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

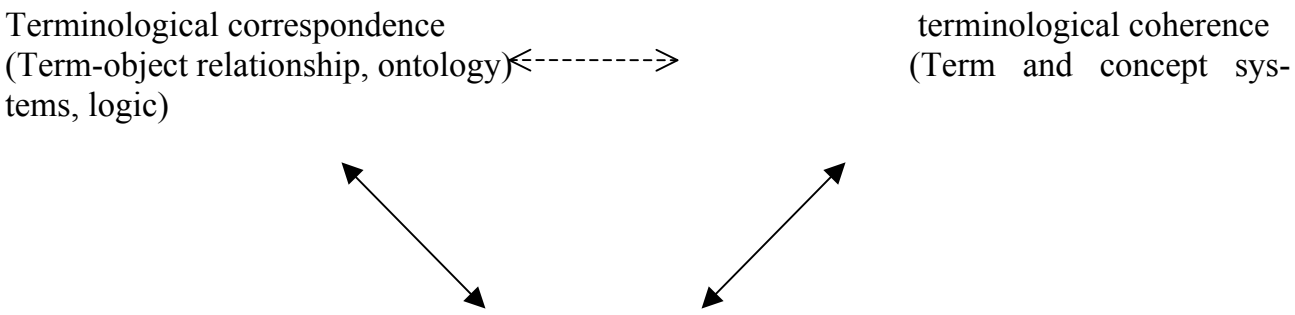
Philosophy has always been characterized by its diversity of opinions, approaches, paradigms, schools, traditions, and epistemological assumptions and orientations that not only succeed each other, but that also compete with each other or that at least co-exist at a certain point in time. Therefore, 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.

LITERATURE

ALEXEEVA, L.M. Interaction between Terminology and Philosophy

BAUM, RICHARD. Die Revolution in der Chemie im Spiegel der Sprache: Das terminologische Manifest Antoine Laurent Lavoisiers von 1787. In: Albrecht, Jörn; Baum, Richard (Hrsg.). Fachsprache und Terminologie in Geschichte und Gegenwart. Tübingen: Narr, 1992, 145-170

BOLZANO, B. Wissenschaftslehre. Sulzbach: Seidel, 1837

BRENTANO, F. Psychologie vom empirischen Standpunkt. Leipzig: Duncker und Humblot, 1874

BRENTANO, F. Kategorienlehre. Leipzig,1933

BÜHLER, K. Sprachtheorie. Jena, 1934

BUDIN, G. 1988 (Vortrag) The Application of terminology-based knowledge data bases in the humanities and the social sciences and its impact on research methods. In: Best, H.; Mochmann, E.; Thaller, M. (Hrsg.). Computers in the Humanities and the Social Sciences. München/London/New York/Paris: Saur, 1991, S. 337 - 342.

BUDIN, G. 1996a. Wissensorganisation und Terminologie. Komplexität und Dynamik wissenschaftlicher Information und Kommunikation. Tübingen, Narr, 1996

BUDIN, G. 1996b: Terminology Science as Applied Philosophy of Science. In: J. Myking, R. Sæbøe, B. Toft (Hrsg.): Terminologi - system og kontekst. Bergen, 1996, S. 59-72

BUDIN, G. 1996c: Evolution of Scientific Terminologies. In: Galinski, Christian; Schmitz, Klaus-Dirk (Hrsg.): TKE 96. Terminology and Knowledge Engineering. Proceedings. Fourth International Congress on Terminology and Knowledge Engineering. 26-28 August, 1996. Frankfurt a.M.: Indeks Verlag, S. 27-34

BUDIN, G. Terminologie und Wissenstechnik als Angewandte Wissenschaftstheorie – Entwicklungsstand und Perspektiven. In: Haltmayer, Wuketits, Budin (Hrsg.). Festschrift für Erhard Oeser zum 60. Geburtstag. Wien etc.: Peter Lang Verlag, 2000, S. 29-41

BUDIN, G. Knowledge Organization for the Semantic Web. Austrian Journal of Artificial Intelligence, 2001 ÖFAI …

BUDIN, G., OESER, E. Grundlagen der Terminologiewissenschaft. In: Hoffmann Lothar; Kalverkämper Hartwig; Wiegand Herbert Ernst (Hrsg.). Fachsprachen/Languages for Special Purposes. Ein internationales Handbuch zur Fachsprachenforschung und Terminologiewissenschaft. 2. Halbband, Berlin/New York: de Gruyter, 1999, S. 2171-2183

BUDIN, G.; MELBY, A. Accessibility of Multilingual Terminological Resources - Current Problems and Prospects for the Future. In: Proceedings of the LREC Conference – Language Resources and Evaluation, Athens, June 2000, vol. II, S. 837ff

DIDEROT, D.; D'ALEMBERT: Encyclopédie, ou dictionnaire raisonné des sciences et des arts. Paris, 1751

ECO, U. Auf der Suche nach der vollkommenen Sprache

FELBER, H. Konrollierte Begriffsdynamik. Berlin: Cedefop, 1988

FELBER, H. Allgemeine Terminologielehre, Wissenslehre und Wissenstechnik. Theoretische Grundlagen und philosophische Betrachtungen. Wien: TermNet, 2001

FREGE, G. Begriffsschrift, eine dem Arithmetischen nachgebildete Formelsprache des reinen Denkens. Halle: Nebert, 1879

FREGE, GOTTLOB. Über Sinn und Bedeutung. Zeitschrift für Philosophie und Philosophische Kritik, 1892

HAJUTIN, A.D. Die verschiedenen Richtungen der Terminologiearbeit. Original erschienen 1971, Deutsche Übersetzung 1993 in Laurén, Christer; Picht, Heribert (Hrsg.). Ausgewählte Texte zur Terminologie. Wien: IITF/Infoterm, 3f

HEMPEL, C. Aspects of Scientific Explanation. New York, 1965

HEYDE, I.E.: Die Objektivität des Allgemeinen. Ein Beitrag zur Lösung der Universalienfrage. Köln, 1965

LEIBNIZ, G. W. Neue Abhandlungen über den menschlichen Verstand (French original) 1704

LOCKE, J.: Essay on Human Understanding, 1690

MEINONG, A. Über Gegenstände höherer Ordnung und deren Verhältnis zur inneren Wahrnehmung. Zeitschrift für Psychologie und Physiologie der Sinnesorgane, 21, 1899, 182-272

MEINONG, A. Über Gegenstandstheorie. In: Meinong, Alexius (Hrsg.). Untersuchungen zur Gegenstandstheorie und Psychologie. Leipig, 1904

MEINONG, A. Über die Stellung der Gegenstandstheorie im System der Wissenschaften. Zeitschrift für Psychologie und Physiologie der Sinnesorgane. 1907

MOORE, A. W. (ed.). Meaning and Reference.Oxford, 1993

OESER, E. Begriff und Systematik der Abstraktion. Wien/München: Oldenbourg

OESER, E. 1991: Terminologie und Wissenschaftstheorie. In Budin, Gerhard; Oeser, Erhard (Hrsg.). Beiträge zur Terminologie und Wissenstechnik. Wien: TermNet 1997, 9-21

OESER, E.; BUDIN, G. Controlled Conceptual Dynamics: From "Ordinary Language" to Scientific Terminology – and Back. In: Terminology Science and Resarch. Vol. 6 (1995), no. 2, S. 3-17

PEIRCE, C. S. The Philosophy of Peirce. Selected Writings. New York, 1940

POPPER, K. Objective Knowledge. London, 1972

PÖRKSEN, U. Wissenschaftssprache und Sprachkritik. Untersuchungen zu Geschichte und Gegenwart. Tübingen, 1994

REY, A. Essays on Terminology. Amsterdam/Philadelphia: John Benjamins

SMITH, B. Austrian Philosophy. The Legacy of Franz Brentano. Open Court. 1994

SOWA, J. Knowledge Engineering. ….2000

THAGARD, P. Conceptual Revolutions. Princeton: 1992

WHEWELL, W. History of the Inductive Sciences 1837

WÜSTER, E. Internationale Sprachnormung in der Technik. Besonders in der Elektrotechnik. Berlin: VDI-Verlag, 1931