Review

Jaap Maat. 2004. *Philosophical languages in the Seventeenth Century: Dalgarno, Wilkins, Leibniz*. Dordrect-Boston-London: Kluwer. (The New Synthese Historical Library: Texts and Studies in the History of Philosophy, vol. 54). 415 pp. ISBN 1-4020-1758-8

As principles of knowledge organization can be applied in a wide spectrum of different domains and research communities, some important manifestations of them have not been investigated in depth by mainstream KO research yet and deserve to be proposed to the attention of those interested in KO. I am indebted to interlinguist Federico Gobbo for pointing me to this important book, which has appeared in a series in history of philosophy but, as reading proceeds, reveals itself as a thorough work about core KO problems.

Jaap Maat addressed three major projects of philosophical languages for his PhD thesis at the University of Amsterdam and later elaborated it into this monograph. The projects, documented in seventeent-century writings, are George Dalgarno's *Ars Signorum,* John Wilkins's *Real Character* and G.W. Leibniz's ideas for a combinatorial logical language. As well as less famous others in their times, they all aimed at developing artificial languages that should have improved scientific and philosophical communication and thinking by virtue of their systematic and logical features. One of the merits of Maat's treatment is that it does not present them as just curious expressions of naive knowledge of their times, as is suggested by Borges's (1952) famous ironical lines and to some extent also by Eco's (1995) essay in history of European culture; Maat, rather, accounts for the clever structures and principles of such achievements in greater detail, based on close inspection of original editions and of many unpublished or recently-published manuscripts by Leibniz, thus making clear that they are (although he does not use this term) nothing but general knowledge organization systems.

The relevance of Wilkins's work to our field was first appreciated by Vickery (1953) and has recently been represented in Laporte's (2018) entry on "Ideal language" in the *ISKO Encyclopedia of Knowledge Organization*. As I have noticed elsewhere (Gnoli 2004), philosophical logical languages including contemporary ones such as Lojban (Cowan 1997) are one kind of artificial language, just as indexing languages are (cf. Coyoud 1966; Hutchins 1975); so it is not by chance that they face similar problems and may develop similar solutions.

This may be realized very well while reading Maat's comparison between the system by George Dalgarno and that by John Wilkins; Wilkins was partly inspired by Dalgarno and the two authors met in Oxford and discussed several aspects, envisaging a close collaboration, but they realized that they disagreed on some important points so eventually continued to develop each project independently. Wilkins also had brilliant organizational skills and was more connected with the academia, as one of the founders of the Royal Society, so he managed to attract a wide attention to his project, although Dalgarno also developed important ideas of his own.

One key point of disagreement that is well illustrated by Maat was that, while Dalgarno selected a limited number (about one thousand) of key concepts expressed by a maximum of three-letter words, and opted for deriving all other concepts by composition of these, Wilkins aimed at a more complete enumeration of concepts each represented by a different stem, thus creating a vocabulary of about 4,000 basic terms. For example, animals are classified by Dalgarno in a Dewey-like schedule such that *nŋk* "whole-footed terrestrial beasts" is a subdivision of *nŋ* which in turn is a subdivision of *n*. However, after the third letter, hierarchical subdivision stops; to further specify kinds of animals in Dalgarno's language, a three-letter stem has to be combined with other ones. Horse is thus *nŋkpot*, that is "whole-footed terrestrial beast—full of breath." (Similar ways of combining stems can be found in natural languages, such as my Gallo-Italic dialects where the word for bat is a noun+adjective combination literally meaning "flighty mouse" and that for tortoise is one meaning "cuppy snake.") Wilkins, on the other hand, preferred to subdivide radical concepts more in depth by various affixes, so that every kind of animal and plant known at his time has its own radical word. His approach is thus described as encyclopedic, in contrast to Dalgarno's analytical one.

Readers familiar with the classification schemes will easily see that such alternatives are also faced by developers of contemporary systems. Rick Szostak's Basic Concepts Classification adopts since its name much the same principle as Dalgarno, listing a limited number of concepts and instructing classifiers to create others by combination of the basic ones (Szostak 2012). Other contemporary systems like the Integrative Levels Classification are deliberately more enumerative, just as Wilkins was; they list more concepts, say "beer," with an autonomous notation and express their semantic connection to other

concepts, like "wheat," only in an additional database field for related classes (Gnoli 2017, 251-2). Both Dalgarno and Szostak on one hand, and Wilkins and me on the other, are aware that concepts are interrelated and that a KOS can express some of these relations; the matter is which strategy is the most efficient to do that.

While Dalgarno and Wilkins developed actually speakable languages, and in order to achieve that they had to accept various compromises with logics, Leibniz had more ambitious insights, as he aimed to express the full definition of a concept in its own notation in the form of some algebraic combination so that rational thought could then be developed as a sort of calculus, that is mechanical analysis of the meanings contained in a term; like every natural number, say thirty-five, is the product of a set of prime numbers (say five and seven), any derived concept would be the product of a set of primitive concepts: if five is set to mean "animal" and seven "rational," their composition "man" can be expressed as thirty-five and will contain the information about its factors, from which such predications as "men are rational" can be deduced mechanically. Although Leibniz never produced a complete language nor, as Soergel (2017, 45) also notices, identified any precise list of primitive concepts, he wrote many papers and notes towards this purpose containing ideas of logics and semantic factoring that make him a precursor of today's ontologies.

One problem that was identified by Leibniz is that, if a concept is expressed as a combination of other concepts, some of which in turn are derived from primitive concepts, and so on, the terms/notation for the resulting concepts would tend to be very long and impractical. This may be one argument in favour of Wilkins's encyclopedic approach over Dalgarno's analytical one. Leibniz envisaged to solve it in some mathematical way, as he noticed that despite natural numbers are infinite they can be expressed with only ten digits thanks to positional notation, so that e.g., 3456 is not a multiple of three, four, five and six. Positional notation is also a key feature of contemporary classification systems (Gnoli 2018).

Another problem in combining concepts, which is discussed by Maat, is that simple juxtaposition of stems is not always enough to convey precise meanings. "Whole-footed terrestrial beast full of breath" may indicate horses just as many other species of wild mammals, and it is only by a convention that speakers have to learn that it can be used to mean horses. In their effort to reduce natural language to a limited set of word classes, Dalgarno and Wilkins had to introduce conventional simplifications. In the same way, Leibniz also paid limited attention to the nature of the relationships by which his primitive concepts should have been combined; are "animal" and "rational" meant to be combined by intersection, by union, or what else? Kinds of relationships are a key component of KOS structures and an important topic in KO theory.

As it can be seen, *Philosophical languages in the Seventeenth Century* is not just a knowledgeable, careful account of three major systems of their time, which itself is a great value, but can also be, if one has the patience to go through the details of its thick pages, a source of comparison and inspiration for people interested in the design of classificatory languages in all times.

References

Borges, Jorge Luis. 1952. "El idioma analitico de John Wilkins." In *Otras Inquisiciones: (1937-1952)*. Buenos Aires: Sur.

Coyoud, Maurice. 1966. *Introduction a l'etude des langages documentaires*. T.A. documents 1. Paris: C. Klincksieck.

Cowan, John Woldemar. 1997. *The Complete Lojban Language*. Fairfax, VA: Logical Language Group.

Eco, Umberto. 1995. *The Search for the Perfect Language*. trans. James Fentress. Making of Europe. Oxford: Blackwell. Translation of *Ricerca della lingua perfetta nella cultura europea*, 1993.

Gnoli, Claudio. 2004. "Naturalism vs Pragmatism in Knowledge Organization." In *Knowledge Organization and the Global Information Society: Proceedings of the Eighth International ISKO Conference, 13-16 July 2004, London, UK*, ed. Ia C. McIlwaine. Advances in Knowledge Organization 9. Würzburg: Ergon, 263-8.

Gnoli, Claudio. 2017. "Syntax of Facets and Sources of Foci: A Review of Alternatives." In *Faceted Classification Today: Theory, Technology, and End Users; Proceedings of the International UDC Seminar 2017, 14-15 September, London, UK*, ed. Aida Slavic and Claudio Gnoli. Würzburg: Ergon, 243-56.

Gnoli, Claudio. 2018. "Notation." *Knowledge Organization* 45(8): 667-684.

Hutchins, W. J. 1975. *Languages of Indexing and Classification: A Linguistic Study of Structures and Functions*. Librarianship and information studies. Stevenage, Eng.: P. Peregrinus.

Laporte, Steven. 2018. "Ideal Language." *Knowledge Organization* 45: 586-608. doi:10.5771/0943-7444-2018-7-586

Soergel, Dagobert. 2017. "The Principle of Compositionality and Entity-Relationship Modelling: Faceted Classification in a Broader Context." In *Faceted Classification Today: Theory, Technology, and End Users: Proceedings of the International UDC Seminar 2017, 14-15 September, London, UK*, ed. Aida Slavic and Claudio Gnoli. Würzburg: Ergon, 43-60.

Szostak, Rick. 2012. "The Basic Concepts Classification." In *Categories, Contexts and Relations in Knowledge Organization: Proceedings of the Twelfth International ISKO Conference, 6-*

9 August 2012, Mysore, India, ed. A. Neelameghan and K.S. Raghavan. Würzburg: Ergon, 24-30.

Vickery, Brian C. 1953. "The Significance of John Wilkins in the History of Bibliographical Classification." *Libri* 2: 326-343.

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