists for a long time, there is no certainty that we know its nature. The attempt to study the term by means of rational methods did not attain its aim. It may be explained partially by the specificity of the human intellect. It has been noted (Gousev 2002) that objectively its organization is more strict and systematized than reality itself. The world around us does not contain such perfect geometrical figures as a dot or a straight line, there is no“ideal body” and “ideal gas”, in other words, it does not contain all those things which comprise the conventional basis for scientific research. As psychologists have noted, people have a genetical ability to find order in phenomena which possess none at all. In this way, the theory of the term reaches a point where it begins to realize that the term does not reflect the correlation of a thing and a word, but rather that of man and reality.

Philosophy of terminology makes it possible to ascertain that the main feature of the term is discrepancy and complexity. P. Florenski, a well-known Russian philosopher, has studied the vast role of philosophy in linguistics. He argued that any research in the sphere of language, including terminology, has as its aim to make this discrepancy more vivid and more objective. Philosophy and terminology are at the basis of the organism of language (Florenski 1998). In this sense, the role of philosophy does not reside in the fact that it creates a common total theory of truth, on the contrary, it breaks this tenet and suggests that terminology may develop without common consent, as a system of individual theories. Philosophy of terminology distinguishes between the two contrasting approaches to terms: one way of studying terms is to observe their external structurization (description of various terminological systems), the other is to regard their internal structurization (terminologization and conceptualization).

Concern with the concept of the term as a language category is the defining feature of philosophy of terminology. It argues that the first thing to realize about the term is that it is not only a unit of language. More than that, philosophy helps terminology to realize that objects of scientific research do not exist in the real world but are constructed specially for the study in question. In this sense, terms are not only objects of description, but also models, specially created for the purpose of the analysis. Thus, when we approach terminology by means of traditional views, it is regarded as having strong links with logic. In contrast to the former, a philosophical view of terminology considers it to be an open and integrative science because it may be presented as a complex of theories.

7. METATERMINOLOGY

There remains a final issue to be discussed. The consequence of a age-old influence of logic upon terminology has resulted in the following. The subject of terminology – the term – was viewed separately from intellectual activity. Logic did not answer the question of how terms were born, since it was mainly occupied with the problems of systematization of terms and description of already existing knowledge. In addition, the term in its logical aspect was studied as an independent special unit, separate from language. A great discovery was made in terminology when the linguistic nature of terms was revealed and studied (Nalimov 1974, Gousev 1984, Nikitina 1987, Lejchik 1989, Grinev 1993, and others). Similar ideas have been put forward by H.P. Grice (1991), who distinguishes between a natural and a non-natural meaning: a natural meaning is discovered and not made, a non-natural meaning is constructed artificially. They are broader in scope in so far as they encompass all systems of signs, including linguistic ones, endowed with meaning by human convention.

A. Tarski (1956) also distinguished between an object language and a metalanguage. He suggests that we use metalanguage in order to interpret and analyse the properties of object language. Linguists with such views have proved that natural language, which exists as the initial phenomenon and therefore as a prime language model, creates other language models, secondary and derived, including terms. In this sense, it may be assumed that terms fulfil the function of commenting scientific knowledge and operating previously created terms, but in new special meanings. Term definitions are formulated in metalanguage. From the concept of metalanguage we might derive a similar concept of *metaterminology*, having in mind that new terms are created as a result of interpretation of previous scientific theories. If we assume that the term is the name of a thought, we must also take into consideration that scientific ideas, once fixed by terms, are based on them. Consider the evolution of the concept *light*: ancient scientists (Pythagoras, Plato, Epicurus) thought of it as *rays* emitting from eyes, Newton shared the same view. In 1690, Huygens introduced the *ether* light theory, in 1900 Planck introduced the term *quantum* for the concept of light. It is necessary to point out that the term *metaterminology* has not yet been adopted in terminology, though it may quite naturally be included into the paradigm of such notions, e.g. *metascience*, *metasemantics*, etc.

8. CONCLUSION

We would like to emphasize the idea that interaction of terminology and philosophy also has an impact on philosophical dialectics. On the one hand, philosophy educates terminologists as followers of preceding knowledge, schools and trends. It imposes a certain order onto theoretical activity. On the other hand, philosophy mobilizes researchers of the term to create new, non-standard conceptions of the term, i.e. to disregard logical laws for the sake of scientific truth. Thus, the most important contribution of philosophy of terminology to the theory of the term is the following:

1. Philosophy of terminology shows that the term is to be studied not only as an object of description, but also as a model of a certain knowledge presented by a researcher.

2. Philosophy of terminology reconciles terminologists with different viewpoints on the common ground of complexity and discrepancy of terms. Philosophy shows the possibility to study internal regularities of terms.

3. Philosophy of terminology clarifies theories of terms.

4. Philosophy of terminology makes terminologists realize new internal relations of the term, including issues of world cognition and its fixation by means of language.

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Gerhard Budin

PROSPECTS OF A PHILOSOPHY OF TERMINOLOGY

1 INTRODUCTION

The following considerations are based on and motivated by L.M. Alexeeva's article 'Interaction between Terminology and Philosophy'. With this article, I would like to continue our international discussion on the philosophical and epistemological foundations of terminology theory. As a response to Alexeeva's account of the Russian philosophical tradition as relevant for the theory of terminology, I will focus in this article on the legacy of Austrian philosophy and its impact on the historical development of the theory of terminology.

2 OBSERVATIONS ON RUSSIAN PHILOSOPHY AND ITS IMPACT ON THE THEORY OF TERMINOLOGY

Alexeeva describes the purpose of a philosophy of terminology as a study of the relationship between language, cognition, and reality. On a second level of argumentation it is pointed out that philosophy may have been the first discipline to create scientific terms and that philosophers started out to deal with the relationship between language and thought. Terminology has essentially developed as a philosophical discipline with a strong orientation toward formal logic.

Alexeeva refers to the two main axes of terminological activities: the referential function of terms describing objects and the formal aspect of term systems with their regularities.

The discussion of the constructivist nature of concept and term formation is another important issue in Alexeeva's article. Terms are not only names for specific knowledge, but also idealized models of knowledge, putting some order into what we perceive as reality. The discussion of meta-language and of a meta-terminology is also crucial. Russian terminology researchers have repeatedly pointed out that the theory of terminology is a meta-terminology (Hajutin 1971). This meta-theoretical level of terminology has been discussed by Oeser in 1990. Therefore the suggestion to introduce the concept of meta-terminology into terminology theory is not new, but Alexeeva is right with this suggestion in confirming Hajutin's original idea. The consistent distinction between meta-language and object language is not only a fundamental principle shared by linguistics, philosophy, terminology, psychology, information science, computer science, and many other relevant disciplines, but it is also a pre-requisite for designing practical and robust data models for computational information systems, term bases, knowledge repositories, etc.

As Alexeeva points out, Florenski also focused on the relationship between science and terminology and on the dynamics of scientific knowledge and of scientific terms. Alexeeva

did shed some light on the philosophical foundations of terminology studies and its development in Russia in particular in the second half of the 19th century and at the beginning of the 20th century. Florenski did have impact on later researchers whom we still know in terminology science.

Alexeeva also deplores the over-estimation of logic and of its role in terminology and asks for more focus on the epistemological questions of terminology.

3 PHILOSOPHY AND EPISTEMOLOGY AND THEIR INTERACTION WITH THE THEORY OF TERMINOLOGY

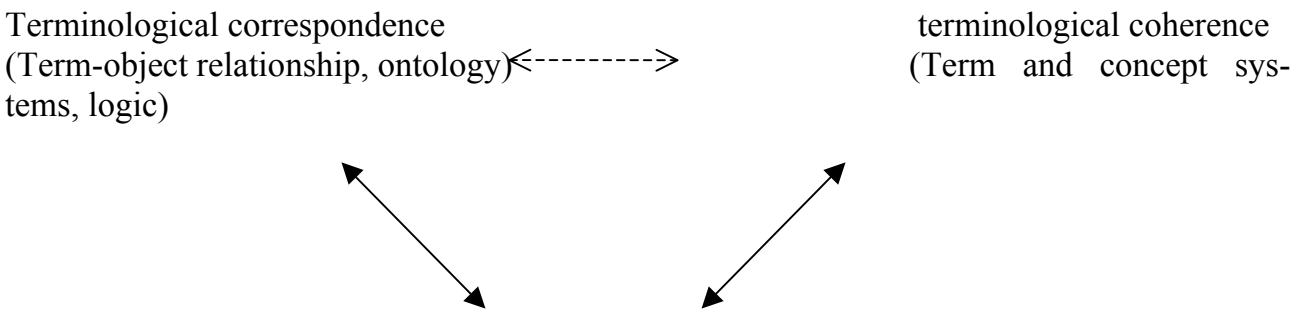
Philosophy has always been characterized by its diversity of opinions, approaches, paradigms, schools, traditions, and epistemological assumptions and orientations that not only succeed each other, but that also compete with each other or that at least co-exist at a certain point in time. Therefore, it should not come as a surprise to us that the above mentioned issues were addressed in most diverse and even contradictory ways, not only from a historical perspective, but also when comparing competing approaches from a synchronous point of view. It may have been a comfortable, yet deceptive illusion that terminology theory could give straightforward or even 'final' answers to fundamental epistemological questions that have been discussed for centuries. As any other scientific discipline, terminology is caught in the quagmires of philosophical debate and in the apories of epistemology. After all, it is terminology theory that has asked for some of the most basic questions of humankind, questions that not only philosophers have been trying to answer for thousands of years, but that have also become the starting points for various scientific disciplines and their specific research agendas:

- What is knowledge and how do we represent it in communication?
- What is the role of language in epistemic progress and in the development of scientific knowledge?
- What is the structure of scientific theories, of scientific knowledge and of scientific language?

Terminology studies have developed a whole range of models, assumptions, hypotheses, theories, and empirical evidence from case studies in the endeavor to answer the abovementioned questions. In doing this, terminology studies have developed as a branch of applied philosophy of science (Budin/Oeser 1995, 1999, Budin 1996a, 1996b, 1996c, 2000, etc.). At the same time we have to state very clearly that we are still at the beginning in charting out the complex and manifold epistemological and philosophical foundations, implications, and ramifications of terminology.

The distinction mentioned by Alexeeva between the referential function and the systematic function of term systems corresponds to the fundamental difference in epistemological orientation between 'coherentist' and 'correspondist' truth models: a coherentist theory of truth is concerned with the logical correctness of any formal system that is designed to describe a

certain fact. Whether this formal system really corresponds to reality is not so important, and the ontological question is left unanswered on purpose. A correspondist theory of truth, however, is more interested in this ontological question rather than in logical correctness of a theory. Truth is achieved when we can certify that a certain term corresponds to a certain object when the meaning of the term, the concept, adequately describes the nature of the object. Of course both models are riddled by severe problems and different kinds of limitations. It is interesting to note that the function of terminological knowledge organization is not only compatible with both, the correspondist and the coherentist approaches, but is also able to reconcile the two positions in an integrative model of terminological epistemology. The following figure illustrates this integrative view, where a semiotic orientation is the pragmatic foundation of reconciling ontological models of a correspondist nature and logical models of a coherentist orientation.



Scientific nomenclatures are examples of this claim: they should be both: logically correct AND corresponding to reality, i.e. true in both senses. As the history of science has been showing time and again, such nomenclatures may be erroneous at a certain point in time and so all nomenclatures have been changed time and again whenever new scientific evidence contradicted an old version and falsified the old nomenclature. Case studies have convincingly shown that scientists (until the 19th century in the sense of natural philosophers) have continuously been revising their terms and the underlying meanings (in the form of definitions of these terms), or inventing new terms and discarding obsolete terms, whenever new scientific facts have become accepted as new theorems, theories, or whole research approaches (Thagard 1992, Baum 1992, Pörksen 1994, Budin 1996c, et al.). The dynamic interaction between nomenclatures and other types of terminological knowledge organization systems on the one hand and scientific theories and their structures on the other hand work in both directions in terms of epistemic progress: new concepts lead to new theories, new theories require new concepts. In this dynamic process, the meanings of terms are continuously changing (Budin 1988). Hempel formulated this explicitly: Theory formation and concept formation go hand in hand, neither can be carried out successfully in isolation from the other (Hempel 1965).

Alain Rey reconstructs the history of the term ‘nomenclature’ as it emerged in 17th and the 18th centuries in France and in Britain, when well before Linneaus researchers such as Tournefort and Locke pointed out how crucial it is to know the scientific names of plants in order to understand their structure and characteristics (Rey 1995: 11ff). He refers to Diderot’s and D’Alembert’s Encyclopédie (1763) as a major step forward in collecting terminologies of different professions of the time. But it was not until 1837 when William Whewell defined the term 'terminology' in the context of his History of the Inductive Sciences as the 'system of terms employed in the description of objects of natural history' (Whewell 1837). Indeed, the history of science has been a history of scientific classification systems (Oeser 1974) and terminologies (Budin 1996), as Thagard (1992) has shown in his case studies on conceptual revolutions in the history of science (Darwin, Wegener, Lavoisier, etc.).

Alexeeva mentions several philosophers whose approaches proved to be quite fruitful for and applicable to terminology, in particular representatives of Analytical Philosophy, Logic (as a branch of Philosophy), Neo-Positivist approaches such as the Vienna Circle and its major representatives, and other closely related epistemological positions. I would like to point out again (Budin 1996b), that quite diverse philosophical and epistemological approaches (in general philosophy as well as in philosophy of science) did prove to be useful in contributing to the philosophical foundations of terminology theory. Non-analytical approaches such as idealistic philosophy contributed significantly to a better understanding of crucial processes such as concept formation and abstraction (for German philosophy of the 18th and 19th centuries, for instance, see Heyde 1965, Oeser 1968).

We may dare to conclude in a hypothetical way that all philosophy and epistemology contributes, more often than not inadvertently, but often unavoidably, to terminology theory in providing ideas and partial and temporary answers to fundamental questions of terminology. In fact, when we look at the very origins of (Western) philosophy as we know it today, i.e. to classical Greek philosophy, we discover very quickly that Aristotle in particular (but also the Pro-Socratic philosophers, Plato, and many others) did raise many of today’s philosophical and epistemological issues that we have been concerned with in terminology studies today. Aristotle’s logic has essentially survived into contemporary logic (as reframed by Frege) that has become a crucial element in terminology theory as Wüster developed it from the late 1920s onwards. Porphyry's tree of conceptual hierarchies, for instance, has been used in Medieval philosophy and is still valid as input to the philosophical foundations of knowledge engineering and ontology building, as John Sowa has shown so convincingly (Sowa 2000). Terminology theory has thus become a major foundation of recent ontology engineering and provides a solid basis for designing knowledge organization systems for the Semantic Web (Budin 2001).

Semiotic aspects and the problems of meaning and reference have been crucial elements of epistemology and philosophy. In the late 19th century, Frege’s work on modern logic was also a major contribution to today’s theory of reference and theory of meaning (Frege 1879, 1892) as it has been further developed since then by Russell, Quine, Davidson, Putnam, Kripke, and many others (see a compilation of key texts in Moore 1993).

Seminal contributions to the eternal epistemological questions of language, knowledge, and thinking also came from Locke with his Essay on Human Understanding (Locke 1690) and Leibniz with his criticism of and response to Locke in several publications, in particular Leibniz (1704). Kant's philosophy is also crucial for the development of epistemology and of terminology as a rigorous discipline. It also contains a constructivist model of concept formation according to logical categories. Evolutionary Epistemology (with its Popperian version as well as with a more biologically oriented tradition founded by Campbell and Lorenz) has continued and further elaborated such constructivist models. Neo-Kantian philosophical approaches (Hartmann, Cassirer, Diemer, et al.) have further developed this epistemological orientation of a systematic concept theory. In this context the discussion of the cognitive dimension in the philosophy of terminology is relevant. Contrary to some recent criticisms of terminology theory that claimed that the cognitive aspect was lacking, it has to be pointed out very clearly that the cognitive aspect has always been included, reflecting the relevant contemporary state-of-the-art of psychology. At the time when Wüster started to design a coherent terminology theory, the thought psychology of Bühler, Selz, Vygotsky, and others was the most advanced theory of the time.

Several decades before, significant contributions to 19th century phenomenology by Peirce (between 1875 and 1904, see Peirce 1940) and by Husserl (between 1891 and 1913, see Husserl 1913) provided us with additional ingredients that found their way into object theory, definition theory, and other components of terminology theory. Peirce's categorization of three levels of human experience as Firstness (qualities that exist as potentialities, properties of objects, monads), Secondness (facts, constraints, relations), and Thirdness (laws, continuity, order, legislation, etc.) provide a very robust grid for phenomenological descriptions in science and technology. This categorization has also been applied in computational terminology modeling: monadic potentialities are data categories (firstness), implemented by linking them to each other in concrete databases (secondness), abstracted and generalized into meta-models (thirdness) (see also Budin/Melby 2001). Peirce's theory of signs (1893-1903, see Peirce 1940) can only be understood in the utterly complex context of his phenomenology (that he actually called phaneroscopy), his philosophy of science, and his psychological epistemology.

The search for the perfect language has been one of the permanent driving forces for language reform and for designing terminological systems. A normative philosophy of language strives for a perfect communicative situation that can be produced by a perfect linguistic system. Numerous attempts at designing such languages (for a historical account see Eco 19xy) have failed (and had to fail), but the very idea is guiding star and a principle of hope for all 'linguistic interventionists' who are convinced that a prescriptive approach to language is necessary. Every terminologist knows from daily work that the ideal of a perfect language fully adhering to all our well known terminological principles such as precision, conciseness, linguistic and logical correctness, mononymy and monosemy, etc. can never be achieved. The inherent imprecision of natural language as opposed to formal language and the inherent polysemy of words is a fact that terminological models have to take into account. Florenski's focus on discrepancy and complexity and on the polysemic nature of terms is crucial for the philosophy of terminology. The dynamic nature of terms and their constant change in meanings require constant human intervention in the form of 'termino-

logical control' (Felber 1988, Oeser/Budin 1995), which in turn requires the documentation of terminological change in databases, so that these discrepancies and the complexities can be fully studied.

4 AUSTRIAN PHILOSOPHY AND ITS IMPACT ON THE DEVELOPMENT OF THE THEORY OF TERMINOLOGY

Barry Smith's account of Austrian Philosophy, characterized as the 'Legacy of Franz Brentano' (Smith 1994), sheds light on the development of the intellectual context where philosophical ontology developed as a cross-disciplinary field, combining phenomenology, cognitive psychology, logic, linguistics, epistemology, and other related fields. This approach to philosophy was characterized by empiricist and realist orientations from an epistemological perspective and had wide-ranging repercussions on Anglo-Saxon philosophy (Ayer, Russell, Carnap, Wittgenstein), Polish philosophy and German philosophy (Husserl) and psychology in general. It was precisely this intellectual foundation that served, together with Bühler's thought psychology and language theory, Jespersen's and other's works on linguistics, as a point of departure for Eugen Wüster when he founded terminology as a scientific discipline with his seminal work in 1931 on international language standardization (Wüster 1931).

To put it into a nutshell, Austrian Philosophy as a distinct philophical tradition started with Bernhard Bolzano's seminal work on a Theory of Science (Bolzano 1837) and was continued by several schools and traditions (e.g. Ernst Mach and Ludwig Boltzmann), but in particular influenced by Franz Brentano with his early works since 1862, in particular 1874 on Psychology and a Theory of Categories (post-humously published in 1933). Brentano's psychological phenomenology and ontology served as points of departure for Alexius Meinong on a Theory of Objects (in particular Meinong 1899, 1904, 1907), for Anton Marty's philosophy of language, and for German philosophers such as Husserl as well as Polish philosophers such as Twardowski.

The epistemological foundations of this type of Realist Ontology serve as a robust point of departure for formal-computational ontology engineering. The fact that terminology theory is based on exactly the same historical predecessors and is also pointed out by Felber in his reconstruction of the theoretical and philosophical foundations of General Theory of Terminology, Knowledge Theory and Knowledge Engineering (Felber 2001).

5 CONCLUSIONS

In concluding I would like to express my hope to intensify our cross-cultural polylog on the philosophy of terminology by comparing different traditions in different countries, cultural spheres, and language communities. The global nature of science will facilitate the emergence of a trans-cultural and global philosophy of terminology that is able to integrate diverse theoretical elements, epistemological positions, and cultural traditions.

A philosophy of terminology is not only possible, but it is an absolute necessity in order to further develop terminology theory on a more robust foundation. This work is also necessary from a methodological point of view in order to extend the methods of terminological knowledge engineering, knowledge organization, data modeling, etc.

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TERMINOLOGY AND PHILOSOPHY: FROM LOGIC TO THE PHILOSOPHY OF SCIENCE

L.M. Alexeeva's paper focuses on the relationship that has existed, and continues to exist, between Philosophy and Terminology throughout their development.

Her text presents a series of ideas that provide the foundation to the main topic of the paper: the relationship between terminology and philosophy has changed from concentrating on logic –the main focus since the birth of terminology until a few years ago– to place itself in the field of the philosophy of science. This transition has brought new themes and issues to terminology, together with a different understanding of terms themselves.

The main ideas developed in her paper can be summarised as follows:

Philosophy has played an important role in terminology; it has conditioned the concept itself of the term and the concpetion of the theory of terminology. Because of this, one can say that the Philosophy of Terminology is one of the fundamental aspects of terminology, as its purpose is to understand the nature of terms and their relationship with reality and the mind.

The Philosophy of Terminology is founded on the idea that philosophy lies at the origin and development of all disciplines, and that philosophers were the first to raise the issue of the relationship between thought and language –the tool for representing and communicating thought.

Philosophy was also the first discipline to reflect on what a term is, what the relationship between terms and objects is, and whether terminology describes reality or constructs a representation of reality. According to Alexeeva, Philosophy has helped terminology to achieve the status of a science. Philosophy has contributed in clarifying what a term is and whether terminology is an autonomous discipline or just a practice.

In its beginning, the development of terminology was conditioned by logic. During the early 19th century, philosophy increased its interest in language. The Vienna Circle –which principles were used by Wüster to develop the theory of terminology–, assumed that language had a logical structure that reflected the structure of reality and scientific thought could only be expressed through this language, based on logic. It also assumed that all sciences could be treated in the same manner as physics, which was considered to be the science par excellence.

During this period under the influence of logic, terminology sought to describe terms as representations of reality; the term systems of different branches of science were developed,

and the representation system was unified. Within this framework, terminology is understood to be a branch of the scientific disciplines.

Nevertheless, this system of logical representation –although it allowed the unification of different disciplines– could not describe all terms, especially those that can be represented in different systems. In fact, in Terminology there is a discrepancy between "the desire to obtain a definite and truthful data" and "the impossibility to reach this aim". Thus, the problem of terminology is, on one hand, trying to develop a suitable description method, while, on the other, solving problems of term standardisation and unification.

Within Russian philosophy, several thinkers came forth with new reflections on terminology. Among them, P. Florenski, who deals with the correlation between scientific disciplines and terminology, and the specificity of the terminological object. Regarding the correlation between the sciences and terminology, he poses how the sense of any discipline lies in the creation of its terminology, for terms are thought stops that reveal the conception and development of a particular discipline. Terms are units that "fix" a specific knowledge. In addition to Florenski, Alexeeva also mentions Lotte, who stresses that terminology develops by evolotion or by revolution, and Vinokur, who introduces the distinction between the common word –corresponding to the name of an object– and the term –which is the name of a concept. He also believes that terms are "functions" of words.

Currently, in modern terminology, these problems have been replaced by different ones. The most important one concerns the dynamics of terms: the relationships established between language, mind and knowledge (how human beings perceive, categorise and express reality), and the relationship between terminology and scientific disciplines (how disciplines create terms). Terms are understood to be units of information created by a discipline, and are integrated within its system forming a structure and partaking of its internal regularities. Thus, terms are interconnected with the different disciplines and evolve with them.

With this approach, Terminology is separated from logic, to which it has been linked since its creation as a discipline, and it teams up with the philosophy of science.

In this new approach of the philosophy of science, terms are not mere language units nor representaions of preexisting real objects; instead, they are "constructs" of thought within a certain discipline. Thus, they are not only descriptive units, they are also models created especially to be analysed. In contrast to the previous approach, based on logic, current philosophy considers terminology as an integrative discipline composed of different theories.

In the logical approach, terms were understood to be static units whose only point of interest was their systematisation within a structured system, and they were only studied as independent units set apart from language; the new philosophy asserts the linguistic nature of terms and observes their dynamics, where they are created by means of language in a defining metalinguistic activity which gives them a new meaning within the system. Thus, terms become "names of thought". These new terms are interpretations of prior scientific theories and, once they become fixed, theories are based on them. The activity of using terminology

as the reflection of a discipline in order to explain the evolution of this scientific discipline is called metaterminology.

In fact, Alexeeva's paper, writen from the perspective of Philosophy, sets out from the interdisciplinary nature of terms –units which she believes are the central object of Terminology as a discipline. And based on this principle of interdisciplinarity, she develops the philosophical aspects of terminology.

Nevertheless, the approach to terminology from the perspective of Philosophy makes her establish the importance philosophy has had upon terminology since its beginnings and throughout its development. Not only because the philosophical framework in which Wüster placed himself gave origin to his conception of terms, but mostly because the evolution of philosophical thought has conditioned the conception itself of terminology as a discipline. This conditioning can be summarised briefly in a few ideas:

First, within the framework of philosophical idealism and neopositivism, terminology evolved following logic; thus, the term is conceived as a unit that represents reality and the focus of attention of terminological activity is developing the concept systems and the terms of the diferent disciplines following a uniformising guideline, both in the representation and the fixing of designations.

The second idea is that today, terminology lies within the framework of the Philosophy of Science, where terms are neither mere representations of reality nor simple units of language but elements participating in the construction and evolution of the discipline to which they belong. The centre of the analysis of terminology goes beyond an interest in terms as static units forming part of the concept system of a discipline; it becomes a dynamic conception which is understood as a process in which terms emerge, aquire their meaning and evolve from the development of the discipline itself, contributing significantly towards the discipline's development. Following this idea, the terms coined in a subject represent its state of knowledge, and the production of new terms assumes an evolution of thought in that discipline.

In this conception, terms are not representations of reality; rather, they are representations of thought about reality, for scientific disciplines are all abstract "constructs" of reality, sets of "constructed" concepts originating in a previous terminological stage.

The conception presented by Alexeeva sends us to the evolution that terminology has also undergone in Western Europe: how it has passed from a static conception to a dynamic conception of terms, which places terms in the centre of the production and transmission process of specialised knowledge. Terminology is thus conceived as the representation of a development stage of each specific discipline in continous evolution.

This conception is totally coherent with the claim of the intersdisciplinarity of terminology, although it does not clarify how this philosophical perspective fits in with other perspectives of terminology within a single polyhedric and multidimensional model. This is where the

"Door model" ("Modelo de las puertas") developed by Cabré (2002) could serve as the starting point of this polyhedricity.

Alexeeva's paper lets us see that in Russia the evolution of terminology from Philosophy is in harmony with the development this subject has undergone also elsewhere in Europe. This can be confirmed in the writings of Slodzian (1994) and, within the scope of Philosophy of Science, in J.L. Barona (1998, 2000).

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SOME BASIC CONCEPTS OF TERMINOLOGY: TRADITIONS AND INNOVATIONS

For 70 years, since terminology science was singled out as an independent discipline and sphere of activities in the former USSR, it has covered a long way – from tiny sections in publications on lexicology in academic linguistic treatises and sporadic remarks in the works by representatives of natural and technical sciences to the ramified science which employs modern achievements of human cognition in cognitive terminology science, from understanding of terms as a periphery of lexis within national languages to the description of terms as the most important lexical class in the Languages for Specific Purposes (LSP), without which modern culture could hardly exist. In this presentation an attempt is made to exhibit the present state of art in Russian terminology science with special reference to its basic concepts and categories included in the foundation of theoretical and applied terminological activity.

1. CONCEPT VS. NOTION

Up to the 80-s of the XX century the terms "notion" and "concept" were used synonymously, but "notion" was used much more often within the Russian scientific tradition.

Yu. S. Stepanov, the outstanding Russian linguist, writes in the "Linguistic Encyclopeadic Dictionary": "Notion (concept) is the same phenomenon as the meaning of a word but it is considered in some other system of connections: meaning – in the language system, notion – in the system of logical relations and forms which are investigated in the language study as well as in logic" [Stepanov 1990]. At the same time a French scholar, A. Rey, claims in his book "La ter-minologie: noms et notions" that the word as well as the term is correlated with a notion, and the concept is not even mentioned [Rey 1979].
However, in the 80-90s of the previous century, the linguistic term "notion" and "concept" appeared to be interpreted quite differently in works by Western scientists as opposed to those of Russian scientists.

On the one hand, cognitive science in the West was dealing with the problems of knowledge representation in man's mind and knowledge structures in language. In Russia, we had such publications as "The Human Factor in the Language" (Moscow, 1991) and "The Language and the World Picture" (Moscow, 1991). In these publications, differences between notions and concepts were discussed on the basis of a differentiation between linguistic and mental world pictures, which resulted in different naming of these phenomena. The units of the operative conscious we work with at the mental level were called concepts. Concepts are born as a result of observations of objects and phenomena in the surrounding world, of their classification and categorization.

On the other hand, in the works by German and English specialists on Languages for Specific Purposes (LSP) and the Russian followers of the LSP theory there appeared a division of logical notions as the products of logical cognition, which are differentiated by the highest degree of abstraction (compare: big, medium and small terms in syllogisms), and special concepts which circulate in the subject sciences as opposed to methodological sciences; i.e. concepts which are designated by means of special terms.

Thus, in Russian scientific tradition the word "notion" is attributed to Logic, and the word "concept" is used in different sciences in two different meanings. The first meaning is typical of cognitive science and cognitive linguistics. Here the term "concept" is a designation of the results of mental activity. Here the concepts are fuzzy and diffuse and may be used to indicate not necessarily substantial features of objects. The identification of objects by means of concepts is highly individual since a person selects from the outside (objective) world what he needs.

In terminology science, including cognitive terminology science, the second meaning has been established: here the word "concept" is used to denote the results of mental procedures in specific (scientific, technical, etc) knowledge, more or less precise mental units designated by the terms of the subject sciences.
Nevertheless, it will be fair to mention that in the works by the first Russian terminologists it was claimed that terms denoted and expressed notions – D.S. Lotte, E.K.Drezen, G.O. Vinokur did without concepts. It should also be stressed that the controversy "notion – concept" is still widely discussed and that there is no generally accepted agreement on differences between notion and concept. Thus to some researchers, what distinguishes notions and concepts is the static nature of notions and the dynamic nature of concepts, which are clarified only within the boundaries of the text [Alexeeva 1998]; to others, it is mostly the more or less precise meaning of notions and the rather vague and fuzzy intension of concepts, of which very blurred boundaries admitting several quantitatively different interpretations are typical [Shelov 1998]. The controversy between notion and concept has given rise to a new research direction of terminology studies, called cognitive terminology.

2. TERM

In Russian terminology science, one can find dozens of definitions of the concept "term". In a monograph by V.P.Danilenko there are 19 definitions of the term [Danilenko 1977]. During recent years, their number has greatly increased. Some authors add in their definitions new attributes of the term, determined by the meaning accepted by them [Melnikov 1991; Grinev 1993].

The simplest definition of a "term" given in the "Dictionary of Linguistic Terms" by O.S. Akhmanova [1966], who claims that a term is "a word or a word combination of some specific (scientific, technical, etc) language created (accepted, borrowed, etc) to define precisely some special notions and to designate special objects; compare nomenclature". Some other much more sophisticated definitions take into consideration the linguistic and logic

nature of the term, the systematic nature of terminology, the formal and functional structure of a term etc.

In particular, a protracted discussion took place between adherents of D.S. Lotte (conventionally regarded as proper terminologists) and those of G.O.Vinokur (conventional linguists).

D.S.Lotte held the view that the term is a special word [Lotte 1961; 1971; 1982], and G.O. Vinokur considered "the term to be not a special word, but only a word with the specific function", and claimed that "any word could perform a role of a term, however trivial this word might be" [Vinokur 1939]. The disagreement can be reconciled if we proceed from the assumption that the term borrows from the lexical unit of a natural language only what can be called its language substratum, and that the principal nature of the term resides in its terminological nature, i.e. its ability to designate a specific concept in the system of all the concepts within a particular area of knowledge or activity. In most cases we may assume that attributes of the strict logical concept are imposed "from above" on the substance of the term and that consequently the term represents a compound multi-strata product in which the natural language substratum and the logical superstratum are both present. Accordingly, they form "bottom" and "top" strata, enclosing the "core of the term" with its specific conceptual, functional, and formal structure which interact with the language substratum and the logical superstratum [Leitchik 1986].

In the publications [Shelov 1982; Chelov 1986; Shelov 1998] it was assumed that the nature of the term can be characterised in the following way: a. it is a concept denoted by a lexical item (word or word combination) that makes this item a term, b."the degree of termness" of an item (= the quality of being a term) is determined by all items necessary for the identification of its concept within the whole system of definitions (explanations) of these items, belonging to the domain under consideration, c. the more information is required in a definition (explanation) to identify a concept, denoted by a certain item, the greater the "degree of termness" of this item.

Two theses are most important for the interpretation of "the degree of termness" above: 1. the term is inherently different from the common word and word combination of the concept it denotes, 2. the concept of termness is postulated as purely relative since some lexical items are declared to be "more terms" and the others are declared to be "less terms".

This understanding of the degree of termness is in agreement with the views according to which "the meaning of the term is its place in the theory", stated in studies by O.S. Achmanova [Achmanova 1966], A.A.Reformatsky [Reformatsky 1959; Reformatsky 1968,] and A.V. Isachenko [Isachenko 1962]. In particular, according to proposition c., any word or phrase is more terminological in proportion to the number of words and phrases involved in its definition; the augmentation of scientific theory with new terms which express general fundamental concepts and through which some existing terms are redefined increases the degree of termness of all other terms (whose definitions remained unchanged) etc.

2.1. Term motivation

There is a tendency to treat the problem of term motivation as an integral part of the problem of the term itself. Term motivation has been studied in depth by many terminologists, including researchers from East European countries of the former USSR [Kandelaki 1977, Skorohod'ko 1983, Kyyak 1988]. At the lexical level, some terms have been convincingly demonstrated to be completely motivated and, consequently, lacking no definition at all [Shelov 1998; Shelov 2002a]. Those terms are usually characterised as completely motivated, i.e. their concept is absolutely motivated by their constituents.

Some term constituents were treated by D.S. Lotte as terminological elements of terms [Lotte 1961; Lotte 1971]. The concept of 'subterm' as a term component of a separate terminological unit has been introduced in the publications [Shelov 1998; Shelov 2002a]. Some lexical constituents absolutely motivate the conceptual contents of the terms, which therefore lack no definition.

If not fully motivated by its constituents, the term must be defined (otherwise its concept remains uncertain); full motivation of a term by means of its direct or indirect (implied) constituents actually plays the role of a definition, thereby making the latter absolutely superfluous.

3. TERMINOLOGICAL DEFINITION

According to A. Rey, "term definition is probably the very centre of terminological problems" [Rey 1979]. Recent publications in terminology research distinctly demonstrate constantly growing interest in the problem of term definition analysis. A very useful and authoritative anthology on the matter froma philosophical point of view edited by J.C. Sager has appeared recently [Essays on definition 2000]). Besides, the ever growing interest in terminological definitions could be at least partly explained by the facilities that information and term databases may offer in case proper conceptual analysis is applied to terminological definitions, providing a database with highly reliable data in a well structured and machine-readable form. The opportunity to get most important pieces of information directly from definitions opens rather promising perspectives in new computer technologies [Jose, Finatto 1995; Martin 1992; Meyer, Bowker, Eck 1992; Pozzi 2001; Sager, L'Homme 1994; Sager, Ndi-Kimbi 1995].

Like any definition and unlike any affirmation, the terminological definition cannot be true or false – defining is a speech act aimed at obtaining common word usage. The producer of a definition simply invites an interlocutor to keep to the same concepts while using the same linguistic units; thus a definition is valid as a naming act, being a kind of performative utterance as discussed extensively by linguists since J. Austin. As any definition is absolutely invulnerable from the point of view of being true or false, the interlocutor cannot criticise it for being false or praise it for being true. But a definition is very sensible to some other criteria, linguistic and logical arguments being basically involved. So the interlocutor might

still consider the definition proposed absolutely useless or even as making clear things unclear and obscure, and might on this basis completely reject it.

Definitions outline the conceptual limits of terms and set up their logical and conceptual relations. It has recently been proposed that a distinction should be made between a proper term definition, definition in the narrow sense of the word (opredelenije, definitsija – in Russian), and some other types of term concept explanations which were then to be called exposition (tolkovanije – in Russian) [Leichik, Shelov 1991; Shelov 1998; 2000; 2001]. The following two observations are most important.

First, expositions are very typical of the way in which basic and most principal, "first level" terms of any scientific discipline are explained. Expositions make the corresponding terms qualitatively vague and uncertain: cf. linguistic unit, linguistic category in linguistics, style, genre, literature in literary science, concept, cognition, thought in cognitive sciences, life, organism in biology, facies in geology, etc. are very good illustrations of what is meant.

Second, the difference between pure definition and exposition brings us back to the controversy between the notion and the concept, seeing that presumably the proper definition coins the notion of the term whereas the exposition coins the conccept of the term. The structure of the expression by means of which any term is defined (Dfn) is much more complex and sophisticated than that of the term itself (Dfd). This expression cannot simply be a reference to any other terminological unit; moreover it cannot be as syncretic as a Dfd term itself, – if so, it would have no explanatory power. So, among other means of explanation of term meaning, term definition seems to occupy the central position. In normative terminological dictionaries and standards there is a steady tendency to use almost exclusively definitions in the narrow sense. In ordinary terminological dictionaries both definitions (in the narrow sense) and expositions are used.

A terminological definition in the broad sense of the word is an explanation of the conceptual contents of a Dfd term. However different term definitions are, when defining terms we always first aim at disclosing the conceptual contents of a Dfd lexical item, and secondly at applying the cognitive function of this disclosure. Terminological definitions cover both proper definitions (definitions in the narrow sense of the word) and expositions.

The proper definition should be classed among performative utterances considered by its author be a definition, and as not admitting different qualitative interpretations (within the limits of the chosen initial concepts). A verbal term definition (in the narrow sense) is a performative utterance prescribing a concept to a Dfd term by indicating its position among other (specific as well as non-specific) concepts of a domain. As soon as an explanation of the term concept admits different qua-litative interpretations, it loses its status of definition and turns into an exposition. However, the role of expositions is very important since they preserve the unity, integrity and continuity of science at the upper levels of concepts.

4. TERMINOLOGICAL SEMANTIC STRUCTURE VS. TERMINOLOGICAL CONCEPTUAL STRUCTURE; TERMINOLOGICAL FIELD

Linguistics deals mainly with what it calls the semantic structure of linguistic units. Consequently, the semantic structure of terminology covers all kinds of semantic relations between two terms, one of which is derived from the other (in a very broad sense of the word). These relations may be specific to the domain within which these terms function, as well as not specific and highly typical of the common language. The latter can be perceived as morphological, syntactic, or semantic "operators" applied to some primary terminological items in order to derive new ones so that these new lexical items may function as terms according to the common language grammar, whereas no specific “conceptual addendum” is involved by means of the operator. A set of semantic relations between the terminological units mentioned above is no doubt a part of the semantic structure of the corresponding terminology, but it has nothing to do with the conceptual structure of the corresponding terminology since these relations exist at the level of common language.

As far as the conceptual structure of terminology is concerned, it deals only with one part of the semantic relations – the one which needs particular specification and clarification [Nuopponen 1994]. The following view is accepted in the publication [Stupin 1971; Shelov 1998; 2000; 2001].

The conceptual structure of terminology is a special case of semantic structure. It is a structure of all conceptual relations between two (or more) terms, of which one is directly motivated or defined through the other in the corresponding domain.
Since terms are the most informative lexical units of a special text and serve as designations of specific concepts of science and technology, descriptions of a term definition system and its conceptual aspects establish a logical-semantic structure of terminology, cf. with the concepts of “logical scheme of science” and “logical form of understanding the world”, discussed by D.S. Lotte [Lotte 1961]. In the works previously mentioned, it has been demonstrated that definability of terms through other terms (i.e. facts of one terms being defined through the others) is extremely important for simulating terminological properties of words and phrases.

So formally, the conceptual structure of terminology may be represented by an (oriented) graph which implements the relation of direct definability or motivation between terms and the conceptual interpretation of the relation in question.

Part of the conceptual structure which relates to a separate term makes up its terminological field, and a set of all terminological fields will actually present the conceptual structure of terminology. It is worth noting that the nearest generic concept, the specific attributes and concepts (and, accordingly, the terminological conceptual hierarchy in general) are not established "locally", proceeding from the text of a single separate term definition; this procedure "is global", in view of all sets of definitions. This hierarchy covers terminological units, which have definitions, and the nature of the relations between them is completely determined by the contents of the appropriate definitions.

What is stated above is true only if we have no expositions admitting qualitatively different interpretations. Otherwise every new interpretation could, strictly speaking, generate a new conceptual structure of terminology, related to the same subject field (that is the case we realise as soon as we are confronted by a newly developed theory in the same subject field).

5. TERMINOLOGY VS. TERMINOLOGY SYSTEM

In the 70ies of the XX century the peak of interest towards system character of terminology could be observed and that was connected with the popularity of the biologist L.fon Bertalanffy. This scientist suggested the programme of building general theory of systems, which contained general principles and laws of the systems behaviour no matter what elements and the relationships between them were. The dissertation of L. fon Bertalanffy was translated into Russian in 1969 [Bertalanffy 1969].

The modern Russian term study admits two kinds of the totality of terms, - those are terminologies and terminology systems. The common feature of both of them is that they both comprise lexical units of the LSP, which are functional varieties of the modern developed national languages serving specific domains (science, industry, economics, politics, etc).

The difference between terminology system and terminology is, first of all, in the way they come into being. Terminology appears spontaneously as a result of knowledge accumulation and appearance of special notions and concepts. Terminology system is constructed on purpose after a theory was developed that describes and explains regularities, objects, processes and attributes of objects and a system of corresponding concepts was composed in a specific sphere.

Hence it follows that before a terminology system is developed there should definitely exist some theory. In fact, there are some fundamental differences between terminology and terminology system. Terminology enters the mental world far from being accomplished and crowned; its lexical units are very far from being strictly systematic, they form some homonymous, synonymous and polysemantic series. Only in course of unification/standardization terms undergo some changes that enhance their system qualities. In other words, it takes much time before terminology turns into terminology system and this happens (if ever) at a rather advanced stage of knowledge development (this is stated explicitly in methodological recommendations on the terminology standards development). So a terminology system is more than a set of ordered terms: it is actually a logic-linguistic model of a theory within a subject field. Thus, unification of terminology system is based on the difference between the two basic sets of terms – terminology and terminology system [Leitchik, 2000]. According to this approach, terminology system is completely isomorphic to the system of concepts and ter-minology is not. However terminology may continue to develop language-wise, independently of the respective system of concepts, lagging behind or stepping ahead of it.

6. TERMINOLOGY VS NOMENCLATURE

In common usage, nomenclature is often a synonym of terminology. In scientific tradition, however, the word "nomenclature" seems to be used in a more specific sense, and contraposition of nomenclature and terminology can be found. The controversy “terminology VS nomenclature” is very typical of Russian terminology research after seminal ideas of A.A. Reformatsky.

This presentation does not claim to cover the subject completely but attempts to review the most common approaches to nomenclature as opposed to terminology, since terminology and nomenclature are considered to be the most part of the scientific vocabulary [Whewell 1867; Mill 1843, Nilsson 1974; Vinokur 1939; Reformatski 1959; Achmanova 1966; Leichik 1974; Zabin-kova 1976; Bereznikova 1976, Shelov 1985].

At least three different notions of nomenclature can be formulated: 1. nomenclature as a set of scientific and popular names for members of the plant and animal kingdom (nomenclature 1); 2. nomenclature as a set of designations of “lower natural subdivision” (nomenclature 2); 3. nomenclature as a set of conventional notations (nomenclature 3).

The different interpretations of nomenclature represent different scientific traditions. Nomen-clature 1 goes back to the times of K.Linneus and his invention of binary nomenclature for biological species and his indisputable success in attempts of setting it up in denoting subjects of the Nature.

The concept of nomenclature 2 was given birth in scientific practice by philosophical recognition of this fact and meditations over it. W. Whewell and J.S. Mill are the most worth mentioning among others for general discussion of the "nomenclature VS terminology" controversy and its theoretical foundation. Though not completely consistent, this controversy was generalised to most part of the names for chemical elements and some far reaching perspectives on this basis were outlined in distinguishing between empirical and theoretical terms of science.

Nomenclature 3 is usually under consideration of linguists. The use of alphabetic, digital, and alphanumeric systems of symbols is a typical feature of nomenclature 3. Proper names are also used to coin nomenclature 3. It is the most intriguing how these notations come into being and get familiar within the same LSP community.

Different interpretations of nomenclature are not, however, totally unrelated. In fact they have much in common as they are described in the literature. Though separating them from one another is rather difficult, different historic roots can be traced up to nowadays.

Within the framework of the LSP theory which is being developed in Russia (Denisov 1974; Stepanov 1983; Leichik 1974; 1981) it is claimed that nomenclature is one of the three classes of LSP lexis: 1. common nouns and terms which denote general concepts; 2. proper names which denote unique concepts (i.e. the United Nations Organization, the planet Jupiter); 3. nomens denoting particular concepts making up the intermediate class between

common nouns and proper nouns (i.e. an automobile Opel-Kapitan, sweets Merci, a washing-machine Candy Automatic ets). Nomens are conventional notations from linguistic point of view and non-conventional notations from cognitive point of view: they are necessary to describe specific sphere of knowledge and activity. The theory of nomenclature adjoins terminology studies.

7. TERM STANDARDISATION AND UNIFICATION

The unification of terms and their combinations is one of the most important part of the practical terminological activity and one of the branches of the applied terminology studies. Practical terminological activity has two mutual aspects: optimizational and normative [Felber, 1984]. On the one hand, its aim is to substantiate the choice of "optimal terms with optimal meanings", in other words, terms that meet the requirements of the adequate nomination of objects, processes and attributes in the specific domain.

On the other hand, the terms and their definitions selected as "optimal" are entered up in the normative documents and instructions (standards, normative dictionaries, editors' directions, etc) and, thus, acquire legal status. The unification of terms which includes, as a rule, the whole totality of terms (terminology or a terminological system) has a very important function – the one of systematization. Elaboration of methodized and unified terminological system results in the fact that every conceptual place is occupied by a single lexical unit with one only one definition relating to the corresponding concept, it also leads to the systematization of all the sign means which refer to some particular sphere of knowledge and activity.

Types of term unification vary with the sphere of knowledge or activity or other settings; nowadays in Russia there are four types of term unification products: 1. standards for terms and term definitions and terminological applications to the standards of other categories, 2. collections of recommended terms, 3. normative dictionaries; 4. harmonized terminology.

1. Up to the beginning of the XXI century there were in action more than 20 thousand standards for terms and term definitions. The most part of them make up national standards (there are more than 800 of them valid up to now at the national level in Russia). There are also international ISO standards, regional standards, standards of firms and international organizations. The majority of requirements articulated in terminological standards are compulsory for use in some types of documents and papers.

In Russia the institute of VNIIKI of Russian Federation is responsible for terminological standardization at the state level. The firms' terminological standards are worked out and applied in individual industrial companies.

However there is a stable tendency of convergence of the Russian standardization system with the kindred systems in some other industrially developed countries and international organizations. This tendency is well reflected in the project of the federal law on "The basis of technical regulation in Russian Federation". And it looks like modern trend both in Rus-

sian and Western standardization systems to soften their standard requirements and to transfer from strict demands and requirements to recommendations.

2. Collections of recommended terms include scientific and scientific-technical terms which refer to the complex mostly scientific spheres of knowledge (mining, chemistry, building, economics, robotics and others). In Russia such documents are worked out by the Committee for Scientific Terminology in Fundamental Research of the Russian Academy of Sciences. By the end of the XX century the number of these collections achieved 120 with the total number of 25000 recommended terms. This type of unification has acquired regulating status [Brief Work-Book on Development and Ordering of Scientific and Technical Terminology, 1979]. In this type of terminological reference books, as well as in terminological standards, a systematic arrangement of the entries is used. While using these terms the degree of obligation to meet the requirements of recommendation is lower than in the standard prescriptions though the principle of unification is fully preserved.

3. In normative dictionaries the level of obligation is even lower. Nevertheless, this type of term unification has become widely spread since communication between scientists, politicians, diplomats and lawyers without unified and methodized terminology entered up in documents and papers in various spheres of industrial and social activity is very problematic. The most well-known normative dictionary is the International Dictionary of Electrotechniques which is being created in different languages by the International Electrotechnical Committee and which covers terms of physics, electronics, communication etc (more than 100 volumes). The whole of it was translated into Russian.

4. In the process of harmonization the unification of terms is restricted by the reciprocal coordination of terms and terminologies, taking into consideration the national language structures, systems of special concepts, which in its turn depend on the theory, conception, system of views popular in this or that scientific school.

While harmonizing terms and terminologies two groups of factors should be considered: linguistic factors, affecting peculiarities of the languages to which the terms are applied, and ex-tralinguistic factors, affecting the subject sphere and the theory it describes. The preconditions for term harmonization are the integration of knowledge, internationalization of science and technology as well as their globalization, including the active internationalization of terms.

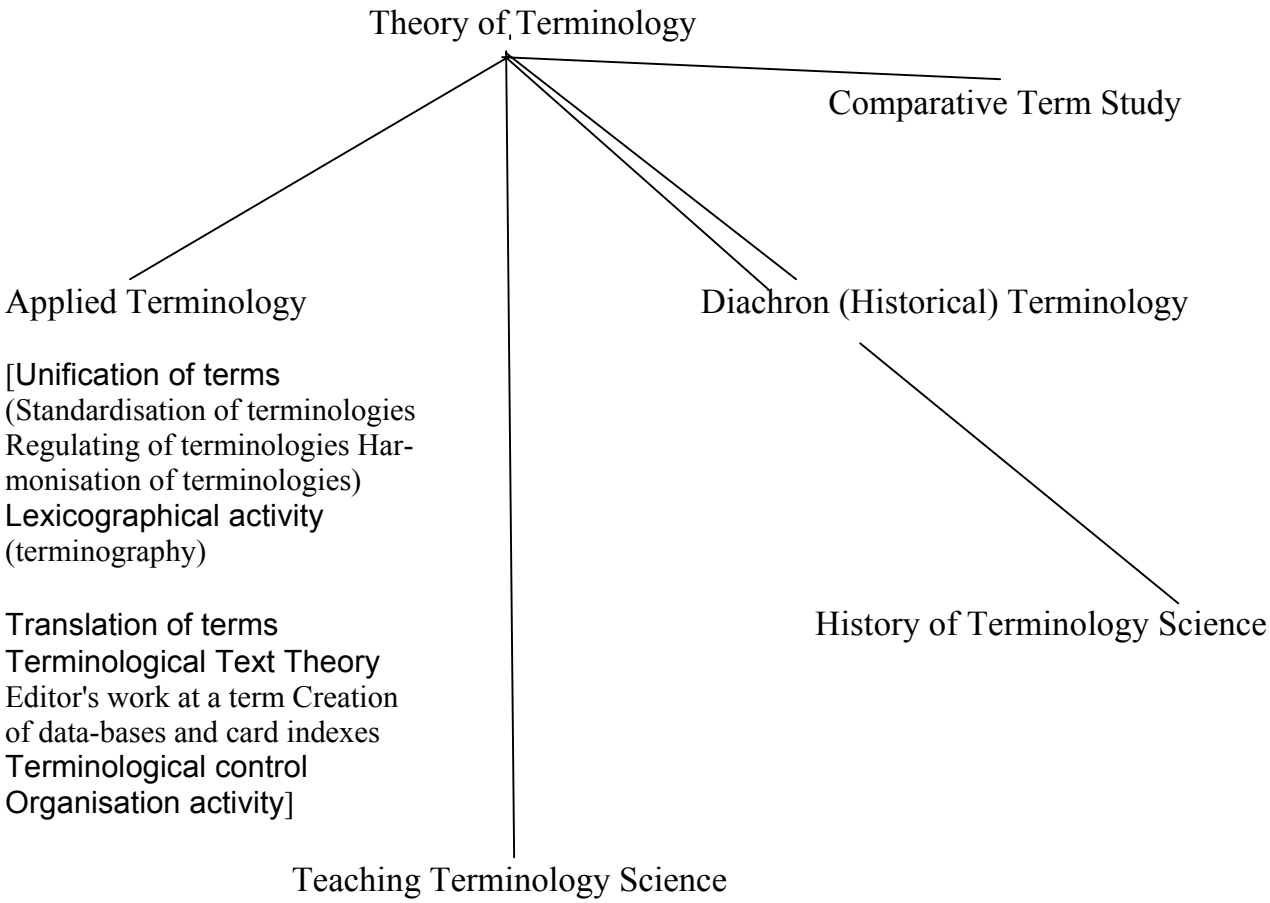
8. CONCLUSION

The history of the Russian terminology is greatly influenced by D.S. Lotte, E.K. Drezen, AA. Reformatsky and G.O. Vinokur, whom we take as classics of domestic terminology and whose views in its turn were influenced by Austran-German terminological school, and particularly by E. Wьster. The present state of the Russian terminology is reviewed in more details in our common article with Mr. Leitchik [Leitchik, Shelov 2003].

Nowadays quite various methods are applied to solve different problems of terminological theory and practice. Some philosophical ideas typical of the Russian terminology scool have been just mentioned at our previous session; some lexicographic methods and there application with respect to terminolgy in computer science will be respected in our presentation with Mrs. L. Tkacheva. Some new ieas of cognitive terminology have been actively eveloping and that will be witnessed by Mrs. L.Manerko presentation.

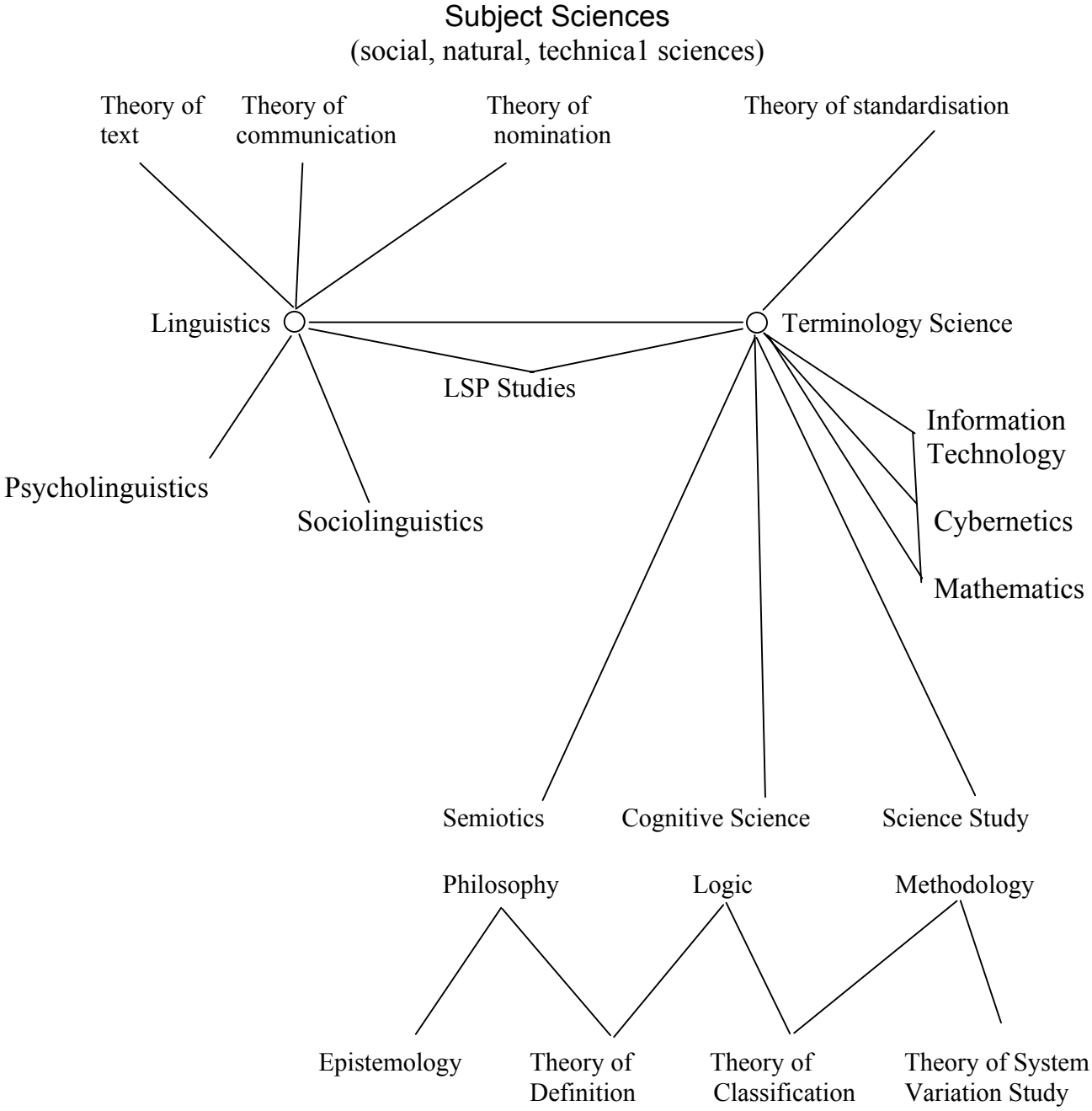
Terminology is no more a part of linguistics but an inependent theoretical and practical domain with a structure of its own, with its own subject and methods. The subject of terminology is very close to LSP's subject but does not coincide with it. You can see the structure of terminological stidies in the ex-USSR and Russia at the fig. 1 below.

FIGURE 1 STRUCTURE OF TERMINOLOGY SCIENCE IN RUSSIA (The Soviet Terminology School)



Terminology science takes its own position within the framework of modern scientific knowledge. E. Wüster mentioned five domains in his famous article of 1974 that have closest correlations with terminology – Sprachwissenschaft, Logik, Ontologie, Informatik and Sachwissenschaften. According to the Russian terminology school, terminology has considerably more connections with basic and adjacent domains. They are presented in fig. 2 below.

FIGURE 2 THE PLACE OF TERMINOLOGY SCIENCE IN THE SYSTEM OF CONTEMPORARY SCIENCES



There are grounds to hope that these connections will expand even more widely and result in new applications and solutions. We witness this expansion as the year of 2002 was called by the UNESCO the year of Terminology.

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Bassey E. Antia

AGENDA FOR FUNDAMENTAL RESEARCH IN TERMINOLOGY: BRIDGING THE EAST-WEST DIVIDE

0. Bernard Shaw was concerned that America and England were two countries separated by the same language. I have attempted to show how (Antia 2001). Our concern here is perhaps greater: the separation of Eastern and Western Europe by walls and languages. I understand that, logically, claiming a wide gulf might be a non-sequitur, but an opportunity such as this for direct discourse is welcome. The paper by Professors Shelov and Lejchik on basic concepts of terminology in the erstwhile Soviet Union (particularly Russia) has fallen on Professor Sue Ellen Wright and me to read from the standpoint of Western Europe, with a view to pointing out similarities and differences, and to sketching a research agenda. My reflections will be on the first part of the Shelov-Lejchik paper. Wright will deal a lot more with systems, which form much of the material of the Shelov-Lejchik paper.

The distinction in the former USSR between notions and concepts is interesting, even though Shelov-Lejchik's account of the fortunes of these two terms in the West (in support of trends in Russian) misses an important cross-lingual (if not also disciplinary) perspective: the acceptation and register of these two terms in different Western European languages. In the version of the Shelov-Lejchik text on which this commentary is based, the absence of 'concept' in a sample of French writing on terminology (where 'notion' is used) is taken to index the fortune of this term in Western writing. This is of course incorrect as the preferred term in corresponding material in English would be 'concept' (not 'notion').

However both terms entered Russian terminology scholarship in (at least) English, it is interesting to see the functional differentiation they have undergone. Shelov-Lejchik distil a basic tendency from the welter of characterizations of notions and concepts in terminology studies: the view of the notion as static, more or less precisely predicated, and of the concept as dynamic, vague and fuzzy. Note that both entities are designated by terms.

In the West, the more familiar distinction is the one between meanings and concepts, usually made in the context of specifying the reference of words as opposed to terms. In the work of most Western scholars of terminology the consensus is that, as a representation of an area of knowledge, a concept is more consciously and deliberately constituted, and the enabling social norm is not that of an entire language community, but of a special interest group that is keen to avoid vagueness in reference. This latter attribute of vagueness is believed to be a characteristic of word meanings, because although the social norm and the act of designation serve to initially structure or delimit the sensations we form, the limitation in the number of available words produces a measure of indeterminacy; that is to say, a given word is repeatedly called to do duty in the communication of other formed sensations.

The Soviet distinction between notions and terms is particularly interesting today that the West seems to be entering into an ère de soupçon (apologies Nathalie Sarraute), a kind of period of suspicion with regard to the precise nature of the concept. Literally by the day,

researchers in the West are claiming that evidence in the data they deal with indicates that concepts, the reference of terms, are not as precisely delimited as is generally believed. However, it seems that as researchers we are all guilty here of not noticing that at least 15 odd years ago, de Beaugrande, Budin (with Galinski, Nedobity, Thaller) and others were already developing theoretical models of object-concept relations that allowed for degrees of indeterminacy. Talk of theory being ahead of practice (in this case, text analysis)! At any rate, going by Alexeeva's view (cited by Shelov-Lejchik) that it is only within the boundaries of text that determination is made as to which representation is static/clearly predicated and which is dynamic/vague, it would seem that Soviet research is ahead of its Western counterpart in this area. Eastern European colleagues appear to have gone past the stage of discovering or proclaiming the relative indeterminacy of terminological concepts in text to a point where distinctions can be made as to which concepts are more or less determinate, and how such a judgement may be made. For a sense of dates, the table in section 3 of the current discussion is enlightening.

In the light of the Soviet distinction, one may ask a number of inter-related questions which could form the basis of future and collaborative East-West research:

a. Does the terminology community have a theoretical account of types of concept that is able to explain and predict degrees of precision?
b. To what extent can previous theoretical models on object-concept relations contribute to such an account, and properly contextualise current claims of term-concept instability?
c. Are there text types or parts of texts in which different concept types, or term-concept stability relations can be found?
d. Should consideration be given in this exercise to the type of discipline one is dealing with (nomothetic and ideographic), the phase of development (constitution, consolidation), etc.?
e. Should a typology of concepts reflect the distinction between system and use, and is there (still) a basis for the system-level? Is the dictionary dead?
f. To what extent can claims of imprecision of concepts be taken care of by the construct of 'views' or, 'perspectivisation' as some have called it (Gerzymisch-Arbogast, Rogers)?
g. To what other mechanisms, for instance, the very act of writing, do we owe established cases of concept indeterminacy?

As a contribution to this direction of research, I have suggested elsewhere that there is something quasi-anthropological that seems to explain why precisely defined system-level concepts lose a part of their determinacy in the writing process (cf. Antia 2002).

2. With respect to the second issue raised by Shelov-Lejchik, the term, I think the previous remarks suggest the probable crisis we are in when we define the term via the detour of the concept; in other words, as the designation of a concept, when there are currently doubts about the attributes of the concept. Should we be adopting the Eastern idea of degrees of termness? I think only to the extent that we are interested in the ontogenesis of terms (mor-

phologically). If termness is to be used for varying degrees of referential precision, let us call everything words.

But beside a definition of the term, Shelov-Lejchik raise a further issue of the status of the term: is it an ordinary word or a special word? Are terms a distinct category of lexical items, and deserving of a different kind of treatment than is given other lexical items? One suspects that between Lotte ('terms are special words') and Vinokur ('terms are ordinary words with special function') there are competing interests: the contention between the establishment of a separate field of enquiry and the reaction of an existing field. Shelov-Lejchik's view is extremely well articulated: "the term represents a compound multi-strata product in which the natural language substratum and [the] logical superstratum are available". Natural language provides, though not always, the communication infrastructure, while a knowledge system provides the content. There is, as we have seen and as we shall still see, awareness in Eastern European terminology studies that the textual environment can affect both the communication infrastructure and the content, so the point will not be belaboured here.

At any rate, in the West, a most recent variant of this debate can be framed as follows: are terms referentially a distinct category of lexical items? Cabré and Sager have different answers. Cabré (1998/9) proposes to "treat terms as linguistic entities akin to other lexical units with respect to their referential nature and their function in discourse." She argues that if linguistics is interested in the competence and performance of language users, the descriptions it provides would be incomplete if it did not account for terms.

How is linguistics made to account for terms and words in the same manner? Her answer is Wittgensteinian in the sense that it views language as making available to users words which, in my interpretation of her, can be seen in one of the following ways:

a. as dummies that acquire meanings in different contexts, including specialised ones; or

b. as having default meanings which are, according to contexts, confirmed, overwritten, or otherwise modified.

Her arguments are that:

i. there is a measure of semantic continuity between words used in an LSP which one is acquiring as part of an initiation into a specialism and words in the individual's repertoire prior to the LSP exposure;

ii. "the nature of a term is not given, but arises as a function of its usage in a specific and situational context."

She might have cited the Russian Vinokur according to whom "the term is not a special word, but a word with a specific function."

A close reading of Sager (1998/9) shows that he disagrees with the above view, and I take the liberty to quote a number of passages:

c. "For a justification of terms as a distinct category of lexical items we have to look in two areas: (1) the things terms refer to and (2) the nature of this reference."

d. "I shall be looking first into the possible explanation of the linguistic origins of terms and secondly, into the philosophical arguments for the separate existence of terms."

e. "By grouping the considerations of the reference function, form and nature of specialised lexical items under the heading of Terminology, we can talk of meanings without doing linguistics ..."

Even while providing an excellent description of a linguistic approach to the study of terms, inspired presumably by Quine's ontogenesis of reference, Sager hinges the case for a distinct lexical status for terms on the argument that concepts (to which terms refer) are in a different referential class from the reference of words. Unlike Cabré in whose perspective lexical units acquire meanings in context, which may be generalised or specialised, Sager's perspective considers the circumstances of the emergence of a reference as the factor determining whether the reference is distinct, and deserving of an equally distinct designation.

The argument goes roughly like this. Reference exists at two temporally successive levels corresponding to stages in the formation of representations, that is, in the organising/structuring of perceptions, reflection, intuition, etc. At a first natural stage, the representations formed are general and unwieldy, and although we assign labels in the form of words to better have a grip on these natural representations, the restricted number of available words means that we will inevitably overload words with more or less different representations.

When this natural situation is considered undesirable, because it leads to misunderstanding, a somewhat artificial situation arises where the acceptation of the general representation is negotiated. The result is a sharpening or refinement of the general representation, which thus satisfies the design specification of a concept according to the German logician, Sigwart: "A representation is a concept only when it is clear, i.e. if what is thought in it is completely conscious" (cf. Sager 1998/9).
This account allows for a consistent description of LSPs as more deliberately and consciously created and used artefacts that constrain some of the flexibility of LGP.

The interest of the debate for me hardly lies in the contention as to in which or in whose realm the study of terms should fall; rather the interest lies in the multiplicity of perspectives for term study which the contention has generated. A view of the debate as an end to itself is no longer necessary. Terminology as a field exists currently. Any contention is ... I prefer trivial to academic. What is required is an openness to who brings what to the table. The study of terms would be stifled if it credited linguistics with providing a scope that was all-explanatory and all-research-agenda-setting. Similarly, to neglect the language substratum, particularly as it affects the logical substratum, would produce extremely austere re-

search. Grinev, a leading Russian scholar of terminology, must have been in this frame of mind in writing, some ten years ago, that "the efficiency of decisions concerning the choice of forms and their endowment with a specific meaning, as well as their use, depends on a clear understanding of the most general laws governing the development and functioning of terminologies" – to which laws linguistics and something-other-than-linguistics contribute. Putting it light-heartedly, the extralinguistic factors say the following, among others, to the linguist:

a. the model of development of a field (e.g. on the basis of an existing science, of the interaction of two neighbouring sciences or of several sciences) affects the terminology of the field, and you can't study this terminology meaningfully except you develop some expertise in the field or are willing to collaborate with an expert;

b. your study of terms may lack some of its profundity and certain of its ramifications if you do not know how the age of the field affects terms in the field, particularly from the perspective of the relation to words in the general language, terms in other fields, etc.;

c. your analysis of polysemy, synonymy and related phenomena may turn out to be one dimensional if you do not relate it to the state of the field being studied: is it in a laminar, stable state, or in a turbulent, paradigm-shifting stage?

d. your identification of precision and vagueness in the reference of terms does not say much until you tell us the nature of material from which the field under study forms its concepts.

On the other hand, the linguistic factors say the following to the group of persons interested in domain-specific knowledge and its rational communication:

a. you can't lock out synonyms; in any case, there is nothing to bother about as there are countless precedents of synonyms becoming referentially differentiated over time;
b. in any case, analyses may reveal functional lexicogrammatical specialisations or differences in distribution of so-called synonyms (cf. Kuryško 1993);
c. the variants of a given term are not a problem at all: they possibly represent several stages in the development or formation of a term;
d. some variants are the result of a natural law at work: the law of economy of effort.

It would be regrettable if the study of terms had to do without one or the other perspective on account of some territorial or protectionist intrigues. This seems to me to be Grinev's (1993) point.

3. Concerns about the nature of the concept quite naturally reverberate in the area of definitions – another issue broached by Shelov-Lejchik. The authors recognise this when they suggest that perhaps what in Soviet studies is referred to as definition proper should apply to

notions, whereas expositions apply to concepts. Historically, definition is equated with the concept in the sense that it is a definition that places a concept in the public realm for use, debate, etc.

In connecting the reference of a term to a definition it would be helpful to introduce two types of considerations and to explore how they interact:

a. the definer's perspective, or a Skopos theory view of the definition. From the way Skopos theory is understood in translation studies, this would mean looking at definitions, particularly in texts, as crafted-to-fit or context-driven (created/immanent) predications – irrespective of the assumed precision quotient of a concept. The extent to which a function or definer's led approach to defining is proven could invite a re-appraisal of categorizations of definitions based on the putative precision quotient of the definiendum. In the West a basis for exploring further this track may be found in the work of Gerzymisch-Arbogast (1996) on concept perspectivization in text and in Bowker's (1997) construct of the multidimensionality of concepts. In dealing with this first consideration, a second needs to be borne in mind, that is
b. the knowledge grid or mesh on which the coordinates of the concept are plotted through the act of defining. A knowledge grid that is emergent, thus interdisciplinary in the sense of obvious links to a variety of competing ancestor or mother disciplines, is likely to be characterised by the multidimensionality of concepts, which in turn is likely to give the impression of both vague concepts and unstable definitions. Because it makes no room for inessential concept characteristics, a grid in which concepts are the results of a pre-specification of characteristics that have no ontological basis is unlikely to offer the variety of perspectives that may be encountered in a grid in which concepts are formed by abstraction on the basis of similar objects. The kind of language resources used in a knowledge sphere (more natural vs. more artificial) and/or the degree of control exercised over language used can determine the level of concept – definition stability.

There appears to be consensus in the West for these theses on the relationship between the nature of definitions and the knowledge system whose concepts are to be defined. I find confirmation in several sources: in Picht's work on different types of concept formation; in Lauren/Myking/Picht's work on types of discipline (nomothetic versus ideographic), and on the issue of responsibility for concepts and terms in fields of enquiry that are in a state of consolidation as opposed to fields that are emergent; in the work of the German philosopher Rickert recently publicised by Sager (2000). Writing on the subject of definitions two centuries ago, Rickert found it important to organise some of his reflection on the subject around groups of disciplines (law, natural sciences and mathematics).

There is also confirmation in the East. There is an excellent Soviet framework for researching into the triad of concept-term-definition which we have been discussing: in the work of Lejchik, a co-author of the paper on which this presentation is based. I will back up a bit here to contextualise Lejchik, and will end my presentation after pointing out what I believe is the common research agenda for the East and West arising from Lejchik's work.

Since it is the functioning of terms in texts that gives rise to concerns about definitions, even in the Shelov-Lejchik paper under review, it was interesting to see what Soviet research exists on terms in text, and what perspectives might be gained therefrom for definitions. A study by Grinev (1992) of directions in Soviet research (as exemplified by student dissertations) from the 1940s – 1980s was instructive. Table 1 is an extract from one of Grinev's tables, and it relates to what is called functional studies.

	1940-50s	1960s	1970s	1980s	Total
Statistical analysis of terms	-	3	9	7	[19]
Functional analysis of terms	-	6	12	44	62
Functioning in special texts	-	5	11	27	43
Functioning in information systems	-	-	3	6	9
	-	1	9	13	23
Functioning of terms in fiction	-	2	4	5	11
Determinologization					

Table 1: Dissertations on term functions in the former USSR (source: Grinev 1994)

The time depth and the diversity of Soviet studies under just one header is striking, but that is not the issue for now. To get an insight into what studies on functioning of terms in special texts may be like, I searched for relevant publications, and was quite pleased to find Lejchik's (1993) work on "peculiarities of term functions in texts". Lejchik illustrates that an analysis of various text types shows that terms exist in three spheres: of fixation (as in incoherent texts like dictionaries); of theory (where terms are coined); and of functioning (as in texts like encyclopaedia that give the state-of-the-art of a field). Thus, there may be identified term-fixing texts, term-using texts and term-producing texts.

In Lejchik's view, there are several implications for definition of this typology. Definitions in term-producing texts where new knowledge is being generated will be unstable: "it is incompetent to fix terms and terminologies in standards and dictionaries during the period when terms are being "born" in texts describing theories, concepts, new subjects (in term-producing texts)" (Lejchik 1993:99). The opposite would be the case in term-fixing texts. There is a questionable implication of definitional stability in term-using texts. At any rate, with appropriate modifications, this typology, like the Shelov posers, provides bases for East-West research collaboration in reviewing and advancing studies of the term.

4. It seems to me that in moving forward along these lines, we must constantly ask what the goal of fundamental terminology research is. Not to ask this question would be to reduce our reflections to mere trivia. It seems to me that the goal of what may be called "variational studies", as an instance of fundamental research, is to understand and thereby improve/enhance specialist communication. It perhaps sounds provocative, but whatever varieties are pointed out by our studies may find their way back into that dreaded term, standardisation. People who need restricted codes just might find in our studies loci where tight controls are called for in the design of controlled languages. Isn't it amusing that it was probably on account of Gerzymisch-Arbogast's study of concept and term 'contamination' in a celebrated book on monetary economics that a new edition of the book "corrects" some of the contamination? Cf. Gerzymisch-Arbogast (1992).

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FROM THE SEMIOTIC TRIANGLE TO THE SEMANTIC WEB

INTRODUCTION

This paper evolved as part of a dialogue between researchers in the "East" and "West", specifically in response to the paper, "Some Basic Concepts of Terminology: Traditions and Innovations", in which S.D. Shelov and V.M. Lejchik have made a valuable contribution to our understanding of the history of terminology studies in the former Soviet Union in light of cognitive science, Languages for Special (or Specific) Purposes (LSP)[4], systems theory, and other developments in philosophy and linguistics over the past seventy years, with special emphasis on recent decades. This response briefly outlines a few significant differences between the Russian experience and trends in Western research. Where Shelov and Lejchik discuss basic concepts, this paper addresses issues involving both classic and developing models that integrate these concepts. This evolution culminates with the elaboration of models for data processing, management, and retrieval in distributed heterogeneous information systems, specifically the Semantic Web (SW).

The discussion begins with simpler, more familiar representations (Saussure (1974 [1916]; Frege 1892; Wüster 1985), classified by Myking as binary, triadic, and four-field models (Myking, 1997, 52). It then works forward to include a variety of more complex, less familiar models designed to reflect broader issues in the philosophy of language and the methodology of information management. These models have, of course, been most famously expressed in the familiar semantic (a.k.a. *semiotic*) triangle, but the inspiration to extrapolate on the model, or even to cast it aside, continues to inspire new variations. Reviews and analyses — both laudatory and condemnational — abound (Eco 1990, Budin 1997). It is not, however, within the scope of this paper to examine all representations, although reference is made to variants proposed by Peirce (late 19th, early 20th century; 1991), Ogden and Richards (1923/1930) and Morris (1938). The intent here is to project a kind of developmental trajectory that leads from the earlier binary and triadic representations to more complex treatments that reference or move beyond the triangle. Attention is paid to problems inherent in the translation of key terms for several seminal thinkers, which only tends to exacerbate the proliferation of confusing terminology that abounds in the vicinity of the triangle.

One overriding factor in any examination of models is the widely recognized observation that all models are false (e.g., Myking 1997: 52; Brekke 1997: 85). Sowa states that "*All models are wrong, but some are useful"* (Sowa 2000a: 384).

> "The main reason that all models are incomplete/false is that they are simplifications. But some are still useful. … There is no such thing as an intrinsically good or bad

[4] The choice of "special" or "specific" seems to be unresolved. A cursory search on the Web yields approximately 3,000,000 hits for each option.

model. A model is judged against the goal, and a model may be good for some purposes and bad for others" (Pease 1998).

The reason that models are false—aside, of course, from the fact that some of them may be simply misleading or not very useful—lies in the fact that the best models use simple visual images or sometimes mathematical functions to illustrate complex phenomena. Sowa (2000a: 383ff.) attempts to explain the relationship between theories, models, and reality by classifying models as bridges designed to fill the gap between abstract theory and the concrete world. The relative accuracy of any model (its ability to represent aspects of the world with some level of *truth*) depends not only on its ability to address the constraints of its intention, but also on the measuring instruments used to define the elements making up the model. Given these limitations, the inherent danger exists that if any model is presented or taught as gospel, it can inspire dogmatic loyalty—and equally passionate attacks. However, if one accepts the relativity and intention-related orientation of all models, then, when a need is perceived for a new model with a new objective, it will be more productive simply to draft the new model than to waste energy tilting theoretical windmills—compare, e.g., Deacon's reasoned departure from Frege and Peirce in comparison to Temmerman's quixotic attack on the Wüster/Felber standardization model (Deacon 1997; Temmerman 2000).

1 THE COMPONENTS IN THE MODEL

1.1 The concept

Shelov and Lejchik discuss in some detail the evolution of thinking concerning concepts and terms. They have introduced a discussion of *concept* and *notion* as they are used in Russian, which inspires an examination of these potentially false friends in English. The relationship between these near synonyms is almost precisely the opposite in English from in Russian, which may go unnoticed even in serious discussion. Many dictionaries list *concept* and *notion* as synonyms, and one will see the word "notion" used to mean an ordinary concept, even in scholarly discourse (indeed, at some points in this article), but treatment of serious concept-oriented terminology and ontology management systems generally only uses *concept* as a reference. The idea of *notion* in English is frequently deprecated in contrast to "concept" per se: notions are individual impressions that lack the strength of consensus-based conceptual structure. They are closer to German *Vorstellung* than to *Begriff*. The emphasis here is on personal, fairly unsubstantiated *theory and belief*, not on scientific evidence or proof. Collocates include, for instance, *he hasn't got a notion; he has a crazy notion; this is just some notion of his*, hence the synonym *whim*, an unfounded idea or motivation. WordNet equates *notion* with *a figment of the imagination*, *a misconception, (an incorrect conception)*, and the venerable (1950) Merriam Webster 2nd Edition cites *notional* as *given to foolishness or visionary fancies*. *Concept,* by contrast, is defined as "an idea … representing the meaning of a universal or logical species; now chiefly, an idea that includes all that is characteristically associated with a term." Consequently, *notion* in English would never be a candidate for serious terminological inquiry.

1.2 Termness

The concept of "termness" introduced by Shelov and Lejchik is an intriguing one when viewed from the perspective of English usage and practice. The equation of broadness and narrowness with respect to relative "termness" has never become a topic for debate in English. Terminologization is widely recognized as a function of term-concept assignment, and both highly formal and extremely informal term selection procedures recognize the standard methods for term creation based on the broad range of either existing terms or words from general language. Sager has made a significant contribution to a discussion of term formation, and Pinker evaluates what terms are and how they function from a cognitive perspective (Sager et al., 1980; Pinker 1999).

The rigor associated with English language term formation varies significantly across a range of applications. The most highly developed, systematic procedures are practiced by official standardizing bodies such as Chemical Abstracts, which assigns names to chemical compounds and complex new products and compounds, such as new polymers or new drugs, according to highly detailed taxonomic rules (Merritt and Bossenbroek, 1997). In biology, for instance, specialized research organizations and learned societies assign new names according to the idiosyncratic rules adopted for specific disciplines, ranging from the highly serious and systematic (nematodes, for instance, where different phenotypes are designated according to a strictly notational system), to the whimsical (fruit fly genes, which are named metaphorically, see Niku and Taipale 20025). The flippant, non-transparent designation of computer objects is a well-known headache for most localizers, and the quirky Anglo-Saxon metaphoric humor reflected in such term assignments as boot and mouse often angers or confuses non-native speakers of English, especially more serious scientists and language planners.

The designation of brand names is subject to legal concerns and is often determined by internationalization criteria and the need to localize products across a wide range of multilingual environments. Given the sheer size of the English language and the presence of numerous varieties, regional variants are unavoidable. While unification or harmonization of terms within companies and enterprises is a growing trend, mapping of concepts and the recognition of multiple synonyms prevails in many fields. Particularly in data management environments, little or no effort is made to enforce single data element names and preference is given to the mapping of local names to standardized data element concepts and names documented in data element registries (ISO 11179).

2 BASIC MODELS

2.1 Saussure

Reflection on the relation of language to the ideas underlying words, terms, or other designators is as old as Western philosophy, but Plato, Aristotle and the ancients did

[5] Typical names include *Ken and Barbie* (these flies have no external genitalia) and *Cleopatra* (which interacts with another gene called *asp* – one might conjecture with unfortunate results).

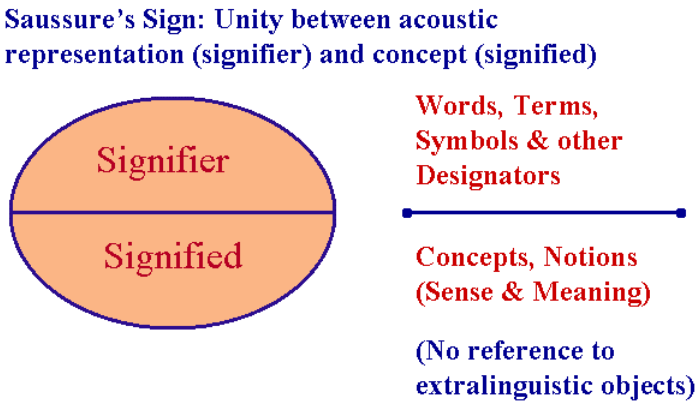

Figure: The semantic (semiotic) sign

not have the last word on the subject. In the twentieth century, Ferdinand de Saussure (1974 [1916]) introduced his binary graphic model based on a simple circle used to express the unity of the linguistic sign, made up of the signifier and the signified. In order to represent the communicative function of language, he defines the nature of the sign as the unity between acoustic representation (the signifier) and the concept (the signified). The signifier can be a spoken word, phrase, etc., a written word, or as some other visual or even tactile (e.g., Braille) representation, not to omit a wide range of various designators, including not only words and terms, but also formulae, symbols, icons, and the like. Important to the Saussurian view is the apparent exclusion, at least in the model, of objects in the external world, implying a skepticism (well founded as early as Aristotle) toward any fixed or natural link between language and objects in the real world. Of further interest is his introduction of his notion of a division of language into three levels:

- *langage*, the human capacity to evolve structured communication systems;
- *langue*, human language, such as English or French, as embodied in rules, grammar, and manuals of style;
- *parole*, any individual speaker's particular use of the language, either in spoken or written discourse.

The "rightness" of the Saussurian view seems to be more apparent in French, where the critical terms form a tight etymological field, whereas their equivalents in English (if one abandons the use of the loan words from French that have become the current norm in English linguistics), are less obviously convincing. Although care must be taken not to overgeneralize on the basis of his later followers, Saussure is associated with the evolution of the structuralist school in linguistics, anthropology, sociology, and philosophy. It is not the purpose of this article to document the many influences of Saussure or the attacks of his detractors, aside from a brief reference to deconstructionist views (see section 4.2). The primary reason for detailing this familiar model here is to plot its influence on later model makers and to introduce English language Saussurian terminology, which has played an important role in the translation of other theorists into English.

2.2 Frege

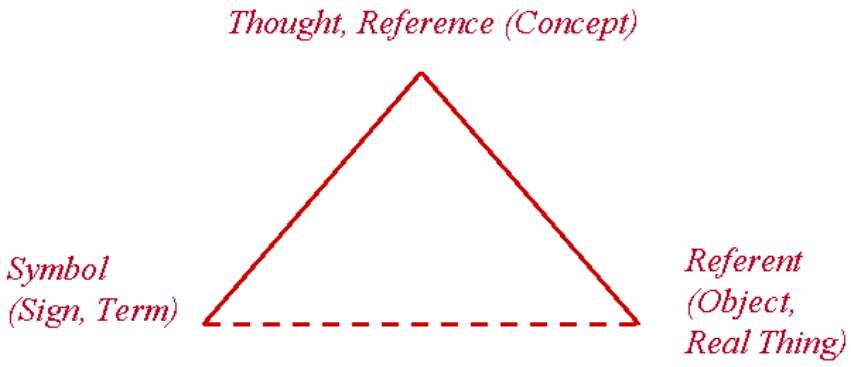

Figure: The basic semiotic / semantic triangle

In contrast to Saussure's omission of any link to extralinguistic objects, the German philosopher Frege, writing in the second half of the 19th century, had articulated the necessity of this dimension, thus establishing a triadic model as shown in figure 2. Although Wüster (followed by Felber) attributes the triangle to Gomperz (Wüster 1985: 76; Felber 1984:100), most modern writers associate it with Frege. Its origins lie in Aristotle6, and the terms used in figure 2 reflect Felber, Saussure, and Ogden and Richards. As Budin has pointed out, any effort to document all the names that have been used to designate the nodes of the triangle by the different writers and former geometry students who have redrawn it is likely to founder under the weight of their proliferation (Budin 1997).

Frege observed that even in instances where there appears to be a monosemic reference between a designation and its concept, situations can exist where the reference still remains unclear. In illustrating his position with the now famous example of the *morning star* and the *evening star*, which are obviously different terms and different experiential concepts or points of view, but the referent involved in both cases is the same *object*, e.g., the planet Venus. The *morning star* and the *evening star* are *senses* (*Sinne*) associated with the *referent (object, significance)* which is the planet Venus, and which Frege characterizes as the *Bedeutung* of the concept in question. Later classification specialists sought to solve this puzzle by speaking of the *facets* associated with a concept (Dahlberg 1993).

The dilemma posed by Frege's *Sinn und Bedeutung* is further compounded by the fact that his English translators chose to borrow the notion of *reference* from Ogden and Richards (symbol, sense, reference) to translate Frege's terms *Zeichen, Sinn, Bedeutung*. This is not wrong, but it can lead to confusion because *Bedeutung* is also quite correctly translated as *significance*. This varied usage easily implies Frege to be closer to Ogden and Richards than to Saussure in his intent. Certainly, the word *meaning,* which is another option for *Bedeutung*, is focused on the conceptual level, and does not adequately serve as a link to either

[6] In *De Interpretatione* "Aristotle sets out his 'semantic triangle' [wherein he] claims that words signify thoughts, which in turn are likenesses of things. This passage is traditionally interpreted as providing the genesis of a semantic theory according to which words signify concepts primarily and things only secondarily (i.e., only *through* the mediation of such concepts)" (Brower-Toland 2003).

Sinn or *Bedeutung*. Readers of Seleskovitch, for instance, are aware of the confusion that can be sown if the terms *sense* and *meaning* are bandied about without precision, especially within a single body of work (see Wright, 1994/5). Nor does *meaning* adequately reflect the intimate etymological relation between the *sign* and the act of *designation* that is critical to either Saussure or Frege.[7] Finally, English usage in lexicography co-opts the terms *meaning* and *sense* with regard to the lexicographical entry, attributing to *meaning* all the various connotations (concepts associated with a word in a dictionary entry), whereas *sense* indicates the specific significance of a word in a given context. Of course, it is an individual *sense* of a term that becomes the subject of the terminological entry.

2. 3 Wüster and Felber

With his engineering perspective, Wüster valued the triangle as a graphic model for use in explaining linguistic relationships to subject-area specialists in order to facilitate domain-specific communication through terminology management. In light of the zeal with which some of his adherents have promoted a rather rigid, solid-line model, it is important to point out that Wüster's view of the triangle was more circumspect. *"Die Grundlinie"* he wrote, *"sollte eigentlich fehlen. Und der rechte Schenkel sollte nur gestrichelt sein, denn unmittelbare Zuordnung gibt es nur zwischen dem Zeichen (links unten) und dem Begriff (an der Spitze)."* [*"The bottom line should not be there at all, and the right side should only be a broken line, because there is only an indirect link between the sign (lower left) and the concept (at the apex of the triangle)."* (Wüster 1984: 76; translation by the author.)] Wüster's representation of the triangle places the *Zeichen* at the lower left and *Sinn* and *Bedeutung* together at the apex of the triangle, which may reflect his unfamiliarity with Frege's distinction between the two or a conscious desire to create a variation on the theme. He does not indicate an awareness of the difference.

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[7] „Die *Bedeutung* eines Eigennamens ist der Gegenstand selbst, den wir damit bezeichnen; die Vorstellung, welche wir dabei haben, ist ganz subjektiv; dazwischen liegt der Sinn, der zwar nicht mehr subjektiv wie die Vorstellung, aber doch auch nicht der Gegenstand selbst ist. … Ein Eigenname (Wort, Zeichen, Zeichenverbindung, Ausdruck) drückt aus seinen Sinn, bedeutet oder bezeichnet seine Bedeutung. Wir drücken mit einem Zeichen dessen Sinn aus und bezeichnen mit ihm dessen Bedeutung." (The significance of a designation is the object itself that we are designating; the notion that we have in this process is totally subjective; somewhere in between lies the sense, which is, to be sure, no longer subjective like the notion, but nevertheless is still not the object itself. A designation (word, sign, compound sign, expression) expresses its sense, but it signifies or designates its significance. We use a sign to express its sense and to designate its significance). (Frege, "Sinn und Bedeutung", 1892; variant translation by the author using Saussurian rather than Richardian terminology; an *Eigenname* is actually a proper name, but here the context would indicate that he is concerned with broader designations.)

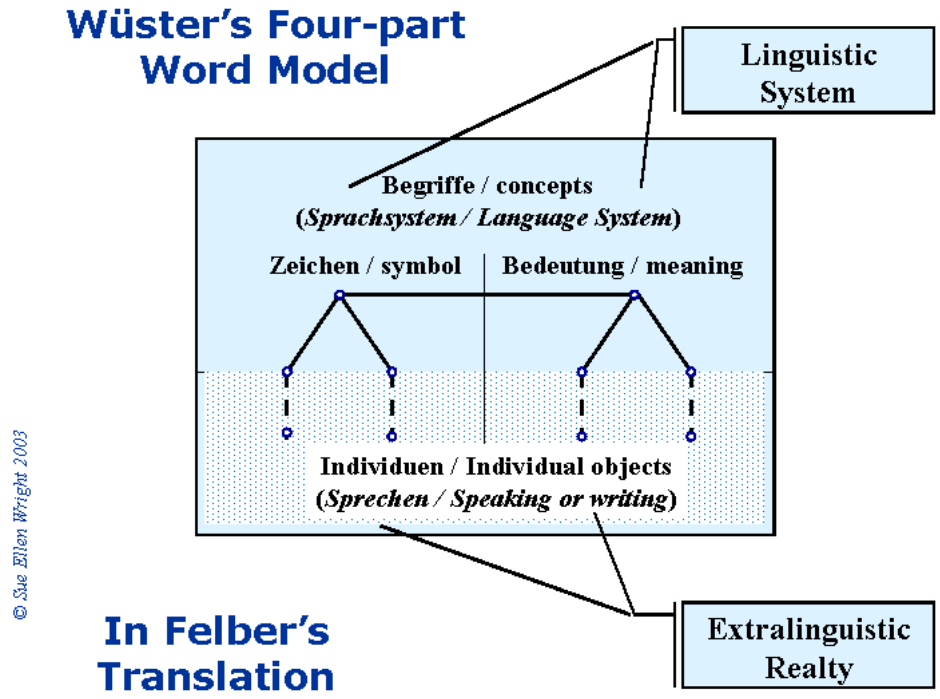

Figure: Wüster's four-part model in Felber's translation

Again, the English equivalents for the German terms Zeichen, Sinn, and Bedeutung present a problem, especially for the more complex four-part model (figure 3) that Wüster proposed for superimposing the elements of the triangle on the Saussurian model of language levels. Although Felber clearly acknowledges Wüster's debt to Saussure (see also Brekke 1997: 85 ff.), in presenting Wüster's ideas from The General Theory of Terminology to an international audience in his Terminology Manual (Felber 1985: 100), he either failed to use or possibly eschewed the customary English equivalents for the Saussurian elements. In any event, the result is that monolingual English readers who do not know the original German frequently fail to grasp the direct connection and find the Wüsterian model difficult to comprehend. Interpreting the Zeichen, which is essentially the sign, as a symbol can become confusing in light of the fact that symbols in terminology management are just one of the signs or designators that can be used to represent a concept (along with terms, formulae, etc.). Felber gives the nod to Ogden and Richards' terminology, no doubt in deference to Wüster's citation of their work. Objections to meaning in this context have been cited in the previous section of this paper and recur with respect to Benjamin. In this light, I prefer the interpretation in figure 4. Although "language system" and "speaking" (Felber's original translations) may seem clear, the unambiguous "English" loan words langue and parole actually clarify the provenance of the model for any reader with a sound linguistic background. In this particular case, it is not inappropriate for the author to be associated with the terminology of another author, but the problem is that the author (Wüster) expresses an affinity for both Saussure and for Ogden and Richards, which makes the choice of terminology doubly difficult due to the divergence of terms used to translate these authors.

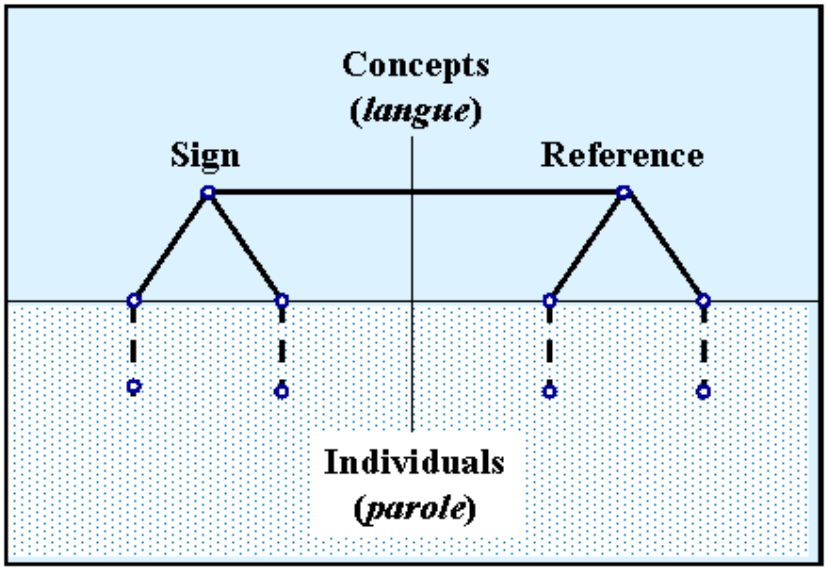

Figure: A retranslation using Saussurian terms

Aside from the conjecture that he did not know or acknowledge Frege, Wüster's preference for Sinn und Bedeutung placed together at the apex of the triangle can be interpreted as an assertion that, even if we recognize a distinction between the two, both reside properly at the conceptual level. Indeed, both avatars (the morning star and the evening star, two senses), and Venus (single significance or reference) are nonetheless concepts, for which the real object (the actual star in the sky) alone occupies the right-hand position in the triad. Sowa's stacking model (figure 10) suggests a possibility for representing this added complexity posed by the famous puzzle (see figure 5).

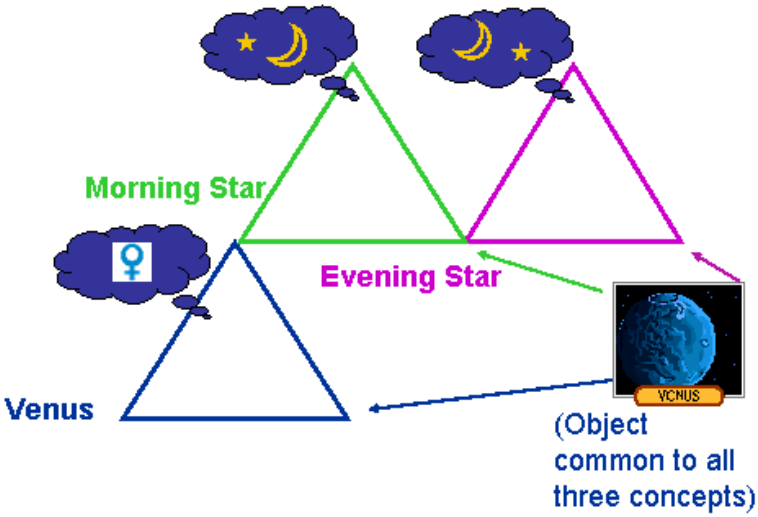

Figure: Modeling conceptual facets

3. THE TRIANGLE AND TRANSLATION

3.1 St. Jerome's dictum

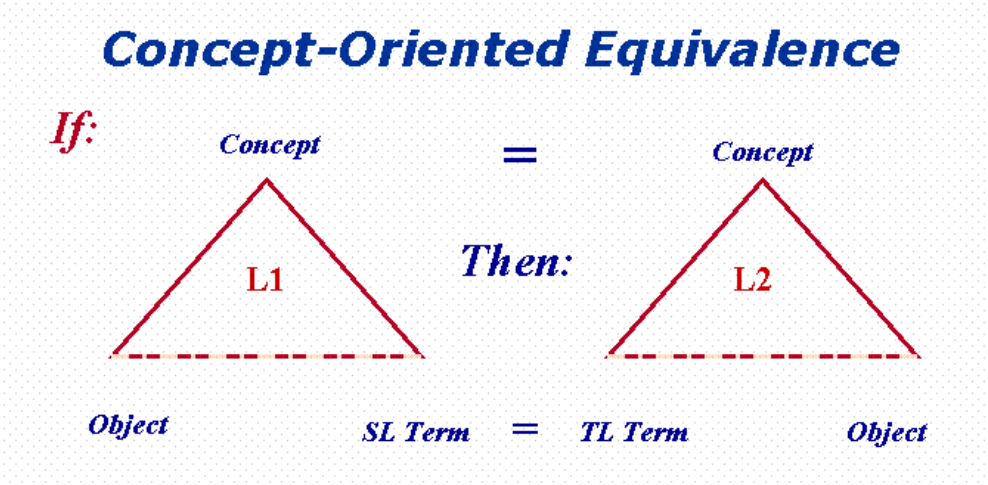

Figure: Combating the term-equivalence fallacy

Wüster introduced the triangle as a practical tool for standardizers, but it has also been used in the training of translators. According to the conventional wisdom of Cicero and St. Jerome (non verbum e verbo sed sensum exprimere de sensu [Hoppe 1996]), the model in figure 6 exemplifies the ancient dictum that translators should not translate word for word, but rather according to a sense derived from a sense. In translation-oriented terminology management, as well as in data management environments where synonyms, equivalents, or synonymic data elements, for instance, are mapped to one another for purposes of translation or data exchange, the paired triangles (rightly or misleadingly) have been used as a symbol for accurate equivalence or transfer.

The critical issue here is that apparently equivalent terms (based on such factors as translingual cognates) or apparently synonymous data category names should not be used to establish equivalence or to match up data categories. Similar or even identical forms (e.g., en control, fr contrôle) can be notoriously misleading because of subtle shifts in conceptual reference, and directional issues such as diversification (broader meaning in the ST than in the TT, accompanied by conceptual splitting to accommodate the divided senses) and neutralization (the opposite phenomenon, where two or more concepts in the ST merge to form a broader TT term-concept pair). Although widely accepted, particularly by communicative, skopos-oriented translators, the implication of the triangle was rejected by Walter Benjamin, who advises against the translation of the sense of texts at the cost of faithfulness to the sign. This position has exerted considerable influence on the anti-structuralist, deconstructionist literary translators in France and North America.

3.2 Walter Benjamin

In the "Task of the Translator", Benjamin (1923, 1969) diverges from the received wisdom of Jerome with an extended discussion of *Sinn* (sense) and *Bedeutung* (which I will here

translate as *significance* because this is closer to his other English translators than is the *reference* used by English translators of Frege), while at the same time taking on the structuralists with a barrage of their own vocabulary. In so doing, he indulges in an exercise of terminological variation that may be lost on many who read him in the English translation because of the apparent disregard for (or perhaps just frustration with) this particular semantic field on the part of his various English translators. Rendall in particular recognizes Benjamin's debt to Frege, but nonetheless chooses to vacillate between *meaning* and *significance* in his choice of renderings for *Bedeutung*, then compounds the confusion by also assigning *meaning* to *Sinn* as well. Despite his citation of Frege, he avoids using *reference* at all (Rendall 1997; Benjamin 1997).

The problem inherent in the translation of Benjamin is partly one of situationality and syntax. It can be difficult to reconcile all inflectional forms with a single interpretation of *bedeuten* viewed from its perspective as a lemma. In ¶ 3 of the essay (*Übersetzung ist eine Form. ...*), Benjamin writes: *"...Übersetzung ... ist doppel**sinn**ig. Es kann **bedeuten** ..."* and speaks of the *"**Bedeutung** dieser Form"*, contrasting *Bedeutung* to *"den selbständigen **Sinn**"*. In this paragraph, Rendall's solution for *es kann bedeuten*, is entirely natural: "it can mean …" in the sense that a word or term *can mean*, which leads Rendall perforce to equate *Sinn* with sense and *Bedeutung* with *meaning*. In the next paragraph, however, he reverts to equating *Bedeutung* to *significance*, which brings us (at least in the context of English conventions for naming parts of the triangle) back to Saussurian usage in English and ignores the standard equivalents for Fregian *Bedeutung*. Thus Rendall's failure to observe the "regularities of the text", here a highly purposeful regularity in vocabulary usage, destroys the link between the introductory discussion in ¶ 3 and Benjamin's development of his thesis in ¶ 4. Furthermore, the variation between the terms used for the English translation of Frege and the Saussurian (and yet equally accurate) terms used for *Bedeutung* is very likely to mask Benjamin's contentious invocation of Frege, which is very clear in the original German.

This anomaly might not be so disturbing if 1) Rendall had not taken it upon himself specifically to correct lapses and losses in previous translations and 2) he were able to maintain consistent usage throughout the rest of the translation. Unfortunately, in ¶ 11, where Benjamin continues his discussion of the translator's role in conveying the significance of the text, Rendall indulges in a terminological switch worthy of Seleskowitch. Where Benjamin writes *"Denn worauf bezieht Freiheit sich, wenn nicht auf die Wiedergabe des **Sinnes**, ... allein wenn der **Sinn** eines Sprachgebildes identisch gesetzt werden darf mit dem seiner Mitteilung ...",* Rendall offers: *"For what can the point of freedom be, if not the reproduction of **meaning** ... only if it can be posited that the **meaning** of a linguistic construction is identical with the **meaning** of its communication ..."* (Rendall 162). Hence a close reading of Rendall's English version will not enlighten the reader with regard to Benjamin's careful delineation of his position with regard to *Sinn und Bedeutung*. I will not argue the question of Saussurian vs. Fregian terms at the moment, but I do propose that if *Sinn* is to be *sense*, it should always be *sense*, and that *Bedeutung* should be consistently *significance*. This consistency yields "*it can signify"* for "*es kann bedeuten"* and *significance* for *Bedeutung* in ¶ 3 and *the reproduction of sense* and *the sense of the linguistic construction* for *Sinn* in ¶ 11.

Such a reading returns coherence to the target text and does justice to Benjamin's own plaidoyer for respect for the *Zeichen*.

As noted, the choice of *significance* here (as opposed perhaps to *reference, denotation,* or other possible options) reflects a bias for Saussurian terminology. Although it is by no means certain whether Benjamin consciously drew on Saussure, his debt to Frege is quite apparent in terms of his usage and cadence. Reference to the *Zeichen*, which is made up of the *Bezeichnende* and the *Bezeichnete,* is a clear invocation of German equivalents for the *sign / signifier / signified* relation, but this affinity is already present in Frege, as is the discussion of *das Meinende / das Gemeinte* (*that which intends, the intention*). The necessity to make a choice from among various options underscores the dilemma of the translator: in opting for one solution over another, the translator places the source in a context with respect to the history of ideas, a context which may or may not be appropriate to the situationality of the original. It can be argued, however, that Rendall's preference for Saussurian terminology (albeit inconsistently applied) is more appropriate to his skopos, for his readers are mostly translator-linguists.

The importance of the translational problem described here is central because the distinction between *sense* and *significance* is the core thesis of Benjamin's essay. Where Saussure focused on the sign (comprised of the *signifier* and the *signified*, the designator and the concept designated, i.e., the left side of the triangle), and Frege concerns himself with the relationship between the *sense* (the conceptual level) and the *significance / reference* (the object level, i.e., the right side of the triangle), Benjamin reverts to a pre-Aristotelian view that true equivalence can be found only between the *sign* and the *significance*, e.g., between words and objects, as manifested in pure language (the nodes at the base of the triangle). His citation of Mallarmé (*Les langues imparfaites en cela que plusieurs... languages imperfect on account that they are many*—as noted by Rendall, no English rendering can do justice to the syntactic rupture of Mallarmé's original) conjures up the image of the *confusion* of Babel. His introduction of pure language implies the perfect language of Adam before the Fall, when the relation between word and object was univocal and unambiguous. This Cabbalistic turn is widely recognized in the Benjamin literature and reflects a long tradition leading across the rough terrain of perfect language, universal language, magic language, and universal classification schemes, linking the Cabbalists to Benjamin, Porphyry to Piaget, Leibniz to the Cycorp Universal Upper Ontology (Cyc 1997), and polygraphies to the *interlingua* of the more visionary proponents of machine translation (Eco 1995, Melby 1995).

Amidst the mystical abstraction of his argument, Benjamin proposes an example that is conceived perhaps as a pendant to Frege's discussion of the object Venus and that is concrete enough to be called a model in its own right (figure 7). The figure illustrates Benjamin's argument concerning the *mode of intention* and the *intended object* with the example of bread—postulating that translation from *Brot* to *pain* comprises an almost mystical act that somehow links these disparate items together in an act of pure language. My rendering here adds English *bread* and Armenian *lavash*, and multicultural options such as Ethiopian *injira / enjeera* would further illustrate the variations in connotation and denotation existing between the conceptual intension [sic!] of *bread* and its extension, e.g., the many kinds of objects associated with this concept. In Benjamin's view, it is not the convergence of sense as

a whole that determines equivalence, as implied in figure 6, but rather a single point of the *sense* (alas, Rendall is still using *meaning* here—thus leaving the English reader in the dark as to whether Benjamin posits *meaning* in *Sinn* or *Bedeutung*). This *sense* is positioned tangential to pure language that is enabled or released by the act of translation, and which, in the fulfillment of messianic time, has the potential to overcome the foreignness and confusion imposed by the event of Babel.

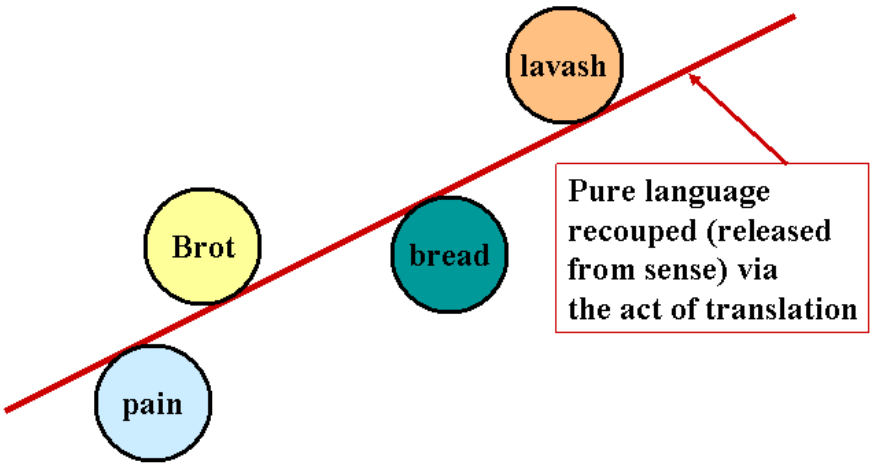

Figure: Significance and its tangential relationship to pure language

Benjamin's argument is designed to counter the structuralist view that equivalence is somehow addressable in terms of the commonality of characteristics comprising the sense of concepts in multiple languages. Interestingly, however, Wright (1993) uses a similar comparison to underscore the value of the terminological method based on Wüster's declaration that the "content of a concept is understood to be the totality of all its characteristics" (1984: 7). Sowa, in contrast, cites Wittgenstein as saying that "the common concepts of ordinary life can only be characterized by a loose set of family resemblances, not by a definitive set of necessary and sufficient conditions." (Sowa, 2000a: 350)

Sowa's position is probably closer to the truth value associated with general language in natural discourse, and yet the fact remains that in practice experts write definitions of special language terms based on the enumeration of significant (if not essential) characteristics. Certainly, the four varieties of "bread" cited in figure 7 are substantially different, and yet it is quite possible to write a viable definition that links them all on the basis of a small set of common characteristics: Merriam Webster certainly covers all the examples in figure 7: *a usually baked and leavened food made of a mixture whose basic constituent is flour or meal*. The variety of flour used, the presence of water or possibly milk, the degree of rising, miscellaneous secondary ingredients, all these other properties of different sorts of bread, are quite irrelevant in light of the essential *characteristics* of flour and leaven as the primary ingredients. Ironically then, Benjamins anti-structuralist graphic image can serve as a viable argument for a structuralist representation of common characteristics classifying even the pancake-like *injira* under the concept of *bread.* This is not to say, however, that Wüster is

right and Benjamin wrong, but rather that the model itself can be applied in diverse environments depending on the intention required by a given situationality.

4 NEW MODELS

4.1 Damasio

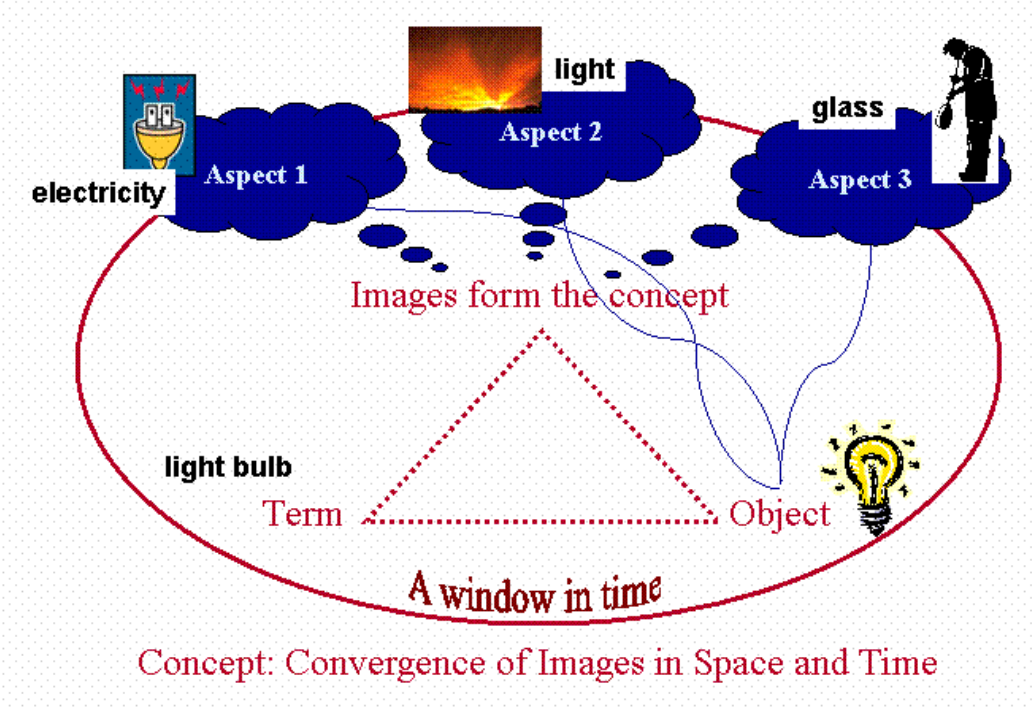

Figure: Damasio's dynamic concept formation

Sowa asserts that Wittgenstein declined to speculate on mental processes because the nature of meaning does not depend on their nature (Sowa 2000a: 195), but Antonio Damasio, a Portuguese-American neuroscientist with a strong philosophical bent, delves into mental processes with the implied premise that the formation of concepts is a function of these processes and does indeed inform the organization of meaning in the human mind. As opposed to relying on introspection, however, with its potential for dubious observation, his analysis of mental processes is supported by such methodologies as functional imaging, psychophysiology, and experimental neuroanatomy.

The models presented so far appear to document concepts as permanent constructs in the mind, which one would have to assume, if communication is to be at all effective, are somehow stable, at least in a single individual over time, if not also across individuals in a given speech community. Psychology and neuroscience have entertained the hypothesis that concepts are formed in language communities and remain in the mind as consistent prototypes. Damasio maintains, however, that based on empirical studies involving aphasics, concepts do not comprise permanent prototypes that are ever-ready for repeated reference, but rather constitute instantaneous convergences of aspects that combine during a window in time and space. It is this instant of convergence that generates quasi-recollected constructs that we

perceive as concepts to which we have already assigned words or terms, provided, of course, we have previously encountered the object.

The images that evoke these concepts "are *not* stored as facsimile pictures of things, or events, or words, or sentences. The brain does not file Polaroid pictures of people, objects, landscapes; nor does it store audiotapes of music and speech… In brief, there seem to be no permanently held pictures of anything. … Memory is essentially reconstructive" (Damasio 1994: 100). According to this analysis, thought is grounded in these fleeting perceived images, certainly not in words, and it is on the basis of these images that we organize signals coming into the sensory centers in the brain, aggregate them into meaningful groupings, and categorize the results. Damasio states that "dispositional representations exist as potential patterns of neuron activity in small ensembles of neurons", which he calls "convergence zones" (102). The dynamic variability of Damasio's analysis supports Picht's preference for Felber's conclusion that "the concept is therefore an element of ***thinking***" (German: *Denkeinheit*; Picht1997; Felber 1984: 115; emphasis by the author) as opposed to "unit of ***thought***".

Damasio's view does not necessarily rule out the image of something like prototypes, but it does negate any notion that they can exist in any sort of a priori way. The upshot of these iterative processing events is that concepts are in constant flux even in the brain of a single individual. In Damasio's model, as in Piaget, the brain is predisposed to categorize the critical aspects (characteristics) associated with a single cognitive event and to classify the resulting concept (Piaget 1952). The classification function itself is innately human, but any given ordering system is purely arbitrary from the individual's standpoint, and even so-called "scientific" classifications are based on arbitrary cultural convention.

4.2 Kuhn and Feyerabend

Damasio does not carry this view of the human mind into any sort of conclusions concerning the possibilities for interpersonal communication. As a scientist and a physician, he implies a certain norm, where communication is at least "as good as it gets", and focuses his attention on pathological inabilities to verbalize on the part of individuals with serious brain lesions. His interest is in the real-time linkage between perceived concepts and their linguistic embodiment via the identification of associated words. Nevertheless, it is not difficult to use his theory to support the notion of incommensurability postulated by Kuhn and others, such that it becomes impossible to compare two paradigms or their parts because of essential differences that are fundamental to the very nature of the human mind. This train of thought has led translation theorists, among others, to support the seasonally discounted, seasonally resurrected Whorf-Sapir hypothesis that translation (i.e., the mapping of concepts across language boundaries to facilitate interlingual communication) is impossible (Sapir 1929). If individuals have different visions of the world, then any marginal commonality in vision is held together by the local conventions of cultures, disciplines, or sub-disciplines, ethnic groupings, etc., resulting in "different logics, different visions of the world and man" (Gernet cited by Ronan 1998; see also Hart1999). Skepticism regarding meaning is common to the same deconstructionist schools that valorize Benjamin.

4.3 Deacon and Pinker

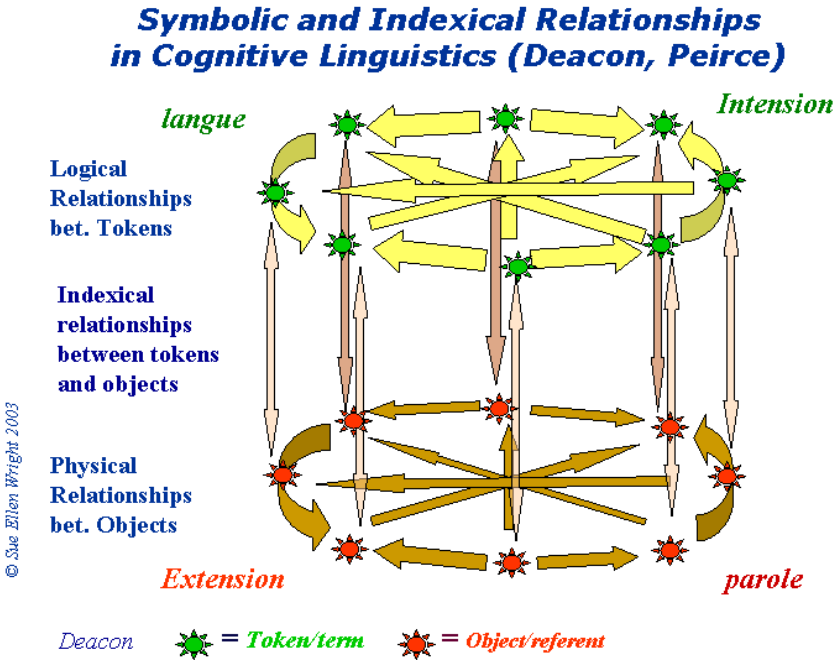

Figure: Logical, indexical, and physical term-object relations

Another American neuroscientist, Terrance Deacon, considers the Saussurian and the triangular semiotic models (in this case citing Frege), and notes that "the correspondence between words and objects is a secondary relationship, subordinate to a web of associative relationships" (Deacon 1997: 70). In attempting to describe these relationships in more detail, he relies heavily on Peirce's terminology of tokens and objects, equated here to terms and referents (objects in the real world). The implied elemental relation between the signifier and the signified, between the word/term and the referent, is overly simplistic. In its place, Deacon proposes a model designed to approximate the complexity of real-world experience by noting the logical and associative relationships that exist between tokens (conceptual references) on the one hand, and the physical, perceived relationships that may exist between objects in the real world on the other. Indexical (as well as iconic and symbolic, to cite Peirce's discussion of conceptual relations) links are formed between conceptual tokens and perceived objects. Echoing Damasio, these relations are not static or permanently recurring phenomena, but rather diachronically invoked "combinatorial possibilities and co-occurrences … [reflecting] the probability of correlations between things" (Deacon, 483).

This particular model does not, as it might seem at first glance, link the sign world directly with the object world, for the moment of triangulation achieved in the traditional semiotic model is embodied in the mediation performed by the relational interaction between tokens and objects. Deacon's view supports the idea that in addition to the basic relationships portrayed in different versions of the triangle, words (tokens) interact with other words and the subtle conceptual deviations can occur because of historical, cultural, and etymological

word-bound distractions that affect our thinking (misinterpretations, puns, other word plays, etc.). Given the potential for different word/term systems in different languages, it is possible to see how different "logical" systems in one language may not make a great deal of sense to another linguistic community. For instance, the cited problem that the sign / signifier / signified / significance set so confidently promulgated by the Saussurian structuralists threatens to fall apart in English if one tries to translate the basic doctrine without retaining the French loan words.

Deacon's model also introduces relations between things in the apparently real world, proximities and juxtapositions that affect the way that we formulate concepts in any given situational context. Viewed on the printed page, the model fails to explicitate the constantly changing configuration of these various features, which results in different faceted views of the same objects or the assignment of similar or different terms, depending on 1) changes in situation, 2) changes in viewpoint, 3) changes in language over time, but Deacon's insistence on iterative co-occurrences is consonant with Damasio's ever-changing conceptual landscape. Furthermore, the notion of both conceptual reference and language itself varying over time is addressed in Pinker's analysis of the evolution of language from generation to generation, based on the premise that each successive cohort of first-language learners is faced with many of the same challenges experienced by second-language learners, with the result that no child ever truly learns the tongue of their mothers (and fathers), despite universal valorization of the mythic mother tongue, but rather, that each generation reinvents language to fit its own needs and experience (Pinker 1995). Generational change and migration of semantic content are also a crucial element for Benjamin.

4.4 Sowa and the spinners of the Semantic Web

Sowa deals with knowledge representation, focusing on the principles and history of logic as expressed throughout the western tradition from Plato and Aristotle to the modern day. He addresses the formal rules of inference and of inheritance as expressed in predicate logic, harkening back to Frege and Peirce as the originators of predicate calculus, which provides a means for representing the granularity reflected in predicate logic (Sowa 2000a). The avowed purpose for applying predicate calculus in artificial intelligence is to provide machine-parsable "statements" that can be used to support inferences by automatic agents. In electronic information resources, these statements are most frequently expressed in the form of axioms and rules embedded in ontological systems. As such, they participate in the *metalanguage* associated with those systems. The presence of rules and metalanguage introduces a new dimension of complexity, allowing models to encompass many layers of semantic content.

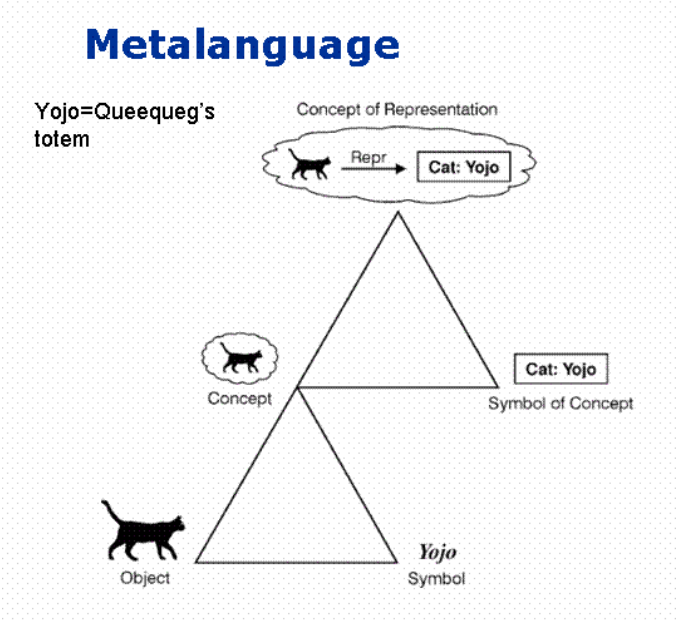

Figure: Sowa's representation of metalanguage (Sowa 2000b)

In order to position metalanguage with respect to language relations per se, Sowa expands the model by stacking the familiar triangle. The object of his somewhat tongue-in-cheek exposition in (Sowa 2000b) is his black cat Yojo, whom he introduces without mentioning any intertextual reference to Melville's Yojo, the equally black wooden totem who serves as a mystical companion to the Maori Queequeg. Sowa's description of the concept harkens back to Damasio's notion of the instantaneous perception of an image, "The cloud on the top [of the bottom triangle] gives an impression of the neural excitation induced by light rays bouncing off Yojo and his surroundings. That excitation, called a *concept*, is the *mediator* that relates the symbol to its object" (Sowa 2000b).

The stacked triangles are intended to represent the fact that the black cat in the model is, of course, not indeed a black cat in-the-flesh, but rather an iconic representation of a black cat, hence an element of metalanguage, yet another level of sign used as a placeholder for the actual object, Yojo the cat, who presumably is disinclined to sit still long enough to be actually embodied in an image of this nature. Indeed, everything about the image has a sign character at the metalinguistic level. It is only by the use of conventions (such as Sowa's carefully explained "cloud") that we can entertain the useful fiction that the model effectively portrays at least three different levels of semiotic interaction. *Metalanguage* according to Sowa, "consists of signs that signify something about other signs, but what they signify depends on what relationships those signs have to each other, to the entities they represent, and to the agents who use those signs to communicate with other agents" (Sowa 2000b).

At its broadest, Sowa defines this sort of *agent* as a "software system that automatically performs useful tasks" (Sowa 2000a: 330). His treatment of agents demonstrates the varying views and definitions offered in the information technology community for different kinds of inferential and functional programs and routines that perform decision-making or quasi-

decision-making actions in computerized environments such as the World Wide Web or enterprise-specific Intranets. *Whatis.com* defines an intelligent software agent as a "*program* that gathers information or performs some other service without your immediate presence and on some regular schedule". A less restrictive view of the intelligent agent might allow for a modification: "... performs a service without direct human intervention," but would eliminate the schedule element because an agent could also perform a one-time, non-recurring function in response to a specific request. Sowa relates the functions of agents to the performance of controllers in automatic feedback systems, thus orienting the function of the agent to long-standing engineering practice as well as to the behavior of natural systems in nature.

Terminology theory has traditionally stressed the importance of orienting terminology management to the creation of concept systems (Wüster 1985; Felber 1986; Arntz and Picht 1989, among others), an approach widely adopted by ISO TC 37 and by many terminology standards committees working in carefully defined, delimited subject fields. Without discounting or rejecting the potential value of systematic terminology management, Wright and Wright (1997) emphasized the utility of ad hoc terminology management (*terminologie ponctuelle*), e.g., terminology management outside the semantic ordering environment afforded by closed concept systems. They stressed pragmatic approaches imposed by the time-constraints and methodological limitations of text-centered, translation-oriented terminology management in industrial and commercial environments. Theoretical and philosophical concerns (Cabré 1998, Temmerman 2000), as well as pragmatic considerations (the tendency in modern software globalization environments toward ad hoc, sometimes "throw-away," terminology practices) have even stridently rejected systematic terminology management as overly prescriptive or impractical within the framework of production processes involving just-in-time delivery of terminology products to authors, translators, and localizers. Some theorists and corpus linguists are disturbed by the fact that they see objectivist models as false—not necessarily an original observation if we assume that *all* models are false. They perceive closed systems as out of sync with the real world and incompatible with the creation of terminological resources within dynamic, corpus-oriented environments. Other practitioners simply find it impractical to deal with systematic ordering in the context of ever changing, constantly expanding, terminological and semantic values in document-related knowledge networks such as those that prevail in the localization industry. Finally, small linguistic communities and language planners seem to have more luck achieving consensus with respect to conceptual relationships than is the case with terminologists working with sprawling world languages like English and Spanish.

Resistance to systematic terminology management notwithstanding, the evolving Semantic Web (SW) and the development of so-called universal or "upper" ontologies have given rise to the notion that terminologies, even uncontrolled, rapidly expanding collections, can be linked to upper ontologies (Ortiz 2000) that provide systematic reference while maintaining open systems. More and more companies are defining and maintaining complex synchronically dynamic thesauri, taxonomies, and ontological resources for objects and functions in their information environments. The challenge is for terminologists to integrate terminological and lexical (e.g., machine translation lexicons), into interoperable, multi-level systems where lexico-semantic information can move back and forth between applications and

information systems, and even across enterprise boundaries, with relatively little loss. Such transfers are rarely totally lossless, but given a certain calculated loss, they are nonetheless not incommensurable.

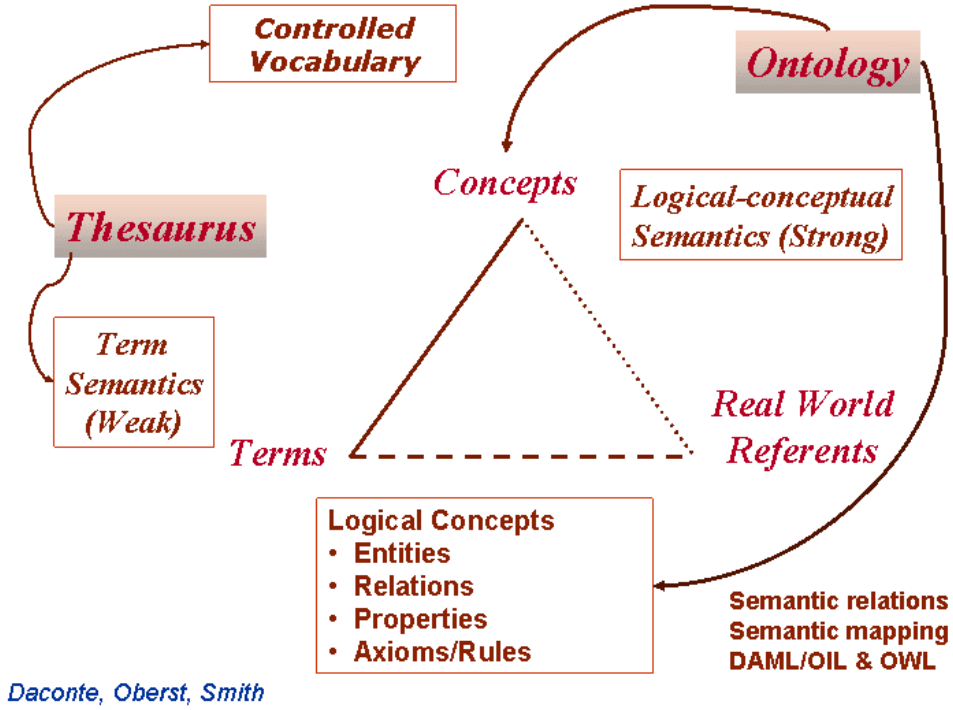

Figure: Thesaurus resources compared to ontology resources

Daconte, Obrst, and Smith plot taxonomies, thesauri, conceptual models, and ontologies along a cline demonstrating a gradual increase in semantic content toward the ontological side of the figure, where they note that one can "express arbitrarily complex meaning" (Daconte et al., 2003: 157). They refer back to ISO 704:2000 (*Basic Principles of Terminology Work*) and to the semiotic triangle to explain the principles of thesaurus and ontology management for articulating the structures of axiom-driven ontologies designed for use by agents in the Semantic Web (op cit., 2003: 208 ff).[8] Their representation is rendered visually much more complex than the image shown in figure 11 by the inclusion of detailed examples illustrating the specification of entities, relations, properties, and axioms. The unadorned triangle provides a kind of visual metamodel that the architects of the evolving Se-

[8]Thesauri comprise essentially term-based systems (the left hand side of the triangle) and are used for information search and retrieval. "Therefore the semantics of the classification space can remain relatively weak …" depending on broader than and narrower than relations. (Daconte et al., 2003: 210) "An ontology, however, does try to represent the complex semantics of concepts and the relations among concepts, their properties, attributes, values, constraints, and rules." Ontologies are intended for use by software applications (e.g., or perhaps, among others, by "agents" in Sowa's sense. Thus ontologies work on the concept/real world side of the triangle. "Unlike the thesaurus, an ontology tries to express precise, complex, consistent, and rich semantics" (op cit.: 211).

mantic Web can decorate with semantic detail in the form of an unlimited number of individual data categories, relations, and links to other semantic nodes. Not just words or terms, as illustrated on the thesaurus side of the image, but rather fully defined rules enable inferential linkage and action on the part of intelligent agents on the Web.

In many cases, the objects defined in ontologies are at the same time data elements (data categories) used in metadata registries designed to facilitate the interoperability of knowledge resources on the SW. Current efforts in ISO TC 37 involve the coordination of all data categories used in linguistic resources produced in a number of thematic domains (terminology, lexicography, electronic lexicons, NLP lexicons, morpho-syntactic markup systems, etc.). The objective is to create a global metadata registry (a family of standards under the banner of ISO 12620 for data categories) that will enable data exchange, access, and interoperability in heterogeneous environments. The ultimate goal is to be able to leverage data across resources and resource types in order to take full advantage of existing data collections, such as in mixed environments involving controlled authoring, human, and machine translation. But on a broader scale, the anchoring of local, even ad hoc terminological or lexical information into layered ontologies brings the model back full circle to the systematic approach: the creation of computer-supported ontological systems that provide for dynamic, open-ended concept mapping eliminates the limitations posed by closed concept systems and allows the ongoing construction of evolving views. Furthermore, the richness afforded by large models facilitates multi-faceted perspectives.

5. CONCLUSION

This article began with a discussion of the contradictory falseness and utility of models with respect to theory and the representation of truth. Models are most useful when they are drafted for the purpose of designing something we are going to build or make work. The architect's model, for instance, exemplifies the future finished building. In digital environments, models expressed in Universal Modeling Language (UML) provide a skeleton that we can decorate with our choice of data categories and styles in order to design a data architecture. Starting with the simple Saussurian model, admittedly an oversimplification, yet useful for the expression of a particular theory of language, we progress to a highly complex model made possible by the ability to manipulate both data and images within a multilayered electronic knowledge system. The utility of the model is not simply that it represents a view of truth (e.g., of extralinguistic reality), but rather that it *functions*, it performs tasks in an agent-driven semantic network. It is not necessary that the model reflect the way that language works in the human mind because computers function entirely differently from the human mind. The critical factor is simply that the model be capable of performing useful work in the form of information access, retrieval, and manipulation. In fact, as Daconte et al. point out, the crucial issue in the adoption of any model in this environment is that the most widely used model will be the most useful, and that even highly elegant models will be ineffective if they are not widely accepted.

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Errata in IITF-Journal Vol. 13 (2002): Margaret Rogers: 'Clines' and boundaries: forms of representation in Terminology, pp. 52 – 61

On page 55, the following two illustrations are missing at the end of section 2:

On page 59, the example 'cold start valve' is incorrectly assigned to section 9. The examples are part of section 9. Further, the section labelled '1' on page 60 should be '10', and sections 9 — 10 should look as follows:

9. The linguistic types of representation form include paraphrases, as well as the term, both representing the concept. As indicated in point 6, translators have used paraphrase as a textual strategy to cover new concepts through the long history of knowledge transfer across linguistic boundaries. But the line between paraphrase and term is not a clear-cut one, as implied. Paraphrases have an important expedient function in filling terminological gaps in texts, but they also have a regular terminological function if viewed from a language-typological perspective. Compare, for instance, the following:

cold start valve	Kaltstart-Ventil	électrovanne de commande de régime de ralenti
idle speed valve	Leerlauf-Ventil	électrovanne de commande de démarrage à froid

The structure of one language's paraphrase or pre-term, e.g. *car fitted with a catalytic converter* (*cat car*), may be the structure of another language's term.

10. Practical experience from term extraction has shown me that identifying term boundaries is not as straightforward as suggested in the paper, where the problem is resolved by reference to the concept. But the concept itself is very slippery in texts, as we have seen, and functionally so in many cases. The paper acknowledges that even a formal definition (at system level) only represents a particular view of a concept. The representation of concepts in texts is therefore problematic for the establishment of systems, although in a sense it is the text which is real rather then the aimed-for system, which is actually a kind of model, not a kind of reality.