

What do we talk about when we talk about language and science?

Translating early modern science.

Edited by Sietske Fransen, Niall Hodson, and Karl A. E. Enenkel

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Language as a scientific tool: Shaping scientific language across time and national tradition.

Edited by Miles MacLeod, Rocío G. Sumillera, Jan Surman, and Ekaterina Smirnova

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The past decade has seen a steady stream of works on language in the history of science. This has also been true of all prior decades back to the founding of the discipline. No matter which genealogy you trace, how language and science interact has been a primary topic of preoccupation. One of the oldest stories in the field from, at least George Sarton's days, traces the "rise of science" from ancient Greece, through translations into Arabic, then from Arabic to Latin, then into vernaculars in Western Europe, and ending at the overweening dominance of English in scientific communication. Another strand, originating perhaps in the Vienna Circle but exploding with Thomas Kuhn's notion of incommensurability, has analyzed scientific reasoning and scientific change through explicitly linguistic vocabulary. (The so-called "linguistic turn" in the 1990s grew out of this heritage.) And yet a third — expressing itself in mirror-image variants in studies of "diffusion" or in postcolonial historiography— emphasizes the literal and figurative "translation" of modern science out of Western Europe to the rest of the globe.

Distinctive in recent work, and reflected in the two volumes under review, is a self-consciousness about these varied traditions, and a willingness to borrow eclectically from the insights of each in order to craft new approaches. This task is monumentally difficult, and both of these volumes demonstrate why that is so, albeit in different ways. There are at least two signal problems that confront scholars who tackle these questions.

The first is that you cannot do it alone, because we are all limited in our linguistic proficiencies as well as our expertise in all the varied subfields (history, philosophy, sociology, linguistics, not to mention the various sciences) that a well-grounded approach would have to address. Sometimes, the collaboration is citational, drawing from the scholarship produced by predecessors and peers, but to build new perspectives it has to be actual. An obvious solution to this is the edited-volume format, which draws collaborators from many disciplines and specializations.

Sietske Fransen's, Niall Hodson's, and Karl A. E. Enenkel's *Translating Early Modern Science* makes the linguistic diversity explicit by prominently displaying the original language text, alongside an English translation, in the body of the articles. Fransen states in her introduction:

We hope that the inclusion of all text fragments in the original languages will help those readers who might want to have a look at the primary source material themselves. Since the current academic world has adopted English as its hegemonic language, this seemed a workable compromise (p. 8).

(Although a few English-only fragments slipped past the contributors' eyes, this is a laudable effort, and one that ought to be instituted as a default.) Occasionally, Miles MacLeod's, Rocío G. Sumillera's, Jan Surman's, and Ekaterina Smirnova's *Language as a Scientific Tool: Shaping Scientific Language Across Time and National Tradition* does

something similar by including the original languages in the footnotes, albeit inconsistently. This is likely a consequence of the editors opting not to focus on *translation* exclusively.

One now confronts the second problem for the historian of science approaching language: What does one mean by “language,” anyway? These books demonstrate a host of possible approaches without being close to exhaustive: nomenclature, translations, tonal register, pragmatics of language use, sociolinguistics, history of the book, visual languages, writing systems, philosophy of language... The list goes on. The editors face a heavy burden in assembling and editing the essays, and especially in their introductions, to be particularly clear about the scope of the book.¹ Why these particular methodologies and topics and not others? The two books boast seven editors between them, further straining unity of vision. *Translating Early Modern Science* succeeds better in Fransen's single-authored introduction, although not all the essays cohere to the interpretation of “translation” she offers. *Language as a Scientific Tool*, by contrast, seeks to make a virtue of eclecticism, with the four editors opting for a framework of “tools”:

For these episodes we find the tool metaphor most apt, since in the cases we discuss, natural philosophers and scientists are concerned with how to shape, manipulate, and define either language as a whole or particular languages in order to achieve a certain end, and in many instances this has afforded them philosophical claims about language and its role in science and society more broadly (p. 2).

The difficulty is that “tool”—as Ludwig Wittgenstein demonstrated most forcefully—is just as protean a category as “language.”

With both volumes having admirably embraced collaboration, each takes a different approach to maintaining coherence. *Language as a Scientific Tool* is more bravely ecumenical, which ends up limiting some of its potential conceptual contribution, while *Translating Early Modern Science* trades constraint for focus. In the process, it also illustrates some of the challenges of producing Anglophone collaborations with a multilingual cohort in our present publishing climate. Let us take each in turn.

Language as a Scientific Tool begins and ends with distinctive essays that indicate some of its range. The opening piece, by Matthias Dörries, juxtaposes three published biographical studies—John Heilbron's of Galileo Galilei, Cathryn Carson's of Werner Heisenberg, and his own of Heinrich Kayser—to raise the question of how individual scientists' philological training conditioned approaches to nature. On the other end, Scott L. Montgomery's excellent contribution, “Impacts of a Global Language on Science: Are There Disadvantages?”, is a sensitive reflection on the whole spectrum of issues that impact language choice. He lays particular stress on temporality, contrasting the rapid ascent of English as a lingua franca to the much slower rise of previous dominant languages. Optimistically, he suggests, although “the disadvantages we have discussed are all the more widespread, yet [they] may also weaken more rapidly as well” (p. 215). There are few short pieces that cover the issue as economically and insightfully as this one.

The rest of the volume can be roughly divided into four sets of essays, based on which particular understanding of “language” is at play. These are my groupings, not the editors', who instead parse the contributions into three categories—“Language, Rhetoric and History,” “The Creation of Scientific Terminology,” and “Imagining Universal Languages”—which at times juxtapose distinct approaches while separating essays that resonate with each other.

Taking my groupings from the most “metaphorical” use of language toward the concrete conception of language as specific human tongues, we begin with the *philosophy of language*. In the vein of the history of ideas, Miles MacLeod concentrates on British philosophers and their theories of language and empiricism in the 17th century, diving deep into John Locke, Francis Bacon, and Robert Boyle to the exclusion of significant engagement with other European traditions in dialogue with these thinkers. Martin Herrnstadt and Laurens Schlicht examine the Société des observateurs de l'homme in the Napoleonic Era to raise (for the only time in either volume) important questions about deaf and mute individuals' understanding of language.

¹Other techniques to foster coherence, such as cross-references, are deployed sporadically in both volumes, but not every essay uses them, which only deepens the reader's sense that separate projects are on display not only between the volumes, but within each as well.

The next category concerns *pragmatics and linguistic analysis*, consisting of two contributions: Priya Venkatesan Hays on how scientists (writing in English) express ambiguity in their findings, especially as related to climate change; and Ekaterina Smirnova on the Russian meanings in use of the term “*opyt*”—which can be translated as either “experiment” or “experience”—during the 18th-century development of a scientific community in Russia. Both are interested in how terms function within the context of a language, and deploy tools of both close and distant reading to analyze them.

The third grouping might be called *language-like phenomena*. Helena Durnová’s account of how computer languages came to be understood as “languages,” with emphasis on Algol and its appropriation by Czech programmers, constitutes a significant contribution to several different literatures, underscoring how important it is for historians of science and technology to treat computation not simply as a tool for analyzing language, but as itself implicated in our understanding of language itself. Rocío Sumillera and Markus Krajewski each discuss universal languages, in the 17th century (John Wilkins and Jonathan Swift) and the *fin de siècle* (Volapük, Esperanto, Ido), respectively. Although the latter were (and are) used as languages of communication, the analysis in both focuses on illustrations of abstract conceptions of language.

The final set addresses *nomenclature and translation*, the bringing of scientific knowledge from one human language into another. Two of the pieces situate Polish in juxtaposition with other languages. In the case of Jerzy Biniewicz’s essay on the mathematical nomenclature derived from Latin in the 16th century by Tomasz Kłos and S. Grzepski, the question is how scholars adjusted to a world “after Latin.” (Among the contributions to this first volume, this one could most easily have appeared in the second.) A highlight of the volume is Jan Surman’s analysis of coinages for the substance we know as “oxygen” in French, Danish, and Polish—the latter two being exceptions among the Indo-European tongues (and beyond) in not borrowing the French *oxygène* directly or calquing it (for example, German *Sauerstoff*). As he notes, every construction of a nomenclature requires grappling with specific features of the entities to be represented in language: the phenomenon itself or the community discourse already in place. Finally, Josefina Rodríguez Arribas offers an erudite study of treatises on astrolabes in medieval Hebrew. The interaction of these texts with Arabic, Judeo-Arabic, Latin, and biblical Hebrew emphasizes the intertextuality of late medieval Spanish scholarship.

For all the value of individual contributions, it is difficult to argue for the utility of reading all these pieces together as one grouping rather than individually or in pairs for different purposes. *Translating Early Modern Science*, on the other hand, narrows its scope in terms of time, place, and operational definition of “language” to stress one problem: how did early modern European scholars confront the waning grip of Latin on European intellectual discourse? Once more, the editors provide three groupings—“Translating Networks of Knowledge,” “Translating Practical Knowledge,” and “Translating Philosophical Knowledge”—which work well enough to bind each subsection. Parsing the contributions according to method, however, yields three categories which in their uneven distribution highlight today’s main approach in history of early modern science toward translation.

The first two categories comprise 5 of the 12 essays in the book. The first, containing only Thomas Morel’s illuminating piece about the use of Euclidean geometry in mining treatises, explores *language regimes*. Texts appeared in Latin, German, and the mining dialect *Bergmannsprache*, and the latter tended to elide references to humanist classics like Agricola—while at the same time demonstrating fluency in Euclidean geometry. Analyzing these writings across linguistic regimes provides insight into how ideas traveled.

Next come four essays that use *translation as metaphor*: they go beyond the common notion of translation as moving words from one language to another. Calling them metaphorical does not dismiss them; on the contrary, the imaginative expansion of the term “translation” has long been a fertile source of new approaches. Meghan C. Doherty, in her essay, examines how images were “translated” between British and French publications in the 17th century, exploring the kinds of (non-linguistic) “literacy” involved in interpreting images outside their original (linguistic) context. Charles van den Heuvel studies Dutch polymath Simon Stevin’s unpublished works as a kind of “translation” among genres of writing. B. Harun Küçük provides a welcome expansion of the linguistic register beyond the Western Indo-European set, to look at how Ibrahim Müteferrika’s rhetoric of Copernicanism functioned in an Ottoman context. The theme of “translation” is fairly attenuated here, as Küçük instead stresses how literary registers functioned intertextually within court culture. Finally, Fabien Simon mobilizes Robert Boyle’s term of “universal truchman” to discuss the 17th-century experiments in universal languages (such as Wilkins, whom we

encountered above in Sumillera's essay). We can see the hybridization between metaphorical and literal translations here: "Universal languages are either the ideal translator and/or the negation of translation, rendering it obsolete" (p. 311).

Most of the essays, however, fall into a single broad category: biographical studies of translators. Depending on one's familiarity with and interest in the individuals in question, the articles provide compelling reinterpretations of what it meant to function in the early modern linguistic space. The range is broad: Felicity Henderson looks at Robert Hooke's circle's (mostly unpublished) translations of foreign works such as Friedrich Martens's German-language description of Greenland; Jan van de Kamp writes about Theodore Haak's translations of scripture and Milton between Dutch, English, and German; Michael Bycroft provides a compelling interpretation of the centrality of Charles Dufay's translation of an Italian treatise on Chinese lacquer in launching his remarkable professional career in France; Joyce van Leeuwen stresses the boundaries between philology and technical transmission in Niccolò Leonico Tomeo's translations of the Aristotelian *Questiones Mechanicae* (1525) from Greek to Latin; Richard J. Oosterhoff concentrates on Charles de Bovelles's innovations in technical French; Iolanda Plescia draws from Translation Studies to examine the intertextual construction of Galileo's works and reputation in English by Thomas Salusbury; and Rodolfo Garau compellingly reads the translation of Epicurus's thought first into Latin by Pierre Gassendi and then into English by Walter Charleton, stressing the additional challenge of rendering palatable works at odds with Christian orthodoxy. This is a rich selection of high-quality research provided by a range of scholars hailing from a number of different countries and native languages.

Such benefits as clearly accrue from this cross-cultural collaboration do present an additional technical challenge that it behooves us, as a field, to recognize—and to pressure publishers to do this work justice. The final essay mentioned, Garau's on early modern Epicurianism, is a case in point. I single it out not to chastise the author in any way—it is one of the most fascinating and well-argued of both collections. But in terms of *editing*, the author has been poorly served. In general, alas, *Translating Early Modern Science* is marred throughout with copy-editing errors: I believe I detected more than one in every single essay, and in some of them, such as Garau's, the lapses were severe enough to on occasion inhibit comprehension. This is not the fault of the non-native speaker as writer, nor is it the fault of the volume editors; it is the fault of Brill, the publisher, in the first instance, to provide adequate resources to ensure the essays adhere to standards.

Those standards are what we as a field need to ponder. One cannot simply outsource these concerns to the editors of each volume. Native speakers also have difficulties navigating many of the "standard" rules, and in the collaborative environment necessary in this field—and the globalized academic sector we presently enjoy—the challenges are accentuated when the editors are not necessarily native speakers of English. (Case in point: the majority of the editors, let alone the contributors, of these two volumes are not.) It should not be a matter of rendering everything in Oxford English (or whatever standard you choose), as long as the piece communicates its ideas. However, all too often deficient copyediting can induce readers to casually dismiss first-rate scholarship as substandard. If we are going to rely on English as the overwhelming medium to convey scholarship in our field, then we need an active conversation as to what "English" means, and who is responsible for enabling writers and readers access to it.

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