

Focus: Linguistic Hegemony and the History of Science

Introduction: Hegemonic Languages and Science

Michael D. Gordin, *Princeton University*

Abstract: Science has historically been a multilingual enterprise, yet the present day appears to belie this generalization. It is difficult to deny the observation that the natural sciences today have converged to a state where a particular form of English—variously termed “Global English,” “International English,” or “English as a Lingua Franca”—serves as the almost universal language of interaction among scientific practitioners. The history of science demonstrates that many other languages have served (and, in many contexts, still do) for scientific and scholarly interchange. The unusual feature about the past several decades is not that the dominant language of the natural sciences is English (as opposed to, say, German or Russian or Chinese) but that it is *a single language*. This Focus section seeks to open up avenues of inquiry that would put both the past and the present of science into conversation, along this axis of translation and hegemonic languages. In addition to outlining the contributions—which explore the cases of Arabic, Chinese, Latin, French, and Russian over a millennium—this introduction addresses the charged question of English.

Even if you know more than one language, it is easy to garner the impression that most people are monolingual. Many countries tabulate their census data as though respondents were monolingual, privileging whatever was listed as a person’s dominant or everyday language, and maps of global languages often present monochromatic blocks to track ostensibly monolingual populations. Even linguistic maps of states with multiple *official* languages (Switzerland, Belgium, Kenya, and the tremendous complexity that is India)—to say nothing of countries with significant linguistically diverse immigrant populations (the United States, Canada, Israel)—for ease of presentation pass silently over the fact that large segments of the population, almost certainly a majority, have some degree of competence in more than one language.¹ Yet it is safe

Michael D. Gordin is Rosengarten Professor of Modern and Contemporary History at Princeton University. His most recent book is *Scientific Babel: How Science Was Done Before and After Global English* (Chicago, 2015). He is now working on a book centered on Albert Einstein in the multilingual environment of Habsburg Prague, 1911–1912. Department of History, Princeton University, 136 Dickinson Hall, Princeton, New Jersey 08544, USA; mgordin@princeton.edu.

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¹ For a clear and brief account of the complexities involved in counting languages and assessing degrees of competence among users see Stephen Anderson, *Languages: A Very Short Introduction* (Oxford: Oxford Univ. Press, 2012).

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to assume that most people for most of history have been to some degree multilingual. Scientists are no exception to this rule: they are real people who live in real places and function in a diversity of contexts. In many settings—especially if they are not native-speaking Anglophones—they even use multiple languages when working *qua* scientists: in lab chatter, grant applications, popularization, teaching.² The diversity of languages and forms of language use deployed by scientists is an enormous, albeit relatively understudied, topic, far exceeding the bounds of this particular Focus section.³

The subject here is substantially more constrained: the image of “hegemonic languages” across the history of science. By this we mean the repeated representation of scientific inquiry as *being* or at least *aspiring to* a single language of communication. We use this phrase rather than the more common “lingua franca,” which functions as a term of art within contemporary linguistics to describe this phenomenon.⁴ Our avoidance of “lingua franca” is deliberate. Deploying “lingua franca” as an analytic category has the potential to cause confusion, since the term was an actors’ category used to characterize a widespread trading pidgin in the late medieval and early modern Mediterranean, a space and time covered by two of the essays in this Focus section. Further, these essays circle around efforts to standardize languages for communication, which sit oddly beside the original notoriously unstandardized trading argot.

More important than the terminology is the salience of the notion that not only can there be a hegemonic language for science but that this is a desideratum, even an obligation. Nature is one, the quest for understanding nature is unified, and therefore the language by which we represent it should be one: so the reasoning often goes.⁵ Although scientists (and, earlier, natural historians, natural philosophers, mathematicians, physicians, and so forth) are now and have always been multilingual, there are two reasons why one should not dismiss the notion of a solitary hegemonic language for science out of hand.

The first is that the hegemonic ideal captures something striking about science as compared with other forms of human cultural activity: the compression to a smaller set of languages. In every historical period and geographic context of which I am aware, scientific communication has taken place in a relatively small number of vehicular languages—languages intended to be understood by a community of researchers dispersed across broader space—compared to the number of ambient languages in the region. That number has not, historically, been *one*, but

² This is easily seen in the ubiquitous practice of “code-switching”: alternating among different languages within a single utterance or conversation. The prevalence of code-switching varies, but it inarguably has played an important role in scientific communication and has left numerous residues in terminology (witness Russian “*chemozem*” in soil science or German “*Gestalt*” in psychology).

³ See Michael D. Gordin, *Scientific Babel: How Science Was Done Before and After Global English* (Chicago: Univ. Chicago Press, 2015); and Scott L. Montgomery, *Science in Translation: Movements of Knowledge through Cultures and Time* (Chicago: Univ. Chicago Press, 2000).

⁴ For a helpful discussion and embrace of the term see Nicholas Ostler, *The Last Lingua Franca: English until the Return of Babel* (New York: Walker, 2010). On the etymology see Henry Kahane and Renée Kahane, “Lingua Franca: The Story of a Term,” *Romance Philology*, Aug. 1976, 30:25–41.

⁵ For a thoughtful contemporary discussion of the costs and benefits of a single language for scientific communication see the recent treatment in Scott L. Montgomery, *Does Science Need a Global Language? English and the Future of Research* (Chicago: Univ. Chicago Press, 2013). Throughout these essays we refer to human languages, of the sort that can be learned as a native language by a child. Alongside such languages, scientists deploy a large array of representational systems that are not at all linguistic (graphs, chemical diagrams) to convey scientific results, as well as mathematical formalism, which as a form of writing shares some features of human languages. On this point see Sundar Sarukkai, *Translating the World: Science and Language* (Lanham, Md.: Univ. Press America, 2002), p. 7; and Gordin, *Scientific Babel* (cit. n. 3), pp. 12–13. The problems posed by the universality (or not) of mathematical representation within the sciences are not the subject of this Focus section. For an introduction see the classic essay by Eugene Wigner, “The Unreasonable Effectiveness of Mathematics in the Natural Sciences,” *Communications in Pure and Applied Mathematics*, 1960, 13:1–14.

it is typically low. When you compare science with trade, literature, the military, the fine arts, you find that all of these tend to allow for greater linguistic diversity than does science. (Certain religious traditions with liturgical languages are the chief domain that has greater compression than science.⁶) Given this compression, one would expect to find that at certain times and places the number would be so restricted as to be basically unitary (at least to a reasonable approximation).

For science, one of those times and places is right now, essentially everywhere around the world, with the phenomenon sometimes called “Global English.” This is the second reason to examine the notion of hegemonic languages across the history of science closely: for the first time in history, there seems to be one and only one language that is globally assumed to be understood by any natural scientist.⁷ There is no question that English is overwhelmingly dominant in scientific communication today, such that, with some exceptions, publishing in some other language is a marked act, a deliberate indicator of a specific agenda.⁸ English, by contrast, is framed as neutral. (It goes without saying that it is not actually neutral.) The cultural status of the natural sciences is so high, and the research infrastructures of national and transnational funding bodies are so heavily influenced by their model, that the effects of Anglophonia are already quite noticeable in the social sciences and, to a lesser degree, the humanities.⁹

Why has this happened, and how is it maintained? We should not expect the same answer to both questions. It is difficult to separate the causal story of the rise of Global English from the massive sprawl of the British Empire, though this seems inadequate to explain the case in science, because both the timing of Global English in this domain (beginning after World War II) and the general form of the idiom (highly Americanized) indicate a center of gravity on the Northwestern Atlantic rim. That American hegemony was intimately involved in the linguistic hegemony of the English language is undeniable, but the mechanics are frustratingly tricky to pin down. Some have posited that the advent of computerization and, especially, databases, which at the outset were largely American, pushed the language of the United States everywhere.¹⁰ The case cannot be so straightforward, as shown by classics, a humanities discipline that adopted computerization, text searching, and online publishing very early but remains one of the most multilingual humanities disciplines. (Here, the fact that the discipline is centrally *about* language obviously raises awareness of the scholarly importance of multilingualism.)

⁶ For a programmatic outline of some of the linguistic issues involved see David Crystal, “A Liturgical Language in a Linguistic Perspective,” *New Blackfriars*, 1964, 46(534):148–156.

⁷ This statement, and the rest of this essay, refers to the elite natural sciences; clinical medicine and applied sciences (e.g., agronomy, civil engineering), because of their closer contact with various governing agencies and diverse populations of lower education, typically exhibit a much broader state of linguistic diversity, or at least status-conditioned bilingualism.

⁸ See esp. Ulrich Ammon, ed., *The Dominance of English as a Language of Science: Effects on Other Languages and Language Communities* (Berlin: Mouton de Gruyter, 2001); Montgomery, *Does Science Need a Global Language?* (cit. n. 5); Claude Truchot, *L’Anglais dans le monde contemporain* (Paris: Le Robert, 1990); and David Crystal, *English as a Global Language*, 2nd ed. (Cambridge: Cambridge Univ. Press, 2003).

⁹ Ulrich Ammon, “Linguistic Inequality and Its Effects on Participation in Scientific Discourse and on Global Knowledge Accumulation—With a Closer Look at the Problems of the Second-Rank Language Communities,” *Applied Linguistics Review*, 2012, 3:333–355; and Ammon and Grant McConnell, *English as an Academic Language in Europe: A Survey of Its Use in Teaching* (Frankfurt am Main: Lang, 2002). It is anyone’s guess whether in either domain the compression will become as total as in the natural sciences. My own view is that such an outcome is unlikely but that scholarship in many fields has not yet reached the limits of Anglification.

¹⁰ Robert B. Kaplan, “The Hegemony of English in Science and Technology,” *Journal of Multilingual and Multicultural Development*, 1993, 14:151–172. It is worth noting for the record that the United States does not have an official language. Many civic functions—voting, taxes—can be and are performed in multiple languages, including Spanish, French, and Vietnamese, and much of the Southwest of the country is functionally, if not officially, bilingual in Spanish and English. Nonetheless, at least thirty states have mandated English as the official language. The absence of a federal official language is an occasional right-wing talking point. See Jody Feder, “English as the Official Language of the United States: Legal Background and Recent Legislation,” Congressional Research Service Report for Congress, 7–5700 (16 Jan. 2009).

Another hypothesis is naked imperialism. Although there is no question that at various moments—as a condition of Marshall Plan aid, at various postwar international conferences—the American government has promoted the international use of English, the inconsistency of this pressure, and the fact that English was a dominant international vehicular language of non-aligned nations such as India (a legacy of the British Empire, to be sure), speaks to a more complex story.¹¹ Elsewhere, I have argued that the most important causal force was likely the non-native speakers of any of the languages that have together dominated scientific communication in the modern period (English, French, German, and Russian). The question is what native speakers of Dutch, Chinese, Swahili, Arabic, Portuguese, and so forth have chosen to publish in as their professional, international language. A combination of geopolitics and contingency, especially the decline of German internationally after each of the world wars, left English as the dominant alternative.¹² Surely, a mixture of these factors and others needs to be incorporated into any account.

Maintenance is more straightforward. Once there is a hegemonic language of publication in English, the desire of researchers to be read and cited usually decides the question. Governments and universities have adopted bibliometric indicators such as impact factors and citation counts that reinforce the hierarchy of journals—themselves increasingly aggregated by the relatively few publishers that constitute an oligopoly—further increasing the costs of defecting to another tongue. As research funding has become, with the end of the Cold War, significantly transnational, multinational organizations like the European Science Foundation and even national competitions like Germany's *Exzellenzinitiativen* demand applications in English to facilitate international peer review.¹³ The interconnection of Global English and today's scientific infrastructure is extremely tight.

What role does this provide for the history of science? It is important to underscore that in recent decades history of science as a discipline has exhibited a strong dominance of English, something easy to observe at international conferences and often remarked upon by researchers who are not native Anglophones. It is a rare article in the field today, published in any language, that does not display some, often quite extensive, familiarity with the Anglophone secondary literature; a converse familiarity by Anglophone researchers with the non-English scholarship is much less in evidence. The phenomenon of English in the history of science is not that surprising. Not only is the community more international in composition and subject matter than those subfields of history that concentrate on a particular nation-state or geographic region, but the manifold connections between historians of science and practicing scientists—through our training, our students, our primary sources, our colleagues—likewise work to reinforce a particular linguistic order.

Precisely because the phenomenon of Global English happened so early and so totally in the sciences (as compared to other domains of scholarship), and because of our field's specific relationship to both those disciplines and the language, the history of science has a unique capacity to interrogate the causes and implications of the present linguistic situation. Given the compression of languages in science noted earlier, historians can readily find several significant examples where a single hegemonic language was either quite pervasive across large regions or such a goal was actively striven for by certain communities of scientists. (It is understandable

¹¹ On the hegemony hypothesis see Roswitha Reinbothe, "Der Rückgang des Deutschen als internationale Wissenschaftssprache," in *Wissenschaftssprache Deutsch: International, interdisziplinär, interkulturell*, ed. Michael Szurawitzki, Ines Busch-Lauer, Paul Rössler, and Reinhard Krapp (Tübingen: Narr, 2015), pp. 81–94; and John Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe* (Cambridge, Mass.: MIT Press, 2006), Ch. 2.

¹² Gordin, *Scientific Babel* (cit. n. 3), esp. Chs. 8–11.

¹³ See Ammon and McConnell, *English as an Academic Language in Europe* (cit. n. 9).

that many people would wish that the language they were most comfortable with was more widespread in a particular discipline; it is quite something else to want that language to be the only language of scientific communication.) This Focus section explores five different instances where the hegemonic potential and reality of particular scientific languages was actively under discussion or where it has been broadly assumed by historians to have been in evidence. None of these map precisely onto the situation of today's English—hardly to be expected in any historical comparison—but all of them highlight different features when read against each other and against the present. The cases enable us to begin to chart what is specific to the sciences, what to English, and what to our contemporary era.

The following essays focus on five putative hegemonic languages: Arabic, Chinese, French, Latin, and Russian, listed alphabetically—an arbitrary scheme that highlights the specificity of English as the medium in which the essays are written. In what follows, those essays are presented chronologically, as each author takes a particular moment in the history of each language in the sciences, fully recognizing that the history of each language extends both before and after the moment of his or her emphasis. These languages all have different sociolinguistic trajectories that display enormous historiographical variability. Arabic, for example, is strongly diglossic, with a high-status (Classical or Modern Standard) and an everyday (e.g., Maghrebi) variant, analogous to the polyvalent and polycentric status of German.¹⁴ On the other hand, “Chinese” is a category that encompasses not only Classical Chinese and Mandarin but also mutually unintelligible tongues such as Hokkien and Cantonese; the designation of all of them as “one language” is as much a political point as is the single time zone that unifies today's People's Republic of China.¹⁵ In those two instances, the written language offers an intelligibility not always present in spoken communication, a property shared with Latin. For Russian, and to some extent French as well, use in international science frequently privileged spoken interactions in situations where the written medium was different. In order to convey, however imperfectly, a feel for some of these languages, each author has left quotations in the text from the main language under discussion in the original orthography; translations into English are provided in the corresponding footnote.

The most striking impression in reading the essays is how *not* monolingual these contexts are. Ahmed Ragab recasts both the “translation movement” of ancient scientific texts into Arabic and the second wave of translations of modern science into the language in the nineteenth and twentieth centuries as evidence that Arabic always functioned as a dominant but not exclusive language of scholarly interchange in the region. Arabic's omnipresence is evidence of the existence of a multilingual linguistic regime, not of its absence. Dagmar Schäfer argues an analogous point for Chinese during the Ming dynasty, widely regarded as more intensely focused on a single hegemonic language than, say, the Qing. This impression, she notes, is an artifact of the archive produced by Ming scholars, and reading against the grain brings the diversity of linguistic translation to the fore. Sietske Fransen builds on contemporary scholarship regarding translations out of but also *into* Latin in the seventeenth century to show how Dutch, French, and Italian worked alongside, not in opposition to, Latin at the supposed height of its dominance. Her story is echoed in Mary Terrall's analysis of French during the eighteenth century, when Francophone scholars found themselves with a language that would take them almost everywhere in print or speaking—but not without friction, gaps, and a significant sense of unease. Finally, Elena Aronova explores the role of Russian in both Soviet internal communication (within the USSR and the Soviet bloc) and in international organizations, highlighting how en-

¹⁴ See the classic essay by Charles A. Ferguson, “Diglossia,” *Word*, 1959, 15:325–340.

¹⁵ John DeFrancis, *The Chinese Language: Fact and Fantasy* (Honolulu: Univ. Hawaii Press, 1984).

forcement of a linguistic hegemony was often a strategy promoted alongside a simultaneous push for multilingual inclusion.

It is hard to imagine any collection of essays on this issue that would leave these cases out. Could the set have been expanded? Certainly, although less obviously for the modern period. German, for example, for all its ubiquity in nineteenth- and twentieth-century science, never enjoyed a solitary hegemonic reputation (though there were quite a few who aspired to it throughout that period). Many other European languages—Italian, Dutch, Portuguese, Spanish—had regional importance, often through colonial administrations, but in none of those cases did their civic significance correspond to something that can be neatly categorized as “hegemonic.”¹⁶ The situation in the premodern period is rather different. Consider just three languages (there are others) that stand out for their significant role as regionally monolingual vehicular languages: Greek (*koinē*), Sanskrit, and Persian.¹⁷ It is regrettable that the exigencies of space do not allow a more comprehensive treatment.

What do we learn from the juxtaposition? Obviously, that is largely something for readers to decide for themselves as they consider what follows. One of the most important lessons from my reading, however, is that hegemonic language regimes have not, historically, been totalizing; these languages were always significantly conditioned by the medium of communication (oral, written), the intended audience, and the kind of knowledge being communicated. That point also holds for English today, although its dominance within the sciences is much greater than any of these historical examples. (Whether that is a difference in degree or in kind is a matter of intense debate.¹⁸) Any attempt to write the history of even very recent science that fails to consider the possible linguistic dimensions—even if those aspects are in turn discounted as not relevant—will always be incomplete. Potentially significant, often informal, aspects of scientific practice can take place in multiple idioms even in an Anglophone world of print. As a corollary, we as a community need to pay more attention, even in Anglophone situations, to what *kind* of English is being used: native speaker or not, formal writing or casual note taking, slang, American, South Asian, Singaporean, and so on. None of the languages discussed in the following essays were static entities, and they all bore the traces of the historical moment in which we find them. It is a dimension that we cannot afford to ignore, in scholarship or with each other.

¹⁶ The regional significance of these languages is a point often made in passing or implicitly, but it structures the argument of many histories of science in imperial contexts. See, e.g., Jorge Cañizares-Esguerra, *Nature, Empire, and Nation: Explorations of the History of Science in the Iberian World* (Stanford, Calif.: Stanford Univ. Press, 2006); Neil Safier, *Measuring the New World: Enlightenment Science and South America* (Chicago: Univ. Chicago Press, 2008); and Harold J. Cook, *Matters of Exchange: Commerce, Medicine, and Science in the Dutch Golden Age* (New Haven, Conn.: Yale Univ. Press, 2007). Many further examples could be given.

¹⁷ See, respectively, Geoffrey Horrocks, *Greek: A History of the Language and Its Speakers*, 2nd ed. (Malden, Mass.: Wiley-Blackwell, 2010); Sheldon Pollock, *The Language of the Gods in the World of Men: Sanskrit, Culture, and Power in Premodern India* (Berkeley: Univ. California Press, 2006); and Nicholas Ostler, *Empires of the Word: A Language History of the World* (London: HarperCollins, 2005).

¹⁸ See, e.g., the literature surveyed in Montgomery, *Does Science Need a Global Language?* (cit. n. 5).

“In a Clear Arabic Tongue”: Arabic and the Making of a Science-Language Regime

Ahmed Ragab, *Harvard University*

Abstract: The history of Arabic as a language of scientific learning is punctuated by two “translation movements.” The first took place in the ninth century, when many scientific and philosophical Greek, Persian, and Indian works were translated into Arabic under the patronage of members of the Abbasid dynasty (750–1258 in Baghdad) and their clients and courtiers. The second was sparked by the establishment of European-style schools in the Arab provinces of the Ottoman Empire in the nineteenth century and witnessed the translation of modern European scientific texts into Arabic. In both cases, translation was a complex and iterative process where scholars, translators, and patrons grappled with questions about the history of the language, its relation to other languages, and its attendant opportunities and limitations. This essay looks at these two moments of translation, asking how such processes took place, what questions emerged, and how they related to other intellectual, political, and social concerns at the time. It argues that translation efforts did not emerge from or lead to an exclusively Arabophone setting but, rather, developed in a linguistic regime that involved constant connections with other languages and relied on the gradual and iterative construction of an Arabic scientific archive that defined the role and the history of Arabic as a scientific language.

According to scholars, two “translation movements” followed by two “renaissances” punctuate history of science in Islamicate societies. The first referred to the translations of Greek, Persian, Syriac, and Sanskrit texts into Arabic in the eighth and ninth centuries, preceding the “Classical (or Golden) Age of Islamic Sciences.”¹ The second described the translations of modern scientific texts in the nineteenth and twentieth centuries, paving the way for the *Nahḍa*

Ahmed Ragab is Associate Professor of Science and Religion, Affiliate Associate Professor of the History of Science, and Director of the Science, Religion, and Culture Program at Harvard University. His publications include *The Medieval Islamic Hospital: Medicine, Religion, and Charity* (Cambridge, 2015). He is working on a book on piety and experiences of patienthood in the medieval and modern Islamicate world. Department of the History of Science, 1 Oxford Street, Cambridge, Massachusetts 02138, USA; ahmed_ragab@harvard.edu.

I used a simplified Library of Congress convention for transliteration. Arabic words that have made their way into regular English (“Quran,” “Abbasid”) were left without transliteration. All dates used here are Common Era dates, and all translations are mine unless otherwise indicated.

¹ See Ira M. Lapidus, “The Golden Age: The Political Concepts of Islam,” *Annals of the American Academy of Political and Social Science*, 1992, 524:13–25; and Franz Rosenthal, *The Classical Heritage in Islam* (Berkeley: Univ. California Press, 1975), pp. 1–5.

(Renaissance) of the Arabic Middle East.² In both cases, authors and translators studied and debated the best way of forging scientific concepts in Arabic, contributing to the construction of an Arabic-language science archive.

In the seventh century, the expansion of the Islamic empire and the encounter between Arabs and non-Arabic speakers contributed to the development of Arabic. New orthographies were developed to introduce diacritical markings into the script. Grammarians worked to standardize and theorize language structures. In the nineteenth century, a linguistic revival (neoclassicism) took place alongside translation efforts—both contributing to reimagining Arabic as a “modern” language. In the following pages, I will take these two moments as entry points into discussing the articulation of Arabic as a scientific language in different historical contexts. By looking at some strategies of translation, I will explore how Arabic lived within a regime of various languages and how its role in relation to scientific knowledge was negotiated.

THE ABBASID TRANSLATION MOVEMENT

Medieval Islamic sources produced in the late ninth and tenth centuries underscored the importance of Persian scholars and bureaucrats in supporting translations.³ This role of the “Persian element” is emphasized by the fact that translations flourished under the Abbasids (r. 750–1250 in Baghdad), whose most important supporters were Persian. In his analysis of the “translation movement,” Dimitri Gutas accepted the role of Persian bureaucrats and proposed that their support for translation was motivated by a “state ideology” that claimed a Persian origin for all sciences: Greek sciences were seen as originally Persian and should be recovered. This ideology, appropriated by the Abbasids who were inspired by Persian political mythology, motivated translations into Arabic.⁴ George Saliba questioned Gutas’s explanation, citing the lack of evidence of pre-Islamic Persian translations.⁵ Following Ibn al-Nadīm (d. 996), Saliba proposed that translations started at the state chanceries under the Umayyads and included translations of practical scientific texts in arithmetic, astronomy, and other disciplines necessary for chancery work. Consequently, Arabic speakers or bilingual bureaucrats replaced Greek and Persian speakers. Pushed by competition, the descendants of Greek and Persian bureaucrats aimed to obtain an advantage by rediscovering classical scientific texts all but forgotten by the Byzantines and translating them, thus regaining their positions.⁶

Such narratives seek to find a pivotal moment or a heavily invested group to explain this translation movement. Moving away from the search for a prime mover might illuminate a more

² Unlike the “Golden/Classical Age,” the *Nahḍa* (Renaissance or Awakening) is an actor’s category designated by Arabophone authors and intellectuals at the turn of the century. Much scholarship has discussed this period. See George Antonius, *The Arab Awakening: The Story of the Arab National Movement* (New York: Capricorn, 1965), pp. 16–41; Elizabeth Suzanne Kassab, *Contemporary Arab Thought: Cultural Critique in Comparative Perspective* (New York: Columbia Univ. Press, 2010), pp. 17–47; and Marwa Elshakry, “The Gospel of Science and American Evangelism in Late Ottoman Beirut,” *Past and Present*, 2007, no. 196, pp. 173–214.

³ An indigenous scientific tradition existed in pre-Islamic Arabia and survived in later centuries of Islamic history, although the records are at best scanty. See Emilie Savage-Smith, “Medicine in Medieval Islam,” in *The Cambridge History of Science*, Vol. 2: *Medieval Science*, ed. David C. Lindberg and Michael H. Shank (Cambridge: Cambridge Univ. Press, 2013), pp. 140–167, esp. pp. 140–141; and George Saliba, *Islamic Science and the Making of the European Renaissance* (Cambridge, Mass.: MIT Press, 2007), p. 4.

⁴ Saliba, *Islamic Science and the Making of the European Renaissance*, p. 10 (“Persian element”); and Dimitri Gutas, *Greek Thought, Arabic Culture: The Greco-Arabic Translation Movement in Baghdad and Early Abbasid Society* (London: Routledge, 1998), pp. 40–52.

⁵ Saliba, *Islamic Science and the Making of the European Renaissance*, p. 11. See also F. Jamil Ragep, “Islamic Culture and the Natural Sciences,” in *Cambridge History of Science*, Vol. 2: *Medieval Science*, ed. Lindberg and Shank (cit. n. 3), pp. 27–61, esp. p. 37.

⁶ Saliba, *Islamic Science and the Making of the European Renaissance*, pp. 59–62; for the strategy of recovering and translating classical texts see pp. 59–60.

gradual, processual, and dynamic translation “movement” that underwrote the emergence of Arabic as a language of scientific knowledge. While Gutas and Saliba, among others, agree on the Byzantine lack of interest in classical Greek learning, Byzantinists have long demurred. Research on the copying of texts, commentaries, and marginalia shows that Byzantine learned circles continued to study and work with these materials.⁷ It is therefore more reasonable to look at a gradual process of Arabization of practitioners of sciences, who came to serve Arabic-speaking clients under the Umayyads.⁸ Even before mastering reading and writing, physicians, astronomers, astrologers, and others needed to speak Arabic and to translate their practice, albeit orally, in order to engage their new clients. As Arabic was the language of the emerging empire, bureaucrats and state functionaries also needed to gain knowledge of Arabic to communicate with their new patrons. Translation was a daily exercise required to maintain the proper functioning of market and state and pushed these learned practitioners and functionaries toward greater Arabization.

Translations by the state chanceries were perhaps the beginning of concerted written translation efforts and may have led to changes in the makeup and personnel of different state offices.⁹ However, in contrast to the narrative provided by Ibn al-Nadīm and other tenth-century sources, these translations were likely the culmination of gradual oral translations and the result of the Arabization of the bureaucratic elites. In the scientific context, Robert Morrison has shown that scientific translations, whether oral or in nonextant written form, dated back to the Umayyad period.¹⁰ Like the bureaucrats, practitioners of the sciences underwent a process of gradual Arabization. They too adopted Arabic to adapt to their new clients and later produced original works in the language. The translation of classical texts was in part an effect of the Arabization of scholars and practitioners who intended to construct their libraries in Arabic.¹¹ In this context, urbanism and the developing religious sciences and belles lettres helped shape a new learned environment that further motivated these translations.¹²

This proposed narrative does not necessarily exclude Gutas’s argument for a state ideology and coordinated effort or Saliba’s proposition of a competition-based movement. Rather, it focuses on translation as a result of Arabization, whereby Arabic emerged gradually as a language of choice and where translation was the result of growing oral and mental facility with the language. There is no doubt that this “facility” was often a requirement rather than a choice: state functionaries could not but “choose” to learn the language of their new lords, and scientific practitioners likewise had to “choose” to use Arabic with their new clients and patrons. Such facility, both as an emerging capacity and as a need, created an archive of Arabic texts and translations, the need for some of which was obvious and immediate and for others not. The gradual and non-linear Arabization of readers, book buyers, and practitioners of scientific knowledge resulted in an equally gradual development of an Arabic science archive.

PROBLEMS IN TRANSLATION

In the later decades of his life, Ḥunayn ibn Isḥāq (d. 873) composed, at the request of a patron, a treatise that enumerated Galen’s books that existed in Syriac or Arabic translation. This was a

⁷ See, e.g., David Bennett, “Medical Practice and Manuscripts in Byzantium,” *Social History of Medicine*, 2000, 13:279–291; and Ragep, “Islamic Culture and the Natural Sciences” (cit. n. 5), p. 28.

⁸ See Peter E. Pormann, *The Oriental Tradition of Paul of Aegina’s “Pragmateia”* (Leiden: Brill, 2004).

⁹ Saliba, *Islamic Science and the Making of the European Renaissance* (cit. n. 3), pp. 58–60.

¹⁰ Robert G. Morrison, “Islamic Astronomy,” in *Cambridge History of Science*, Vol. 2: *Medieval Science*, ed. Lindberg and Shank (cit. n. 3), pp. 109–138, esp. pp. 116–117.

¹¹ In the same vein, Morrison argued that translations were intentional and aimed to serve the contemporary scientific elites: “Interest in existing scientific work created the need for more and better translations” (*ibid.*, p. 117).

¹² Ragep, “Islamic Culture and the Natural Sciences” (cit. n. 5), pp. 37–38.

rather difficult task: he had lost his library and wrote this treatise based only on his memory. The treatise was testimony to the number of books of a single (albeit important) author that were translated before the end of the ninth century. In fact, the treatise itself was a product of translation, as it was composed in Syriac and then translated (and updated) to Arabic.¹³ Of course, the treatise's focus on Galen limits its value in mapping the landscape of translations in the middle of the ninth century. Moreover, Ḥunayn's narrative and his evaluation of various translations were often complimentary to his own role and minimized the contributions of other translators. These shortcomings notwithstanding, the treatise shows Ḥunayn's important reflections on his own and others' work.

Ḥunayn admitted that he had not always been as good a translator as he became by the end of his career. He observed that some of his early translations suffered from various problems; some of these were caused by the condition of the Greek manuscripts, while others were due to his youth and lack of experience. The theme of age and experience was also evident in Ḥunayn's evaluation of his competitors' translations (especially those by a physician named Sergius).¹⁴ In his view, translation was a process that required experience and improved with practice. The importance of experience becomes clearer as we observe Ḥunayn's brief and sporadic explanations of his methods in this treatise. First, he underscored the need for verifying and correcting the original Greek manuscripts. For instance, he was keenly aware of how the Alexandrians had classified and arranged the Galenic corpus. Some treatises were joined together to form larger volumes, and others had their titles changed to match the way the Alexandrians taught them. Some were also poorly copied. In Ḥunayn's view, a good translator would need to edit these manuscripts first. Ḥunayn preferred to acquire a number of manuscripts of the same book and compare them before attempting the translation. He explained that many of his imperfect translations were based on single copies of an original text. He corrected some of these later in his life as he acquired additional manuscripts.¹⁵

Translation was an iterative process. Ḥunayn often corrected his earlier translations and was asked to correct translations done by others.¹⁶ He also revised the work of his nephew Ḥubaysh and others.¹⁷ Translators did not always go back to the Greek text. In some instances, translations into Arabic were made from a Syriac translation. In other cases, a Syriac translation was produced from Arabic. In these cases, the secondary translator often trusted the work of the primary one (as when Ḥubaysh translated Ḥunayn's Syriac into Arabic).¹⁸

The choice of words and the translation of concepts were of paramount importance to Ḥunayn and others. For instance, in a debate between the philosopher and translator Bishr ibn Mattā and the grammarian Ya'qūb al-Sīrāfī, the latter chastised Bishr for his lack of proper knowledge of Arabic, explaining that this would undoubtedly affect his translations:

وإن لم يكن لك بد من قليل هذه اللغة من أجل الترجمة؛ فلا بد لك أيضا من كثيرها من أجل تحقيق الترجمة واجتلاب الثقة والتوقي من الخلة اللاحقة لك... على أن هنا سرا ما علق بك ولا أسفر لعقلك وهو

¹³ Ḥunayn Ibn Ishāq al-Ibādī, *Hunayn ibn Ishāq über die syrischen und arabischen Galenübersetzungen*, ed. Gotthelf Bergsträsser (Leipzig: In kommission bei F. A. Brockhaus, 1925), pp. 1–3.

¹⁴ *Ibid.*, pp. 3 (condition of the Greek manuscripts), xx (youth and lack of experience), 11, 15, 26, 17 (regarding Sergius). Even as Ḥunayn was often critical of Sergius and others, he explained that their early translations were even worse than their later ones.

¹⁵ *Ibid.*, pp. 18 (poor copies), 39 (later correction).

¹⁶ Ḥunayn pleaded with his patrons to let him retranslate as opposed to correcting his competitors' translations. This may have been his way of asserting his superiority rather than a testimony about translation process. *Ibid.*, pp. 13, 30.

¹⁷ *Ibid.*, p. 15. In another situation, Ḥunayn's patron corrected the Arabic, choosing different words and expressions. Ḥunayn commented that others liked his original translation better (p. 24).

¹⁸ *Ibid.*, p. 24.

أن تعلم أن لغة من اللغات لا تطابق لغة أخرى من اللغات من جميع جهاتها بحدود صفاتها في أسمائها وأفعالها وحروفها.... واستعاراتها.... وغير ذلك مما يطول ذكره¹⁹

Al-Sīrāfi was not an impartial observer of translations. As a grammarian, he had serious objections to the way logicians and translators of logic and philosophy, in particular, used Arabic. He believed that they lacked proper training and harbored disdain and contempt for linguists. He was unimpressed by the new words they were creating:

لأنه لا سييل إلى إحداث لغة مقررة بين أهلها. ما وجدنا لكم إلا ما استعترتم من لغة العرب كالسبب والموضوع... وأمثلة لا تنفع ولا تجدي وهي إلى العي أقرب وفي الفهاهة أذهب²⁰

Ultimately, many of the words that al-Sīrāfi objected to survived in Arabic philosophical, logical, and legal writings for centuries, becoming increasingly more popular and successful. However, his comments reflected influential debates during the "translation movement."

The list of patrons named in Ḥunayn's book is rather limited. He translated for a handful of patrons, and they often requested translations into specific languages (some preferred Syriac and others preferred Arabic). Most of his patrons were either scholars (he translated for a number of physicians), scholar-courtiers (like Banū Mūsa ibn Shākir), or state officials. This limited number of patrons indicates that there existed some stable patron–translator relationships. However, these stable relationships were not necessarily representative of patronage politics during this period, which were rather variable and diverse.

In Ḥunayn's world, books were translated and retranslated into both Arabic and Syriac in no particular order. He made some translations for himself and for his son, a famous translator in his own right, and corrected other translations to gift them to his son.²¹ All in all, the picture drawn by Ḥunayn's treatise shows that translation was a nonlinear process. The "movement" did not aim to move all books into one language but was, rather, a process by which texts moved across a variety of languages; meanwhile, better and more authoritative copies were being produced in all of them. A new archive was being built on the foundation of existing texts, based on the preferences of the many patrons, scholars, and translators that contributed to it.

HEGEMONY OR LINGUISTIC REGIME?

The emerging Arabic archive existed in relation to other languages in which texts were produced and into which they were translated. Ḥunayn's library, if we are to take his claims of book ownership seriously, contained an impressive number of Greek manuscripts, to which he continued to add, and an ever-expanding collection of Syriac and Arabic materials. His career and interests were located at the Greek-Syriac-Arabic nexus, but this was by no means the only such nexus at the time. A Sanskrit-Persian-Arabic nexus was influential even before the ninth century. Persian, Coptic, and Hebrew, as well as Greek, Romance, Latin, and Turkic, were written and spoken by sizable populations in the Islamicate world. Far from dominating, Arabic existed and developed in dynamic relation with other languages that influenced the landscape of scientific thought. Arabic, of course, had specific advantages in this sociopolitical context. It was the lan-

¹⁹ "If you need to know the basics [of Arabic] to translate, you must know [much more] to perfect the translation and avoid mistakes. . . . For a language does not correspond to another in all its aspects including nouns, verbs, propositions, metaphors [etc]." David Samuel Margoliouth, "IV: The Discussion between Abū Bishr Mattā and Abū Sa'īd al-Sīrāfi on the Merits of Logic and Grammar," *Journal of the Royal Asiatic Society of Great Britain and Ireland*, 1905, N.S., 37(1):79–129, on pp. 98–99.

²⁰ "[One cannot] create a new language among its own people. We find nothing of value in your jargon save for [the terms] you borrowed from Arabic, which are not proper or useful and [show] ignorance and feebleness." *Ibid.*, p. 105.

²¹ Ḥunayn Ibn Ishāq, *Hunayn ibn Ishāq über die syrischen und arabischen Galenübersetzungen*, ed. Bergsträsser (cit. n. 13), p. 15.

guage of the state and many members of the ruling elites, and it acquired specific significance because it was the language of most Islamic religious texts. Such connections pushed toward the Arabization of the population in various parts of the empire. However, Arabization was rather spotty, depending on region and domain. While scholars and learned science practitioners studied and worked in Arabic, Arabization was slower among the uneducated populace and in rural areas.

Regions east of the Euphrates fell to the Mongols and, after 1250, became the Ilkhanid Empire, where Persian was the dominant political and scientific language. The famous vizier and physician Rashīd al-Dīn al-Ṭabīb al-Hamadānī (d. 1318), a Jewish convert who served the Ilkhanid court as physician and bureaucrat, commissioned the translation of Chinese medical compendia into Persian—one of the earliest systematic endeavors to introduce Chinese medicine to “Islamic languages.”²² In the Eastern Mediterranean, where Arabization was most successful among the population, other languages continued to play important roles in the scientific landscape. Records in the Cairo Geniza show that physicians, patients, and pharmacists communicated in a mixture of Arabic, Hebrew, and Judeo-Arabic, depending on writer and topic. Across these languages, lexical conventions (such as starting with the Islamic formula of invoking the name of God) were maintained, showing a shared linguistic consciousness. A scholar of the stature of Mūsā ibn Maymūn (Maimonides) would write in all three languages.²³ Thinking about Arabic as *the* language of science from the eighth or ninth century until the thirteenth century (and beyond, in the Near East and the Maghrib) in a largely homogeneous setting fails to capture the complex set of relationships that Arabic had with other languages and the changes in these relationships across periods and regions. Here, I propose “linguistic regime” as an analytical category that captures such complex relationships. A linguistic regime is formed of various languages that exist in a dynamic relationship where some languages (in this case Arabic) rise to the top and accrue a variety of privileges for political, economic, or other reasons. More important, in a linguistic regime languages acquire different roles based on discipline and on the identity of the speaker or writer, among other variables. In all cases, the relations and movement across different languages in a linguistic regime affect the ways in which knowledge is produced and practiced.

MAKING ARABIC SCIENTIFIC AGAIN

The establishment of modern, European-style schools in Egypt in the early nineteenth century under the auspices of Muhammad Ali Pasha (r. 1805–1848), the Ottoman viceroy of Egypt, was accompanied by the translation of textbooks and teaching materials from European languages into Arabic. Antoine Barthelemy Clot (d. 1868), who supervised the establishment of the medical school in 1827, commissioned the translation of many texts and compendia, some produced in France and others authored by him, for use in teaching. Clot relied on a number of translators and editors with higher linguistic training to produce translations in sophisticated Arabic.²⁴ This two-tier process was supplanted when a new school of translators opened in Cairo, serving the Pasha’s modernization program. The use of Arabic in medical training was not re-

²² Felix Klein-Franke and Ming Zhu, “Rashīd ad-Dīn as a Transmitter of Chinese Medicine to the West,” *Muséon*, 1996, 109:395–404.

²³ Joshua Blau, *The Emergence and Linguistic Background of Judaeo-Arabic: A Study of the Origins of Middle Arabic*, Vol. 5 (Leiden: Brill, 1981); Blau, “Notes on the Use of Different Registers of Judeo-Arabic by One Author,” *Hebrew Annual Review*, 1985, 9:75–78; Blau, “The Linguistic Character of Saadia Gaon’s Translation of the Pentateuch,” *Oriens*, 2001, 36:1–9; and Aharon Geva-Kleinberger and Efraim Lev, “Language Passivity in the Medical Arabic and Judeo-Arabic Prescriptions of the Cairo Genizah,” *Journal of Semitic Studies*, 2009, 54:435–458.

²⁴ Khaled Fahmy, “The Sheikh and the Corpse,” lecture delivered in Oriental Hall, American University in Cairo, 5 Nov. 2012, <https://khaledfahmy.org/en/2012/11/12/the-sheikh-and-the-corpse/>.

stricted to Egypt. The Protestant College in Beirut, supported by American missionaries (the American Board of Commissioners for Foreign Missions), also taught its students in Arabic, and its medical school relied on translated texts. The same applied to medical training in French-occupied Algeria. As Marwa Elshakry has demonstrated, the interest in scientific texts extended to magazines, popular books, and other publications, where European scientific texts were regularly summarized, translated, and published.²⁵

In the Cairo medical school, Nicolas Perron (d. 1876), who led the school after Clot, was fluent in Arabic and invested in translations. Using French medical glossaries, he decided to expand a project Clot had started to create a comprehensive Arabic medical glossary that would cover all medical specialties. Each instructor was assigned to write a chapter pertaining to his own specialty. Perron and his friend Muḥammad ʿUmar al-Tūnisī edited the text. Translators were aware of the importance of medieval medical terms that had a longer history in Arabic. For instance, in the introduction to a surgery textbook, *Mablagh al-barāḥ fi ʿilm al-jirāh*, the editor Muḥammad al-Hawwārī described the translation process:

حيث ترجمه (الكتاب) الخواجا يوحنا عنحوري المترجم الأول بالإملاء لي ولجملة من أصحابي...وكننت حين استملانه أو حضور دراسته أجهد نفسي في مراجعة الجراحة العربية لأجري اصطلاحها في عبارته²⁶

One of Clot's students translated his own *Treasures of Health* (*Kunūz al-ṣiḥah*), which was then revised by Perron and al-Tūnisī. Intended for the general public, the translation used common words even if they were colloquial and avoided antiquated terms:

وفي حال جمعه، أملاه (كلوت) باللغة الفرنسية للشباب الأمد...محمد أفندي الحكيم الأول المعروف بالشافعي فترجمه أحسن ترجمة وسلمه...إلى...المعلم بيرون...وأمره بتهديبه وتنقيحه كما أمرني بمقابلته معه وتصحيحه وأن أجتنب التعمق في الألفاظ اللغوية ولا أذكر إلا ما اشتهر من الألفاظ وإن كانت عامية ليعم نفعه العالم والجاهل.²⁷

The goal was not only to find terms with a long history in Arabic to translate modern European concepts, but also to create an archive that would help in translating additional terms—a goal embodied in the glossary project. Elshakry demonstrates that a similar process took place in the various scientific translations of the late nineteenth and early twentieth centuries: authors and translators often looked to medieval texts for terms before attempting to create new ones.²⁸

Perron's glossary was never published in its totality. Other physicians extended the effort to create dictionaries (later including English) to facilitate medical learning in Arabic. In all these cases, medieval history continued to play a significant role. On the one hand, it provided an example of Arabic as a language of original scientific production and an argument against claims of its inability to host scientific knowledge. On the other, medieval texts provided a linguistic resource that translators and authors drew on in a variety of ways. History also figures in the attempts to answer the question, "Why translate?" Opponents of translation argue that such a process iso-

²⁵ Marwa Elshakry, *Reading Darwin in Arabic, 1860–1950* (Chicago: Univ. Chicago Press, 2013), pp. 25–72. Under British control, the language of medical education in Egypt became English.

²⁶ "[The book] was translated by khwājah Yuhannā ʿAnḥūrī, [who] dictated the [translated] book to me and others [to correct it]. During this time, I used to study [books] of [medieval] Arabic surgery to match their style of presentation in this book." Bījin and Antoine Barthélemy Clot-Bey, *Mublagh al-barāḥ fi ʿilm al-jirāh* (Cairo: Maṭbaʿat Būlāq, 1835), p. 3.

²⁷ "When [the book] was compiled, [Clot] dictated it to [Doctor] Muḥammad al-Shāfiʿī in French, and he translated it in the best way possible. Then he gave [the translation] to master Perron and asked him and me to correct it avoiding complicated terms and structures, and to only use well-known terms even if colloquial so that [the book] would benefit both the educated and the ignorant." Antoine Barthélemy Clot-Bey, *Kunūz al-ṣiḥah wa yawāqūt al-minḥah* (Cairo: al-Maktabah al-Jadīdah, 1863), pp. 4–5.

²⁸ Elshakry, *Reading Darwin in Arabic* (cit. n. 25), pp. 261–305.

lates Arabic speakers from rapidly developing scientific knowledge. Proponents of translation argue that it is the only way for such speakers to become contributors to, and not just consumers of, scientific knowledge.²⁹ They reanimate a narrative of an Islamic/Arabic Golden Age, when the availability of scientific knowledge in Arabic expanded the ranks of practitioners and led to innovation. While translation continues to be at the heart of a narrative of liberation and national independence, it also serves as part of a narrative of scientific progress. In this narrative, ownership of a scientific language, through making Arabic a language of science, serves as a proxy for the ownership of science, which materializes in progress.

CONCLUSION

It is not possible to write a complete history, or even a road map, of Arabic as a scientific language in the space of this short essay; this piece can only show how long and complex such a history is. It comes as no surprise that Arabic continued to be part of a linguistic regime where its status and uses, but also the way translations and original compositions came about, were affected by its relationship to other languages. From its connections to Persian, Greek, Syriac, Coptic, and Hebrew to its relation to English, French, and other European languages, Arabic's role as a scientific language relied on intellectual, linguistic, religious, cultural, and political factors. Similarly, it was also influenced by questions of identity at the political, religious, and cultural levels, from empire building in the medieval period to waves of pan-Arabism, discourses of independence, and Islamic revivalism in the modern contexts.

Thinking about Arabic as a scientific language requires further examination of the notion of "scientific language." "Science" here was not a neutral descriptor of specific intellectual activities. It was, rather, a value-laden term that denoted commitment to particular epistemic virtues. Medieval translators engaged with questions of word choice and the production of meaning in their work. Modern and contemporary translators had to contend with the complex meanings of science in colonial and postcolonial contexts. Here, a dominant positivist narrative of the universality of modern science and its rapid and continuous progress shaped the requirements for a scientific language. Arabic needed to reflect the universality of this discourse, and infrastructures (of dedicated translators, schools, and publishers) were needed to anticipate such rapid development fully.

In its postcolonial life, "scientific language" as a concept stands in for debates about the ownership of scientific knowledge and "catching up" with "the West." For many, reviving Arabic as a scientific language is a necessary step toward the popularization and democratization of scientific knowledge production and holds a vague promise for Arabic speakers to contribute to innovation—another professed character of modern science and technology. Here, linguistic barriers caused by a science produced in a foreign language (and anxieties around the absence of infrastructures to undertake massive translations) are seen as part of the inaccessibility of the means of knowledge production (such as state-of-the-art laboratories and funding for science education). The lack of real political will to support translations, despite rhetorical support, is perceived as part of the complex political and economic situation that limits attempts at development.

While this piece has focused primarily on translation as a process through which Arabic was and is being forged as a language of science, it does not indicate that the only articulation of science in Arabic is through translation. On the contrary, at each stage of its history the original production of scientific knowledge in Arabic was crucial. The work of the translator was a central site where an Arabic archive of science was being created. The construction of this archive

²⁹ For the views of opponents of translation see, e.g., a survey on teaching sciences in Arabic conducted in Morocco in 2011: <https://goo.gl/MJdlUH>. For those of its proponents see <http://www.taareeb.info/>.

was at the heart of articulating the concept of “a scientific language.” The making of a scientific language relies on the construction and the compilation of this archive, where words, terms, and concepts are created and also where both the meaning and significance of a given language in its linguistic regime, and the epistemic virtues attached to the discipline at hand (here science), are developed and negotiated.

Thinking in Many Tongues: Language(s) and Late Imperial China's Science

Dagmar Schäfer, *Max Planck Institute for the History of Science*

Abstract: A society and scholarly culture united in its use of one language dominates the general view of Late Imperial China's sciences. Recent studies have suggested, however, that in the past, as in the present, multilingual practices might have been the norm. Asian-language historians have shown that Chinese script embraced many tongues, intoning the characters in different dialects and giving them new meanings in Japanese, Korean, or Vietnamese. Rather than assuming that a hegemonic approach to language was a given in historical China, this essay suggests that we should ask *why*—or even *if*—this was the case, given that scientific knowledge was continuously transmitted to China from other learned traditions (Persian, Indian, European) and that new objects and practices entered Chinese learned discourse from diverse vernacular cultures that flourished on the local level throughout the empire. The essay discusses how to understand scientific and technological developments against changing views of Late Imperial China as a culture enmeshed in plurilingual practices.

One of the first things students of Late Imperial China learn is that its scholarship was all in and about Literary Chinese. Thus I was initially not very receptive toward Maria Tymoczko's 2006 proposal that plurilingual practices might have been the historical norm in China.¹ Tymoczko's use of Dunhuang, the gateway to China on the Silk Road, as her primary example reinforced my concerns. Situated on the geographic and political fringes of China's dynastic life, Dunhuang's long multilingual textual heritage was mostly religious in nature. Other counterarguments sprang to mind. Even during the exceptionally plurilingual Yuan (1271–1368) and Qing (1645–1912) dynasties, scholarship and the sciences had all been conducted and recorded in Chinese. I concluded that Late Imperial sciences could be considered multilingual only if one were to accept Tymoczko's expanded notion of translation as including all accompanying forms of cross-social and cross-cultural intercourse.

In the following years I came to realize how crucially my view hinged on the Late Ming period, when literati increasingly turned toward a Classical Chinese language ideal. When David

Dagmar Schäfer is Director of Department III, "Artefacts, Action, and Knowledge," the Max Planck Institute for the History of Science in Berlin, and Professor *honoris causa* at the TU and FU, Berlin. Her monograph *The Crafting of the 10,000 Things* (Chicago, 2011) won the History of Science Society's Pfizer Award in 2012. She is on the Editorial Board of *Transversal: International Journal for the Historiography of Science*, among other journals. Max Planck Institute for the History of Science, Boltzmannstraße 22, 14195 Berlin, Germany; dschaefer@mpiwg-berlin.mpg.de.

¹ Maria Tymoczko, "Reconceptualizing Western Translation Theory: Integrating Non-Western Thought about Translation," *Translating Others*, 2006, 1:13–32, esp. p. 16.

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Robinson reminded us that administration in the Ming military garrisons functioned in Mongolian long into the fifteenth century and I came across a growing number of artifacts and epigraphy evidencing the use of varied languages and orthographies later in the Ming era, I was ready to reconsider Tymoczko's proposal.² As I explored concepts of language, writing, and scholarly exchange, I became increasingly aware of how substantially the notion of a community sharing one language has been the assumption — often unstated — of research on China's scientific development. Research, for instance, had focused on "translation" as an act of transforming one or another source language spoken by a putatively monolingual (always non-Chinese-speaking) group into the target language "Literary Chinese," underlining information accessibility and transfer and not, for instance, the role of translation in the division or homogenization of linguistic spaces or the management of cultures of expertise. The three most important instances: Persian and Arabic sources and practitioners informed Guo Shoujing's 郭守敬 (1231–1316) astronomical reform; Jesuit missionaries reformed astronomy, mathematics, and many technologies from the Late Ming to the Mid Qing; and Western knowledge about weapons and new forms of science brought imperial power to its knees in the nineteenth century.³

In all three of these cases, Ming and Qing intellectual and political elites furthermore remained a homogenous language group, even though, at the same time, historians of language increasingly unveiled the huge regional diversity of languages in this part of the world. Others showed that textual practices of commentary (such as *kundoku*) could in fact be seen as multilingual techniques that helped heterolingual readers make sense of a text written in a specific orthography or language style. Evidently, the notion of a learned culture united by one language was thus under pressure both from without (China's many contacts abroad and centuries-long incorporation into foreign empires as well as the constant influx of knowledge brought by foreign experts) and from within (from local cultures using the so-called Chinese dialects). Why then did multilingualism not take place in Late Imperial China's sciences — or did it?⁴

In this essay I look at how Tymoczko's 2006 proposal for the broadening of translation was one of many cues prompting historians to review the structural premises through which language was historically understood, used, replicated, and revised. The first half unfolds the relation between the politics of language and expertise in the difficult case of the Ming dynasty. The Ming has long been considered a "native" dynasty in which Chinese constituted the norm (and in fact is often assumed to have been the only linguistic competence of scholars); in contrast, historians have studied the multiple languages of the Qing dynasty, generally considered to be a "foreign" dynasty, in depth.⁵ I then touch briefly on approaches to Late Ming and Qing sciences against

² David Robinson, "Mongolian Migration and the Ming's Place in Eurasia," *Journal of Central Eurasian Studies*, 2012, 3:109–129.

³ Regarding the Persian and Arabic sources and practitioners that informed Guo Shoujing's astronomical reform see Nathan Sivin, *Granting the Seasons: The Chinese Astronomical Reform of 1280* (New York: Springer, 2009), pp. 218–224; and Benno van Dalen, "Islamic and Chinese Astronomy under the Mongols: A Little-Known Case of Transmission," in *From China to Paris: Two Thousand Years Transmission of Mathematical Ideas*, ed. Yvonne Dold-Samplonius et al. (Stuttgart: Steiner, 2002), pp. 327–356. On the work of the Jesuit missionaries see Zhang Qiong, *Making the New World Their Own: Chinese Encounters with Jesuit Science in the Age of Discovery* (Leiden: Brill, 2015); and Florence Hsia, *Sojourners in a Strange Land: Jesuits and Their Scientific Missions in Late Imperial China* (Chicago: Univ. Chicago Press, 2011), p. 116. For the role of Western knowledge about weapons and new forms of science in the nineteenth century see Michael Lackner and Natasha Vittinghoff, eds., *Mapping Meanings: The Fields of New Learning in Late Qing China* (Leiden: Brill, 2004), p. 5.

⁴ With apologies to Nathan Sivin, "Why the Scientific Revolution Did Not Take Place in China—Or Didn't It?" *Chinese Science*, 1982, 5:45–66. Thanks to Marten Solderblom-Saarela for asking me to clarify this point.

⁵ See, e.g., Eva Tsoi Hung, "Translation in China—An Analytical Survey: First Century BCE to Early Twentieth Century," in *Asian Translation Traditions*, ed. Hung and Judy Wakabayashi (London: Routledge, 2005), pp. 67–107, esp. p. 85; and David Robinson, "Images of Subject Mongols under the Ming Dynasty," *Late Imperial China*, 2004, 25(1):59–123, esp. p. 60.

the background of the broadening concepts of language and an “East Asian writing system” and illustrate how a “global Chinese” facilitated actors’ skill in thinking in many tongues.⁶

BABEL AND THE MING: TRANSLATION IN A MULTILINGUAL WORLD

Historians have long interpreted the founder of the Ming dynasty, Zhu Yuanzhang (r. 1368–1398), as a ruler who steered his country politically and intellectually toward one language. Zhu is also seen as a major protagonist in the making of “Chinese” historical sciences, having asked in the fifth year of his Hongwu reign (1372) for the translation of some Persian astronomical books: “洪武出入大將入都，得圖籍文皆可考，惟秘藏之書數十百冊，乃乾方先聖之書。” As the preface of the *Qianfang Mishu* 乾方秘書 (*Secret Books of Heavenly Spheres*), attributed to the Hanlin scholars Masha Yihei 馬沙亦黑 and Ma Hama 馬哈麻, explains: “我國無解其文者。”⁷ As soon as Zhu Yuanzhang realized that these books tackled “celestial heaven (*tianwen* 天文), *yinyang*-permutation (陰陽), and calculations on the movement of heavenly bodies (*lixiang* 歷象)” —and thus touched on matters forming the basis of legitimate rule—he ordered their translation.⁸

Contrary to the “two Mas” gloomy invocations of a dearth, the streets of the recently conquered fourteenth-century Yuan capital Dadu were brimming with linguistic expertise. Two centuries of coexistence between Tangut, Jurchen, and Song dynastic states, followed by the Yuan’s multipolar policy of expertise, had resulted in a glut of migrant and diasporic communities in what would soon become the northern realm of the Great Ming. The family Ma was itself a member of a ubiquitous group of multilingual and technically skilled Uyghurs.⁹

Late Ming records depict the Hongwu emperor as a man who cherished “literati” ambitions of his own, yet contemporaries considered his Classical Chinese thuggish and unrefined.¹⁰ Before ascending the throne Zhu had roamed the country, first as a monk and then as a warrior. Although he made ample use of scholars, he just as regularly humiliated them. Most likely Zhu spoke a Sinic variety—that is, one of the “many languages” that Matteo Ricci (1552–1610) two centuries later would identify as a characteristic of Late Ming daily life.¹¹ Zhu may not have been able to understand Persian or Arabic astronomical-astrological texts. However, as the Hongwu emperor he was

⁶ On an “East Asian writing system” see Wiebke Denecke, *Classical World Literatures: Sino-Japanese and Greco-Roman Comparisons* (New York: Oxford Univ. Press, 2014), p. 209; and David B. Lurie, *Realms of Literacy: Early Japan and the History of Writing* (Cambridge, Mass.: Harvard Univ. Press, 2011), p. 6.

⁷ “When, early during the Hongwu reign, the grand general [i.e., Zhu Yuanzhang] entered the capital [of the Yuan Dynasty], he could peruse all registers and books [in the imperial library] except for several thousands of the Northwestern ancestor-sages that had been secretly stored away. These [books] were in a writing (*wen* 文) that [people of] our country could not explicate.” Ma Hama 馬哈麻, trans., *Qianfang Mishu* 乾方秘書 (*Secret Books of Heavenly Spheres*); I used the Beijing Library copy. This preface may have been repeating an imperial edict, thus voicing the first emperor’s genuine concern. All translations of primary sources are my own unless otherwise noted.

⁸ Ma Hama *et al.*, “Preface,” in *Tianwen shu* 天文書, *Hanfenlou miji* 涵芬樓秘笈, Vol. 3 (Shanghai: Shangwu yinshu guan, 1916); this is a translation of Kushyār ibn Labban’s (971–1029) book of horoscopic astrology *al-Madkhal fi Sinā’at Ahkām al-Nujūm* (*Introduction to Astrology*).

⁹ Zhu Zhiqi 祝志琦 *et al.*, *Haichang Zhushi Zongpu Xu* 海昌祝氏宗譜續 (Shanghai: Shanghai Municipal Library, 1881).

¹⁰ Such assessments also originate from foreign accounts, documentation that Late Ming historiographies could not rewrite. See Chen Gaohua 陳高華, “Shuo Zhu Yuanzhang de zhaoling 說朱元璋的詔令,” in *Shang Hongkui jiaoshou shishi shizhounian jinian wenji* 商鴻達教授逝世十週年紀念文集 (Beijing: Beijing daxue chubanshe, 1995), pp. 506–521; and Kwok Ka Fai 郭嘉輝, “Lüelun Da Ming Taizu huangdi yuzhiji jiqi shiliao jiazhi 略論《大明太祖皇帝御製集》及其史料價值,” *Journal of Chinese Studies*, 2015, 61:171–188. I would like to thank David Robinson for his help with the literature. Benjamin A. Elman, “The Story of a Chapter: Changing Views of the ‘Artificer’s Record’ (‘Kaogong ji’) and the Zhouli,” in *Statecraft and Classical Learning: The Rituals of Zhou in East Asian History*, ed. Elman and Martin Kern (Leiden: Brill, 2010), pp. 330–356, specifies that Late Ming writing credits Zhu Yuanzhang with a thoroughgoing interest in the study of apocryphal texts.

¹¹ “Con tutta questa varietà di lingue, ve ne è un’ache chiamano *cuonhoa*, che vuol dire lingua forense”: D’elia, *Fonti Ricciane* No. 53. Ricci expressed his relief that there existed a legal “official speech” (*guanhua* 官話, also often termed Chinese *koiné*) for communication.

acutely aware of the many tongues in his realm. Not only were his imperial edicts translated into Mongolian, Persian, and Chinese; like his son and successor, the Yongle emperor (r. 1402–1424), he also had such orders inscribed on stone stelae erected to enhance his image as a universal ruler.

This early Ming ruler who “spoke” with many tongues may have rhetorically espoused a language policy of Classical Chinese that went hand in glove with a practical policy of exploiting existing expertise. Zhu kept intact the organizational structures and staff of the Yuan astronomical bureau.¹² And, while he indeed invested heavily in local schools for the training of local administrators, Mongolian (replacing Soghdian, Persian, and other languages) continued to function as the diplomatic, administrative, and trade language. Language diversity disappears from Ming imperial accounts around the turn of the fifteenth century, at the same time as multilingual practitioners were relegated to a political back seat.¹³ From the historiographic view, the scholars had won.

Artifacts, however, continued to display a wide range of instrumental literacies, featuring Phagspa seals as well as Mongol, Sanskrit, or Turkic language inscriptions. Even more significantly, despite the political and intellectual supremacy of Chinese and its written culture during the Late Ming period, technical terminology based on foreign languages often persisted in specific fields for centuries.¹⁴ Historians of China’s sciences (similar to those of contemporary English) regularly interpret loan words, borrowings, calques, or the mixing of languages as a sign of foreign influence that nevertheless ultimately underlines the dominance of Chinese and the monolingual condition of language competence among Chinese scholars.

Since at least the Yuan period, Chinese language as one standard set of orthography, syntax, or semantic ordering was under increased pressure. In the fourteenth and fifteenth centuries we find Mongolian written in Chinese, Phagspa, or Arabic and Chinese script representing Kitan, Japanese, Tangut, or Vietnamese.¹⁵ During the Ming and Qing Hui regularly employed three oral languages and four scripts.¹⁶ Uyghur fortune-tellers, weather forecasters, and military experts used the “language of the canonical halls” (*jingtang yu* 經堂語, *xiaojing* 消經), mixing Han-Chinese grammar with Arabic or Persian terms.¹⁷ About a hundred years into the Ming the Hanlin academic Qiu Jun 邱濬 (1420–1495) felt compelled to emphasize that the Ming, unlike their Song colleagues, could no longer claim that theirs was the only “civilized” culture on the grounds that it possessed a written tradition (*wen* 文).¹⁸ Qiu’s remark gives good reason to

¹² Shi Yunli 石云里, “Islamic Astronomy in the Service of Yuan and Ming Monarchs,” *Suwayl*, 2014, 13:41–61. Hongwu commissioned an important work on Early Ming language standardization, *Hongwu zhengyun* 洪武正韻 (*Correct Rhymes of the Hongwu Reign* [1375]). The project was supervised by Song Lian.

¹³ Sarah Schneewind, *Community Schools and the State in Ming China* (Stanford, Calif.: Stanford Univ. Press, 2006), p. 164; and Dagmar Schäfer, “The Use of Work (*gongzuo* 工作之用): A Fifteenth-Century Ming-Chinese Political View” (forthcoming).

¹⁴ Bill M. Mak, “A Treatise of ‘Western’ Astral Science in Chinese and Its Versified Version *Xitian yusi jing*,” *SCIAMVS*, 2014, 14:105–170, esp. p. 126; and Chen Ming 陳明, *Zhonggu yiliao yu wailai wenhua* 中古醫療與外來文化 (Beijing: Beijing daxue chubanshe, 2013), p. 15.

¹⁵ Xu Jin 許晉 *et al.*, “Yuandai yuyan wenzi zhengce yu duoyuzhong chuban de fancheng 元代語言文字政策與多語種出版的繁盛,” *Bianji zhi you*, 2013, 10:106–110.

¹⁶ They also continued to use original texts. See Dror Weil, “Islamicated China: China’s Participation in the Islamicate Book Culture during the Seventeenth and Eighteenth Centuries,” *Intellectual History of the Islamicate World*, 2016, 4:36–60.

¹⁷ Ding Shiren 丁士仁, “‘Jing Tang Yu’ de jiben Tezheng he guanjian Yuqi ‘經堂語’的基本特征和關鍵語氣,” *Xibei Minzu yanjiu*, 2008, 1:48–53. This mixing was caused by the fact that these figures used Arabic for religious studies; Persian was the mode of trade communication from the thirteenth to the nineteenth century. See Liu Yingsheng 劉迎勝, “Huihui guan zazi” *yu* “Huihui guan yiyu” *yanjiu* 《回回館雜字》與《回回館譯語》研究 (Beijing: Zhongguo renmin daxue chubanshe, 2008), p. 3.

¹⁸ It is clear from Qiu Jun’s example that the Ming state and its early literati did not base their approach to translation in the Tang tradition of Buddhist text studies. Qiu Jun 丘濬, *Daxue yanji bu* 大學衍義補 (1487), annotated by Lin Guanqun and Zhou Jifu (Beijing: Jinhua Chubanshe, 1999), *juan* 145, p. 1262 in the modern edition. I was not able to clarify whether Qiu deliberately omitted Tang traditions or was simply unaware of them. Private scholars outside the bureau at that time also grappled with “foreign script”; see Joshua A. Fogel, ed., *Sagacious Monks and Bloodthirsty Warriors* (Norwalk, Conn.: EastBridge, 2002), p. 68.

argue that while Hongwu and Yongle may have wanted to promote multilingualism and expertise, Chinese scholar-officials may have felt seriously challenged by the Early Ming institutionalization of translation, taking it as one impetus to rethink the role of language proficiency in its relation to technical expertise.

A CHINESE BABEL

While foreign script stands in the foreground of research on languages and science, the growing intensity of mid- and late Ming scholarly attempts at “language care”—as we can call the simultaneous attention that evidential scholarship (*kaozheng* 考證) gave to linguistic-textual issues and the ordering and consolidation of society and political power, along the lines put forth in relation to Sheldon Pollock’s discussion of Sanskritization—might well suggest that the real challenge of Ming approaches to language and exchange lay in handling the linguistically diverse spaces that applied Chinese orthography/script but were not standard Classical Chinese.¹⁹

Early Ming compilations illustrate forms of linguistic hybrids and code-switching that historians of China tend to place into an entirely different category—namely, the use of Chinese characters for different phonetic values (i.e., orthography) or written accounts that use Chinese vocabulary but partially adopt the syntax and morphology of another language. Well known are the many sources of the Mongolian era that, even if written in Chinese, often require students “to master at least enough Mongolian to understand Mongolianised, colloquial grammar of Yuan chancery Chinese.”²⁰ Late Ming scholars, followed by modern historians, rather snobbishly emphasized these texts’ nonstandard “Chinese” rather than highlighting how this work represents linguistic diversity and adaptability in action.²¹

The idea that Chinese writing could display some kind of universality reaches back to Matteo Ricci, Andreas Müller (1630–1694), and Gottfried W. Leibniz (1646–1716).²² In contrast, new studies emphasize that “writing” could indeed have provided a standard of meaning “(for basic written vocabulary as well as for the logical connections expressed by grammatical markers) and a common mode of communication shared by elites within the Japanese archipelago and throughout the East Asian region.” This “writing,” in combination with techniques of reading and glossing, “made translation unnecessary” beyond what we generally consider the Chinese territory.²³ Japanese scholars “added the first *kundoku* 訓読 annotations, phonetic markers that made it possible to read the Chinese text in classical Japanese,” in order to understand Li Shizhen’s 李時珍 (1518–1593) *Bencao gangmu* 本草綱目 (*Materia Medica*).²⁴

¹⁹ Sheldon Pollock, *The Language of the Gods in the World of Men: Sanskrit, Culture, and Power in Premodern India* (Berkeley: Univ. California Press, 2006), p. 165.

²⁰ Naomi Standen, “Review: Alien Regimes and Mental States,” *Journal of the Economic and Social History of the Orient*, 1997, 40:73–89, on p. 74. For the context see also Michael C. Brose, “Uyghur Technologists of Writing and Literacy in Mongol China,” *Toung Pao*, 2005, 91(4/5):396–435, esp. p. 426.

²¹ Zhang Tingyu 張廷玉, *Ming Shi* 明史 (Beijing: Zhonghua shuju, 1974), *liezhuan* 16, pp. 3784–3788, and *liezhuan* 24, pp. 3935–3936, thus emphasizes the literati status of compilers such as Song Lian 宋濂 (1310–1381) and Zeng Lu 曾魯 (1297–1353). Nonstandard Chinese is here taken to mean substandard Chinese.

²² Dinu Luca, *The Chinese Language in European Texts: The Early Period* (New York: Palgrave, 2016). For the role of Ming Chinese ideas in this process see Bruce Rusk, “Old Scripts, New Actors: European Encounters with Chinese Writing, 1550–1700,” *EASTM*, 2007, 26:68–116.

²³ Lurie, *Realms of Literacy* (cit. n. 6), p. 208; and Wiebke Denecke, “Worlds without Translation: Premodern East Asia and the Power of Character Scripts,” in *A Companion to Translation Studies*, ed. Sandra Berman and Catherine Porter (Chichester: Wiley-Blackwell, 2014), pp. 204–217, on p. 205.

²⁴ Federico Marcon, *The Knowledge of Nature and the Nature of Knowledge in Early Modern Japan* (Chicago: Univ. Chicago Press, 2015), p. 73. Rebekah Clements, *A Cultural History of Translation in Early Modern Japan* (Cambridge: Cambridge Univ. Press, 2015), p. 111, remarks that “describing the act of producing a Japanese language rendering of a Chinese text as ‘reading’ is only puzzling to the modern scholar who, unused to divorces between script and language, assumes all *kundoku* texts are ‘written in Chinese.’”

We can gather from such research that textual and oral practices have to be taken into consideration to understand how historical actors bridged language differences. East Asian cultures thus chose to keep the coherence of the written account and employed glossing. If the Chinese writing system could hold several phonetic interpretations, then actors would furthermore choose to engage in phonology (*yinyun xue* 音韻學, *shengyun xue* 聲韻學²⁵) as a key to “translating” words and grasping the meaning of “other-language” texts that were written in Chinese.

While researchers have noted the emphasis on phonology in Chinese approaches to and understanding of “language,” they have thus far mainly emphasized that when the Qing revived phonology, philologists such as Duan Yucai 段玉裁 (1735–1815) continued the trend toward affixing meaning in relation to sound within Chinese norms: “凡說字必用其本義。凡說經必因文求義。”²⁶ Other scholars, however, have been much less focused on the Classics and on Chinese. Evidential scholarship, for instance, which was “developing some of the most sophisticated techniques in historical linguistics, phonetics and related fields ever devised in Chinese history,” is also the very scholarship that reveals linguistic diversity to us.²⁷

It is true, though, that evidential scholarship and its search for authenticity had a huge impact on both language understanding and the sciences in Qing times. Alongside the Manchu concern to legitimate their rule within a Chinese dynastic worldview and history, the state-orthodox view emphasized proficiency in one language, style, and form. Most of the state-commissioned translations of European language scientific texts into Manchu, such as Euclid’s *Elements*, remained in manuscript form, subject only to imperial use. Whenever scholars translated mathematical and astronomical works, chemistry, and other sciences in European languages into “Chinese” they debated issues of syntax and wording, choosing to “rely on old terms for the expression of new meaning.”²⁸ Not only had the concept of language changed, emphasizing one stylized and formally affixed ideal. Language identity and homogeneity became central for any discussion of how to do science.

CONCLUSION

The attempt to answer the “impossible” question posed at the beginning of this essay, “Why then did multilingualism not take place in Late Imperial China’s sciences—or did it?” exposes characteristics of China’s scientific language landscape (and our historical reflection thereof) that are astoundingly similar to those Michael Gordin identified in the expansion of English in the contemporary world. For instance, in Late Imperial times practice-related fields such as medicine and healing were more responsive to linguistic diversity than astronomy, farming, and agronomy—which, as sources of legitimate rule, seem to have functioned exclusively in Chinese. China’s his-

²⁵ Zhang Shilu 張世祿, *Zhongguo yinyunxue shi* 中國音韻學史, 2 vols. (Beijing: Shangwu yinshuguan, 1998).

²⁶ “Every time you use a word, you must apply its original meaning. Every time you talk about the Classics, you must scrutinize the meaning based on written accounts.” Duan Yucai, *Shuowenjiezi zhu* 說文解字注, in *Xu xiu Sikuquanshu* (Shanghai: Shanghai guji chubanshe, 2002), *juan 9 shang*, p. 22b. At the same time, a multilingual team of scholars, on the orders of the Qianlong emperor (1711–1799; r. 1735–1796), used strategies of painstaking textual accuracy to remedy the “original” Mongolian pronunciation of its chosen dynastic predecessor, the Yuan. See Matthew W. Mosca, “The Literati Rewriting of China in the Qianlong-Jiaqing Transition,” *Late Imperial China*, 2011, 32(2):89–132, on p. 105.

²⁷ Fogel, ed., *Sagacious Monks and Bloodthirsty Warriors* (cit. n. 18), p. 64. See also Marten Soderblom-Sareela, “Alphabets avant la lettre: Phonographic Experiments in Late Imperial China,” *Twentieth-Century China*, 2016, 41:234–257.

²⁸ Shen Guowei, “The Creation of Technical Terms in English–Chinese Dictionaries from the Nineteenth Century,” in *New Terms for New Ideas: Western Knowledge and Lexical Change in Late Imperial China*, ed. Michael Lackner, Iwo Amelung, and Joachim Kurtz (Leiden: Brill, 2001), pp. 287–304, on p. 291. For the Qing see Marta E. Hanson, “The Significance of Manchu Medical Sources in the Qing,” *Proceedings of the First North American Conference on Manchu Studies*, 2006, 1:131–175. Regarding work on mathematics that remained in manuscript form see Catherine Jami, *The Emperor’s New Mathematics* (New York: Oxford Univ. Press, 2012), pp. 166–168.

torical approaches to language, however, also display substantial differences from the English model. A cultural ideal of civilization informed scholarly attempts to refine language, and scholars approached language as arbitrary and dynamic, rather than considering it natural or part of “scientific rationalism.”²⁹

At the same time, it becomes clear that a synergy of language politics, methodological choices, and historiographic selectiveness, past and present, *cultivated* an image of China’s scholarly “language hegemony” —by which I mean that scholars of the Ming and Qing eras (irrespective of their linguistic capacity or background) presented themselves as speakers of “one tongue” and strove to master it in the form of elegant speech (*yayan* 雅言) for oral communication and Chinese script (*zhongwen* 中文) for literary discourse.³⁰ The reasons for this development are, among others, imperial rulers who determined that the civil service examination, centered around a Classical Chinese canon, would be key to social and political power. We hence have research on when and how Classical Chinese absorbed and appropriated foreign words or how Jesuit *scientia* stimulated late Ming scholars to work “on their own terms.”³¹ But we know much less about the role of other languages in Late Imperial times. Polyglots, for instance, whom we know existed in various eras, are mentioned mainly in passing. Sources in languages other than Chinese are underreported, and research is also beginning to look at how Chinese “went West” and impacted Indic, Arabic, and Persian scholarship.

When studying Late Imperial sciences as “Chinese,” the history of science does so against a long tradition of identity debates using language.³² “(Literary) Chinese” was and is a silent accomplice in arguments about the longevity, success, and consistency of scholarly approaches and the cultural specificity and otherness of China’s sciences in the comparative view. We have assumed a lot on the basis of certain historical moments and the most obvious schools of thought. Mirrored against plurilingualism as the normal condition in daily life and scientific discourse, the changes in the nature of Ming scholarship and its sciences appear to have been driven by a combined policy of steering language and expertise that started during the early Ming period. Similar to the Yuan, the Ming rulers seem to have regarded expertise and language as linked, but while the Mongols embraced multiplicity through their migration policy, Ming scholar-politicians leveraged translation as a political and intellectual instrument of control. As a result of the Ming policy, practitioners—and probably also the relevance—of multiple language skills were relegated to the minor leagues. The politically dominant strands of Qing evidential research reinforced this trend, both with its search for authenticity and its historiographic approach. The fact that religious and state powers—not individuals—commissioned most works of translation and institutionalized the process suggests that the goal of a single standardized language was politically inspired.

More research is needed on what centuries of imperial history and nation-state writing have obscured. We know now that Ming scholars paid respect to Sanskrit or Qing phonologists who had expansively studied Manchu. An emphasis on plurilingualism furthermore draws attention to the biases of modern scholarship on the sciences. Historical linguistics thus far focuses mainly on standard and written Chinese. Comparative linguistics on Sinic languages is not a defined field.

²⁹ Xunzi 荀子, “Yue ding su cheng 約定俗成,” in Hu Qiguang 胡奇光, *Zhongguo xiaoxue shi* 中國小學史 (Shanghai: Shanghai renmin chubanshe, 1987), pp. 37–38. For a translation see Timothy Michael O’Neill, *Ideography and Chinese Language Theory* (Berlin: De Gruyter, 2016), p. 165.

³⁰ This hegemonic language was more than merely a shared language. We might compare it to the way many contemporary native speakers of English can understand many foreign terms or dialects but still consider themselves “monolingual.” Similarly, many researchers presume that Chinese historical elites considered themselves as a group using “one language,” not just sharing a common means of discourse.

³¹ Benjamin A. Elman, *On Their Own Terms* (Cambridge, Mass.: Harvard Univ. Press, 2005), p. 113.

³² Lurie, *Realms of Literacy* (cit. n. 6), p. 350.

Most important, rather than assuming that a hegemonic approach to language—a competence in one language for the sake of scientific understanding—was a given or a necessity, it might be worthwhile to ask *why*—or even *if*—such a hegemonic scientific language was the norm in historical China, given that scientific knowledge was continuously transmitted to China from other learned traditions (Persian, Indian, European) and that new objects and practices entered Chinese learned discourse from varied and extremely diverse vernacular cultures that flourished on the local level throughout the empire. A closer examination of understudied sources such as the Local Gazetteers (*difang zhi* 地方志) may reveal that the “monolingual” character of “standardized” Classical Chinese scientific discourse was in fact challenged by regional diversity as much as by foreign influx. If not, the single-mindedness of learned Chinese would appear all the more remarkable and in need of explanation.

French in the *Siècle des Lumières*: A Universal Language?

Mary Terrall, UCLA

Abstract: In the eighteenth century, French extended its domain over the natural sciences at the expense of Latin, without entirely displacing it. Nor did it definitively supersede other vernaculars for scientific purposes. Scientific disputes and exchanges across language and geographical boundaries depended on a reservoir of overlapping language skills and translation strategies. These varied from case to case; this essay considers cases that illuminate the complex dynamics among languages, framed by the widespread use of French. Examples considered here show the complexity of the linguistic layering in eighteenth-century European science.

When René Descartes wrote the *Discours de la méthode* (1637) in his native vernacular, he was rhetorically reinforcing the central claim of his book: readers would need no special learning, and no special language skills, to follow his chain of reasoning and to apply it to themselves. By default he took his Everyman to be Francophone and addressed him almost conversationally on subjects—the soul, God, certainty—that his teachers at the Jesuit college of La Flèche might well have found more appropriate for Latin. Even in Descartes’s lifetime, French was spoken and read in many places beyond the borders of the kingdom, though Latin was still commonly deployed to breach language barriers. When he went to Holland, for example, Descartes found many French-speaking interlocutors, but he conducted an intense correspondence with Isaac Beeckman in Latin.¹ By the eighteenth century, though it had certainly not replaced Latin for all purposes, French was commonly referred to as the language of Europe, its use extending from commerce and diplomacy to science and scholarship.² As fluency in Latin decreased, scientific travelers could assume that they would be understood in French, whether or not it was their native language—though Samuel Johnson stubbornly conversed in Latin when he crossed the Channel in 1775, lacking confidence in his spoken French.³ Gen-

Mary Terrall is Professor of History at UCLA. She specializes in the history of eighteenth-century sciences and is the author, most recently, of *Catching Nature in the Act: Réaumur and the Practice of Natural History in the Eighteenth Century* (Chicago, 2014). Department of History, 405 Hilgard Avenue, Los Angeles, California 90095, USA; terrall@history.ucla.edu.

¹ Descartes corresponded with Constantijn Huygens in French and with Beeckman in Latin.

² “La Politique et le Commerce ont rendu notre langue presque aussi nécessaire aux Étrangers que leur langue naturelle [Politics and commerce have made it almost as necessary for foreigners to know our language as to know their own].” *Dictionnaire de l’Académie française*, 4th ed. (Paris: Brunet, 1762), “Dedication” (n.p.). (Here and throughout this essay, translations into English are my own unless otherwise indicated.) In a similar vein: “la langue françoise est devenue par une espèce de convention générale la langue courante de l’Europe.” Jean Berryat, “Discours préliminaire,” in *Collection académique composée des mémoires, actes, ou journaux des plus célèbres académies & sociétés littéraires étrangères* (Dijon: Desventes, 1755), Vol. 1, p. xxxvii.

³ James Boswell, *The Life of Samuel Johnson*, 3 vols. (London: Dent, 1925), Vol. 2, p. 172. Johnson noted that the journalist Elie Fréron “spoke Latin very scantily but seemed to understand me”: *ibid.*, p. 161.

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636

erally, young Englishmen on the Grand Tour used French while on the Continent; when Frenchmen traveled to England to hobnob with Newtonians, they took it for granted that they would be able to do their hobnobbing in French. Nevertheless, scientific communication—letters, conversation, journals and books—did not proceed exclusively in French. The shift from Latin to vernaculars—English, German, Dutch, Italian, Spanish, Russian—coincided with a multiplication of venues for the sciences outside the university, and this tended to encourage a multiplicity of languages for scientific purposes. As the French language spread (accelerated by the migration of French Protestants after the revocation of the Edict of Nantes in 1685), it did not so much displace other vernaculars as facilitate their viability as languages of science in their own home territories.

While French extended its domain in the natural sciences at the expense of Latin, classical languages remained the foundation of formal education. Most Francophone authors of scientific works could read Latin easily—and did so, even if they no longer used it for their correspondence.⁴ They often read other languages as well, although linguistic skills were hardly symmetrical; the English were more likely to know French than vice versa. Anglophone natural philosophers published in their native language, but many wrote letters in French; Germans were more likely than the English to be comfortable with Latin but often maintained correspondences in French as well. In short, the use of multiple languages remained commonplace, though French savants were less dependent on knowledge of foreign languages than their counterparts in other lands.

Philosophical or scientific disputes and exchanges across language and geographical boundaries drew on a reservoir of overlapping language skills and translation strategies, and these varied from case to case. As an example from early in the eighteenth century, take the vigorous multilingual debate between the German philosopher Gottfried Wilhelm Leibniz and the English Newtonian Samuel Clarke. What later became known as the Leibniz–Clarke correspondence came out of a three-way conversation, instigated and then mediated by Caroline, recently arrived in England as Princess of Wales.⁵ Caroline knew Leibniz well from her time at court in Berlin and Hannover and was intimately familiar with his *Théodicée* (written in French). Though lacking in formal education, she was fluent in German and French and started learning English even before her father-in-law (George I) ascended the English throne. Clarke, an Anglican clergyman with Socinian leanings and a past Boyle Lecturer, had translated Newton's *Opticks* from English into Latin. (In 1706, when this edition appeared, Latin was still the language of choice for disseminating Newton's work to the Continent; the *Opticks* was translated into French only in 1720.) Clarke had also translated a well-known Cartesian physics textbook from French into Latin, inserting extensive footnotes filled with overtly Newtonian commentary. Twenty-five years later, this remarkable book was translated into English and served as a textbook in English schools for many years—a French physics text, translated into English via Latin, with its Cartesian principles stated and undermined on the same page.⁶

Both Leibniz and Clarke knew Latin well, but as they squared off over the relative merits of Newtonian and Leibnizian concepts of matter, motion, metaphysics, and God each of them chose a different vernacular, Leibniz writing in French and Clarke responding in English. Each

⁴ Françoise Waquet, *Le latin ou l'empire d'un signe: XVIe–XXe siècle* (Paris: Michel, 1998).

⁵ Domenico Bertoloni Meli, "Caroline, Leibniz, and Clarke," *Journal of the History of Ideas*, 1999, 60:469–486. Caroline was married to the Hanoverian Georg Augustus (later George II of England).

⁶ Jacques Rohault, *Jacobi Rohaulti Physica: Latine vertit, recensuit, & uberioribus jam adnotationibus, ex illustrissimi Issaci Newtoni Philosophia maximam partem haustis, amplificavit & ornavit Samuel Clarke* (London: Jacob Knapton, 1697); and *Rohault's System of Natural Philosophy, illustrated with Dr. Samuel Clarke's notes . . .*, 2 vols. (London: James Knapton, 1723).

could read the native language of his interlocutor, and Caroline could read both as well. Caroline discussed the dispute with Leibniz in French, by letter, and with Clarke in English, in person. After Leibniz's death put an end to their dispute, Clarke published the exchange, choosing a highly unusual format for the book, with French and English printed on facing pages.⁷ Passages from Newton occasionally appeared in the notes in Latin, with Clarke's translations; in an appendix, the reader could find passages from Leibniz's works (in their original French and Latin), with parallel English translations.⁸ The book's format made reading easy for monoglot readers, whether English or French; but it also drew attention to the complexity of disputes that crossed linguistic boundaries and the need for careful attention to the meanings of contested terms. The exchange had a long life in print; it was published in monolingual editions only a few years later, both in French and in German, and eventually of course in English as well.⁹ The one language never used was Latin.

Though books in English were not widely read in France, learning the language became a badge of open-mindedness in the early Enlightenment. When Voltaire had to leave Paris quickly in 1727, for the first of many exiles, he went not to Holland or Switzerland but to England, where he met the leading lights of English science and literature. Unlike many contemporary French Anglophiles, Voltaire took the trouble to learn the language of Newton, Locke, Pope, and Shakespeare and fashioned himself as the French spokesman for all things English. His essays on English life and letters famously used the island nation as a foil for French intolerance and despotism; knowing that the French censors would object to the book, he published it in London, in English translation, and let the original French manuscript circulate clandestinely.¹⁰ Voltaire admired Newton and gravity, while mocking Descartes's vortices as unphilosophical dogma. Publishing a dangerous book in English, a language his countrymen barely read, made a political statement about the repressiveness of the French censorship regime. Later, when he lived with Emilie du Châtelet, the two companions made a show to their guests of speaking to each other in English and reading Bernard Mandeville and Newtonian natural philosophy in the original.¹¹

In France, learning English was associated with enthusiasm for the experimental philosophy of Newton and his followers. Georges-Louis Leclerc, later the Comte de Buffon, never went to England, but he made friends with a young English lord visiting Dijon and joined him on extensive travels through Switzerland and Italy—this was probably the origin of Buffon's familiarity with the English language.¹² In 1735, as a new member of the Paris Academy of Sciences, he as-

⁷ *A Collection of Papers which passed between the late Mr. Leibnitz and Dr. Clarke in the years 1715 and 1716 relating to the Principles of Natural Philosophy and Religion* (London: James Knapton, 1717). Clarke himself translated Leibniz's papers into English and enlisted the Huguenot journalist Michel de la Roche to translate his own texts into French. Clarke assured his readers that the translation had been done faithfully, "to prevent any Misrepresentation of Mr. Leibnitz's Sense": "Advertisement to the Reader," *ibid.*, p. xv. On the political ramifications of the Leibniz–Clarke exchange see Steven Shapin, "Of Gods and Kings: Natural Philosophy and Politics in the Leibniz–Clarke Disputes," *Isis*, 1981, 72:187–215.

⁸ This was the first time monoglot Anglophone readers could read any of Leibniz's work.

⁹ *Recueil de diverses pièces, sur la philosophie, la religion naturelle, l'histoire, les mathématiques, &c., par Mssrs. Leibniz, Clarke, Newton et autres auteurs célèbres* (Amsterdam: Du Sauzet, 1720). The German edition reasserted the primacy of the Leibnizian position by including a preface by Christian Wolff and a reply to Clarke's final paper by L. P. Thümmig, a disciple of Wolff: *Merckwürdige Schriften welche au gnädigsten Befehl ihro königl. Hoheit der Cron-Princessin von Wallis swischen dem Herrn Baron von Leibnitz und dem Herrn D. Clarke* (Frankfurt/Leipzig, 1720).

¹⁰ Voltaire, *Letters concerning the English Nation* (London: C. Davis, 1733). When the book was published in Voltaire's original French (without authorization) the following year, it was banned, and Voltaire left Paris again.

¹¹ Judith Zinsser, *La Dame d'Esprit: A Biography of the Marquise du Châtelet* (New York: Viking, 2006), p. 124. Du Châtelet translated Bernard Mandeville's scandalous *Fable of the Bees* into French—though she did not try to publish it.

¹² On Buffon's friendship with the Duke of Kingston see Jacques Roger, *Buffon* (Paris: Fayard, 1989), pp. 27–28, 48–50.

served his Newtonian credentials by translating Stephen Hales's *Vegetable Staticks* into French. "La première fois que j'ai lu les ouvrages de M. Hales," Buffon wrote in his preface, "je me suis aperçû qu'ils valoient bien la peine d'être relus. Comme je voulois le faire avec toute l'attention qu'ils méritent, je pensai qu'il ne m'en coûteroit guères plus de les traduire, et l'envie de faire plaisir au Public, a achevé de m'y déterminer."¹³ Buffon praised the English for abandoning the "spirit of system" in favor of experiments and Hales in particular for the brilliance of his results. But he also noted that Hales could have made his discoveries shine even more brightly by presenting them differently. "Son Livre n'est pas fait pour être lu, mais pour être étudié, c'est un recueil d'une infinité de faits utiles & curieux, dont l'enchaînement ne se voit pas du premier coup d'oeil."¹⁴ According to his translator, Hales had not embellished his experimental reports in any way, even refusing to play up "the most beautiful part" of his book, the chemical analysis of air. Buffon admired Hales but regretted that he wrote like an Englishman.¹⁵

From the vantage point of Paris at midcentury, the spread of French as the language of science and philosophy reflected the progress of knowledge more generally. In his "Discours préliminaire" to the *Encyclopédie*, Jean Le Rond d'Alembert narrated the evolution of taste and literature from the Renaissance to his own day partly as a story of shifting linguistic practices. Humanist adulation of ancient languages had given way to attempts to translate directly from Latin into the vernacular, with mixed results. More recently, men of letters had worked on "perfecting the vernacular languages," creating a modern style grounded in good taste. D'Alembert linked the spread of new sciences to writing in the vernacular, while acknowledging that abandoning Latin came at a price.

L'Angleterre nous a donc imité; l'Allemagne, où le latin semblait s'être réfugié, commence insensiblement à en perdre l'usage: je ne doute pas qu'elle ne soit bientôt suivie par les Suédois, les Danois, et les Russes. Ainsi, avant la fin du dix-huitième siècle, un philosophe qui voudra s'instruire à fond des découvertes de ses prédécesseurs, sera contraint de charger sa mémoire de sept à huit langues différentes; et après avoir consumé à les apprendre le temps le plus précieux de sa vie, il mourra avant de commencer à s'instruire.¹⁶

With this dire prediction, d'Alembert found himself paradoxically arguing for the advantages of Latin, even as he presented a groundbreaking vernacular work to a broad Francophone readership. Philosophy, in its broad Enlightenment meaning, depended on clear and precise expression, and d'Alembert suggested that the advance of knowledge would require a "universal" language. As the closest thing to such a language, Latin should perhaps return to conventional use. "Mais il n'y a pas lieu de l'espérer. L'abus dont nous osons nous plaindre est trop favorable

¹³ "The first time I read the works of Mr. Hales, I realized that they were worth the trouble of rereading. As I wished to do this with all the attention they deserved, I thought that it would hardly cost me more effort to translate them, and the desire to please the Public determined me to do it." Stephen Hales, *La statique des végétaux et l'analyse de l'air*, trans. Buffon (Paris: Jacques Vincent, 1735), "Préface du traducteur," p. iii.

¹⁴ "His book is not written to be read, but to be studied; it is a collection of an infinity of useful and curious facts, whose connection cannot be perceived at first glance": *ibid.*, p. vii.

¹⁵ *Ibid.*

¹⁶ "Thus England has imitated us; Germany, where Latin seemed to have taken refuge, is beginning gradually to lose the use of it. I have no doubt that Germany will soon be followed by the Swedes, the Danes, and the Russians. So before the end of the eighteenth century, a philosopher who will wish to truly educate himself about the discoveries of his predecessors will have to burden his memory with seven or eight different languages; and after having consumed the most precious time of his life in learning them, he will die before beginning to educate himself." Jean Le Rond d'Alembert, "Discours préliminaire," in *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers, par une société de gens de lettres* (Paris: Briasson, 1751), Vol. 1, p. xxx.

à la vanité et à la paresse, pour qu'on se flatte de le déraciner. Les philosophes, comme les autres écrivains, veulent être lus, et surtout de leur nation."¹⁷

D'Alembert was a prolific author of works of mathematics, mechanics, and philosophy—and he never wrote in Latin. His wistful longing for the return of Latin can only be read as ironic. He readily admitted that the ideal of frictionless communication was no more than a utopian dream; nevertheless, we can read in this dream a very real concern with the fragmentation of knowledge and the difficulties of working across languages as the pace of the “progress of knowledge” picked up. We find a similar, perhaps facetious, call for a revival of Latin in P.-L. M. de Maupertuis's contemporaneous *Lettre sur le progrès des sciences*, an eclectic and partly satirical meditation on future directions for scientific research. The trope of “progress,” which would reappear throughout this period in French texts, resonated with d'Alembert's essay.¹⁸ According to Maupertuis, everyone recognizes that Latin is still, of all the languages, “la plus universelle” in Europe, and yet it is actually used by almost no one but priests and physicians. A prince—perhaps his own patron, Frederick of Prussia?—could revive Latin as a truly universal language by moving it out of schools and into the city:

Il ne faudroit que confiner dans une même Ville, tout le Latin de son Païs; ordonner qu'on ny preachât, qu'on n'y plaidât, qu'on n'y jouât la Comedie qu'en Latin. Je crois bien que le Latin qu'on y parleroit ne seroit pas celui de la Cour d'Auguste, mais aussi ce ne seroit pas celui des Polonois. Et la jeunesse qui viendroit de bien des Païs de l'Europe dans cette Ville, y apprendroit dans un an plus de Latin qu'elle n'en apprend dans cinq ou six ans dans les Collèges.¹⁹

Neither d'Alembert nor Maupertuis was seriously advocating a return to Latin as the single language of science—to abandon the vernacular for a dead language ran counter to their own notions of progress and stylistic innovation. But these passages signal that the predominance of the French language was hardly absolute.²⁰ This was nowhere more obvious than in the Berlin Academy of Sciences and Belles-Lettres after its revival in the 1740s. The institution traced its origins to Leibniz's ambitious plan for an academy for all branches of German scholarship: history, language, literature, mathematics, and physical sciences. When it was formally reconstituted by the Francophile Frederick II in 1744, about half the members came from the old German academy; the others were associated either with Francophone circles at court or with the Huguenot community in the city. The king decreed French the official language of the academy and set out to recruit foreigners to enhance the roster. His first success was Leonhard Euler, Swiss by origin, bilingual in French and German, and comfortable writing in Latin.²¹ Frederick

¹⁷ “But we have no grounds to hope for it. The abuse we are complaining about is too favorable to vanity and sloth for one to hope to uproot it. Philosophers, like other writers, want to be read, and especially by their fellow countrymen.” *Ibid.*

¹⁸ The French progress narrative reached climactic expression at the end of the century in the Marquis de Condorcet's posthumously published *Esquisse d'un tableau historique des progrès de l'esprit humain* (Paris: Agasse, 1794).

¹⁹ “He would only have to confine all the Latin of his country within a single city; and ordain that all preaching, legal proceedings and theater performances would take place only in Latin. I could well believe that the Latin spoken there would not be that of Augustus's court, but neither would it be that of the Poles. Young people who would come from different European countries would learn more Latin in one year there than they learn in five or six years in the secondary schools [*collèges*].” P.-L. M. de Maupertuis, *Lettre sur le progrès des sciences* (Berlin: Etienne de Bourdeaux, 1752), pp. 31–32.

²⁰ The predominance of French is sometimes exaggerated; see Marc Fumaroli, *Quand l'Europe parlait français* (Paris: Fallois, 2001).

²¹ Euler moved to Berlin from St. Petersburg, where he wrote in Latin, the official language of the Russian academy; he returned to Russia in 1766. On Leibniz's academy see Ayval Ramati, “Harmony at a Distance: Leibniz's Scientific Academies,” *Isis*, 1996, 87:430–452; on the Berlin Academy under Frederick II see Mary Terrall, *The Man Who Flattened the Earth* (Chicago: Univ. Chicago Press, 2002), Ch. 8.

lured Maupertuis from Paris, promising him autocratic control over the newly Francophone institution. In his thirteen years as president, Maupertuis never learned a word of German. Academicians could read papers in German or Latin to their colleagues at the regular meetings, but in order to be published in the monolingual annual journal they had to arrange for translation into French. Some of the Germans published only rarely as a result and grumbled about being second-class citizens. Linguistic matters colored the day-to-day operations of the academy, though this would have been invisible to international readers of the *Mémoires*.

Making a Francophone institution work in Prussia required constant effort, especially by the secretary Samuel Formey, a native Berliner born to Huguenot parents and educated in French and German. Both Formey and Euler frequently had to facilitate communication between Maupertuis and the German-speaking academicians, many of whom had only rudimentary French. “Il étoit d’ailleurs naturel,” Formey recalled, “que ceux qui savoient un peu de françois écrivent et lussent dans cette langue: ce qui a produit quelquefois des lectures très singulières par le baragoin des lecteurs.”²² As *de facto* editor of the Berlin Academy’s *Mémoires*, Formey had responsibility for transforming these presentations into intelligible papers. He was also intimately involved in managing the academy’s multilingual prize competitions—essays were accepted in French, Latin, or German, but of course the president could not read the German submissions until they were translated. The 1746 question on Leibnizian monads provoked a stream of translations and commentaries in the German-language press, as well as several clandestine publications. In this case, as Thomas Broman has explained so nicely, the Francophone Berlin Academy was challenging German scholars associated with Christian Wolff to defend their philosophy, associated in Halle and Göttingen with the promotion of the German language for enlightened literature and philosophy.²³ Language choice and philosophical predilections could hardly be separated in such a climate.

While Maupertuis was trying to recruit Francophone academicians to Berlin, Emilie du Châtelet was working on a French translation, with commentary, of Newton’s *Principia*. The peculiarities of this translation project raise some interesting questions about the hegemony of French in European sciences at midcentury. With Newton’s physics no longer a novelty and hardly as controversial in France as it had been only a decade earlier, why translate this notoriously difficult text? For Du Châtelet herself, this was a strategic gambit to solidify her reputation as a serious player in a world where her sex kept her on the margins. She had earlier attempted, in *Institutions de physique*, to bridge the Leibniz–Clarke impasse by reconciling Newtonian physics and Leibnizian metaphysics; French readers admired her effort but did not buy her arguments. So she decided to deploy her considerable linguistic skills for the high-profile task of rendering Newton into French.²⁴ To her meticulous translation of Newton’s Latin she appended her own accounts of the latest Francophone mathematical physics (primarily the work of Alexis Clairaut and Daniel Bernoulli), using Leibnizian mathematics.

Du Châtelet finished the proofs of her translation just before her untimely death in 1749. When it finally saw the light of day, some ten years later, Voltaire had commandeered the introduction. His argument for the virtues of French over Latin speaks to our theme. First, it is difficult to read about abstract notions in a foreign language, and Latin is foreign to everyone.

²² “Those who knew a bit of French wrote and read in that language, which sometimes produced lectures quite peculiar for the gibberish of the speakers”: Samuel Formey, *Souvenirs d’un citoyen*, 2 vols. (Berlin: Lagarde, 1789), Vol. 1, p. 166.

²³ Thomas Broman, “Metaphysics for an Enlightened Public: The Controversy over Monads in Germany, 1746–1748,” *Isis*, 2012, 103:1–23.

²⁴ Isaac Newton, *Principes mathématiques de la philosophie naturelle*, [traduit] par feu Madame la Marquise du Châtelet, 2 vols. (Paris: Desaint & Saillant, 1759). Du Châtelet worked from the Latin edition of the *Principia* (1726).

Further, as a dead language, Latin lacks words for mathematical and physical truths unknown to the ancients. As the language used most widely in Europe, and as a living language “qui s’est enrichi de toutes ces expressions nouvelles & nécessaires [which has been enriched with these new and necessary expressions],” French was just more appropriate than Latin for spreading the knowledge of Newtonian physics to new audiences. Unlike translation from English, translation from Latin needed justification beyond bare accessibility. Voltaire suggested that the French translation of Newton might well be an improvement on the original, especially since it was the work of a literary talent. Du Châtelet was, simply, a better writer than Newton. “Le mot propre, la précision, la justesse et la force étoient le caractère de son éloquence; elle eût plutôt écrit comme Pascal et Nicole, que comme Madame de Sevigné. . . . C’étoit un avantage qu’elle eût sur Newton, d’unir à la profondeur de la Philosophie, le goût le plus vif et le plus délicat pour les Belles Lettres.”²⁵

A generation later, in 1783, the Berlin Academy posed a question about how the French language had come to be “universal” and whether its hegemony was likely to continue. The question was advertised in Latin as well as French to the international community of savants. Two essays shared the prize, both agreeing on the virtues of French and the ascendancy of French culture. Oddly enough, one of these had been written in German and had to be translated before it could be read in France. Clearly the universality of French, assumed by the question and the answering essays, did not mean that the sciences could get along without other languages. Latin literacy had not died out; in many fields (e.g., botany, mathematics, medicine) scholars continued to consult Latin works and even to write in Latin for some purposes. Furthermore, widespread fluency in French facilitated the movement of works in other vernaculars across geographical and language boundaries, as translations proliferated in all directions. Language mattered in the era of the “universality” of French: philosophes reflected on the implications of working in vernaculars, translators made strategic choices in framing their work, and readers often drew on proficiency in multiple languages to keep up with the sciences. The examples I have touched on here, however briefly, indicate the fluidity of language use in the period when French ruled.

²⁵ “The right word, precision, accuracy, and strength characterized her eloquence; she wrote more like Pascal and Nicole than like Madame de Sevigné. . . . She had the advantage of Newton in that she combined with the profundity of Philosophy the most lively and most delicate taste for language [*Belles Lettres*].” Voltaire, “Préface historique,” *ibid.*, p. xi.

Latin in a Time of Change: The Choice of Language as Signifier of a New Science?

Sietske Fransen, *University of Cambridge*

Abstract: This essay discusses three authors from the early seventeenth century (Galileo, Descartes, and Van Helmont) and the reasons that guided their decisions to write occasionally in their respective vernacular languages even though Latin remained the accepted language for learned communication. From their writings we can see that their choices were social, political, and always of high importance. The choice of language of these multilingual authors conveyed a message that was sometimes implicit, sometimes explicit. Their usage of both Latin and vernacular proved, on the one hand, their place in the international learned community and, on the other hand, their interest and investment in changing the educational system.

This essay focuses on the first half of the seventeenth century in Western Europe as the period in which Latin gradually lost its status as the preeminent language of scientific discourse and ceded ground to the European vernaculars.¹ Authors of scientific texts exhibited a high level of awareness about their choice of language.² This is demonstrated explicitly in their reflections on the use of language and implicitly in their decisions to choose either Latin or a vernacular as the language of their publications. I discuss three examples of famous authors: Galileo Galileo, René Descartes, and Jan Baptista van Helmont. Each was a multilingual author who chose to write and publish his scientific texts in both Latin and his own vernacular. I preface this discussion with a brief exploration of the presence maintained by Latin in the European society of the late sixteenth and seventeenth centuries, as well as the role it played in the scientific community of the time.

* * *

Throughout the Middle Ages education in Western Europe was organized by the Catholic Church, with Latin as the language of learning. The impact of Latin on learning continued:

Sietske Fransen is a Postdoctoral Research Associate on the AHRC-funded project “Making Visible: The Visual and Graphic Practices of the Early Royal Society, 1660–1710,” at the University of Cambridge. She studies the role of translation of both texts and images in the communication of early modern science. With Niall Hodson and Karl Ehenkel she recently edited the volume *Translating Early Modern Science* (Brill, 2017). Center for Research in the Arts, Social Sciences, and Humanities (CRASSH), Alison Richard Building, 7 West Road, Cambridge CB3 9DT, United Kingdom; sf547@cam.ac.uk.

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¹ For histories of Latin see Françoise Waquet, *Latin; or, The Empire of a Sign* (London: Verso, 2001); and Jürgen Leonhardt, *Latin: Story of a World Language* (Cambridge, Mass.: Harvard Univ. Press, Belknap, 2013).

² Although the terms “science” and “scientific” are anachronistic for the early modern period, I use them here as general terms for “natural knowledge,” which includes among other domains natural philosophy, medicine, astronomy, and mathematics.

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everyone who went to school in the late sixteenth and early seventeenth century learned the language.³ Moreover, the pupils—all boys—would have received their entire education *in* Latin. Their teachers spoke to them in Latin; their books were in Latin; they even spoke Latin in class, regardless of whether the school was in the German lands, England, or Italy.⁴ These school years, in which the learning of Latin in all its aspects—reading, grammar, rhetoric, and so forth—formed the core of the curriculum, were sometimes followed by a university degree. The courses at this level, as well, were taught entirely in Latin. It therefore does not come as a surprise that the language of communication between learned men (and, sporadically, women) was Latin and that science, as practiced by learned men and women, was conducted in Latin.

While education occurred in Latin, an increasing number of books appeared in vernacular languages.⁵ This development was not new to the sixteenth and seventeenth centuries, as already from the thirteenth century onward texts addressing scientific topics were written in the various European vernaculars. Many of these texts were for practical use: recipes, astrology, manuals for surgery, and the like.⁶ However, the new technology of the printing press set in motion far-reaching developments; the number of books in the vernacular increased in comparison with the number of Latin publications, thereby eroding that language's hegemony. The rising star of the vernaculars (in this case especially Dutch, English, French, German, Italian, and Spanish) coincided with a European-wide movement arguing the ability of these languages to provide a serviceable vehicle for recording and transmitting the practice of science.⁷ The adherents of these changes thus insisted that the vernacular language would serve as well as Latin for communicating scientific knowledge.

The promotion of vernacular languages over Latin in the sixteenth century also had to do with eagerness to change the prevailing system of education. The writings of Jean Bodin, Jan Amos Comenius, Petrus Ramus, Paracelsus, and Francis Bacon all argued for major changes to the university system, including the use of vernacular languages. The changes they envisioned were to impact the methods of teaching, the acquisition of new knowledge (trust in observation in addition to bookish knowledge), and the relative standing of the vernaculars vis-à-vis Latin.⁸ The originally rad-

³ From the sixteenth century onward vernacular education was growing. For an example of education in mathematics in the Dutch case see Charles van den Heuvel, "De vesting als mathematisch en cultureel kennissysteem: Het onderwijs in de vestingbouw aan hovelingen, kooplui en ambachtslieden in de Hollandse Republiek (17e eeuw)," *Scientiarum Historia*, 2006, 32:99–118. For Germany see Ivo Schneider, "The Concept of Algebra in the Publications of Johannes Faulhaber in the Context of the Activities of the Rechenmeister," in *Pluralité de l'algèbre à la Renaissance*, ed. Sabine Rommevaux, Maryvonne Spiesser, and Maria Rosa Massa Esteve (Paris: Honoré Champion, 2012), pp. 311–329. On the Italian *scuola d'abbaco* see Richard J. Oosterhoff, "Neo-Latin Mathematics," in *Brill's Encyclopaedia of the Neo-Latin World*, ed. Philip Ford, Jan Bloemendal, and Charles Fantazzi, 2 vols. (Leiden: Brill, 2014), Vol. 1, pp. 691–703.

⁴ For the teaching of and in Latin see Françoise Waquet, *Parler comme un livre: L'oralité et le savoir, XVIe–XXe siècle* (Paris: Michel, 2003); Waquet, *Latin* (cit. n. 1), esp. pp. 19–23; and Leonhardt, *Latin* (cit. n. 1), esp. pp. 184–227. On the education of girls see Jane Stevenson, "Women's Education," in *Brill's Encyclopaedia of the Neo-Latin World*, ed. Ford et al., Vol. 1, pp. 87–99.

⁵ For a quantification of manuscript and book production see Eltjo Buringh and Jan Luiten Van Zanden, "Charting the 'Rise of the West': Manuscripts and Printed Books in Europe, a Long-Term Perspective from the Sixth through Eighteenth Centuries," *Journal of Economic History*, 2009, 69:409–445.

⁶ Ann M. Blair, "La persistance du latin comme langue de science à la fin de la Renaissance," in *Sciences et langues en Europe*, ed. Roger Chartier and Pietro Corsi (Paris: Ecole des Hautes Etudes en Sciences Sociales, 1996), pp. 21–42, esp. p. 21.

⁷ A quick calculation using the data in the English Short Title Catalogue shows that in England the production of Latin titles more than doubled between 1580 and 1680, whereas the production of English titles rose more than nine times: www.estc.bl.uk (accessed 30 Dec. 2016). For a discussion of vernacular languages in early modern Europe see Peter Burke, *Languages and Communities in Early Modern Europe* (Cambridge: Cambridge Univ. Press, 2004).

⁸ Blair, "La persistance du latin comme langue de science à la fin de la Renaissance" (cit. n. 6), pp. 28–33. On the new pedagogical methods of Comenius see Jan Amos Comenius, *The Analytical Didactic of Comenius (Jan Amos Komenský)*, trans. Vladimir Jelinek (Chicago: Univ. Chicago Press, 1953).

ical idea that the mother tongue might be the best vehicle for understanding belonged to an argument that ran simultaneously in the worlds of scientific communication and the European Reformation while being fed by the strong market in printed book production.⁹ In general, literacy in early modern society increased, which meant that authors could presume a larger audience, made up in part of more readers closer to home. Michael Gordin argues that this rise in literacy might have been a reason for more learned publications in the vernaculars.¹⁰

During the Middle Ages and the early modern period authors of scientific texts always lived in a bi- if not multilingual society.¹¹ Nobody spoke Latin as his or her mother tongue. One effect of higher literacy was the increased translation of Latin scientific works into vernacular languages.¹² Translation also occurred in the opposite direction, however: from the vernacular into Latin. It was exactly due to an increase in the production of scientific texts in the early seventeenth century that the number of translations between local (vernacular) and international (Latin) languages increased.¹³ The late sixteenth- and early seventeenth-century author thus had a degree of freedom in choosing the language for his scientific writings.

This availability of choice of language can be seen clearly in the correspondence of university-educated men. Often these men wrote to each other in Latin when they came from different countries and therefore lacked a common vernacular; Latin served as the intermediary language. On the other hand, within the same linguistic region, or when common vernaculars were available, some authors would forgo Latin, as when Jan Baptista van Helmont (1579–1644) corresponded in French with his honorable friend Marin Mersenne (1588–1648), a French priest and natural philosopher who certainly knew Latin. At the same time, Van Helmont wrote in Latin to another French scientist, Pierre Gassendi (1598–1655), to whom he could have written in French. Van Helmont's mother tongue was Dutch, and this language took precedence when he wrote to the authorities at the diocese of Mechelen during the legal proceedings brought against him because of his scientific writings, which were published in Latin.¹⁴ Van Helmont was no exception in using both Latin and various vernaculars in his scientific correspondence. The first secretary of the Royal Society, Henry Oldenburg (1619–1677), for example, used not only Latin but also German, his mother tongue, as well as French and English in his correspondence.¹⁵

⁹ On vernacularization and religion see Alexandra Walsham, "Unclasping the Book? Post-Reformation English Catholicism and the Vernacular Bible," *Journal of British Studies*, 2003, 42:141–166; on market forces see, e.g., Ian Maclean, *Learning and the Market Place: Essays in the History of the Early Modern Book* (Leiden: Brill, 2009).

¹⁰ Michael D. Gordin, *Scientific Babel: How Science Was Done Before and After Global English* (Chicago: Univ. Chicago Press, 2015), p. 41.

¹¹ This was also true for the classical period. See J. N. Adams, *Bilingualism and the Latin Language* (Cambridge: Cambridge Univ. Press, 2003).

¹² There is no comprehensive study of all translations made in the early modern period, but the "Renaissance Cultural Crossroads" project has catalogued all translations printed in England between 1473 and 1640, which shows a steady increase in the number of translations. See <https://www.hrionline.ac.uk/rcc/>; and Sara Barker and Brenda M. Hosington, eds., *Renaissance Cultural Crossroads: Translation, Print, and Culture in Britain, 1473–1640* (Leiden: Brill, 2013).

¹³ On the translation of vernacular scientific texts into Latin see Peter Burke, "Translations into Latin in Early Modern Europe," in *Cultural Translation in Early Modern Europe*, ed. Burke and R. Po-chia Hsia (Cambridge: Cambridge Univ. Press, 2007), pp. 65–80. On translating early modern scientific texts in general see Sietske Fransen, Niall Hodson, and Karl Enekel, eds., *Translating Early Modern Science* (Leiden: Brill, 2017). Regarding the increase in scholarly books see, e.g., Ian Maclean, "The Market for Scholarly Books and Conceptions of Genre in Northern Europe, 1570–1630," in *Learning and the Market Place* (cit. n. 9), pp. 9–24, esp. pp. 11–12.

¹⁴ On Van Helmont and his use of language see Sietske Fransen, "Exchange of Knowledge through Translation: Jan Baptista van Helmont and His Editors and Translators in the Seventeenth Century" (Ph.D. diss., Univ. London, Warburg Institute, 2014).

¹⁵ See Henry Oldenburg, *The Correspondence of Henry Oldenburg*, ed. A. Rupert Hall and Marie Boas Hall, 13 vols., Vols. 1–9 (Madison: Univ. Wisconsin Press, 1955–1973), Vols. 10 and 11 (London: Mansell, 1975, 1977), Vols. 12 and 13 (London: Taylor & Francis, 1986).

In the seventeenth century there was a definite change in the dominance of Latin within the science community. Ann Blair has located it in the decade between 1630 and 1640 for the French context.¹⁶ Its consequences can be clearly recognized in the decision that the vernacular would be the medium of communication for two institutions of scientific investigation founded in the 1660s: the Royal Society in London and the Académie des Sciences in Paris. In the case of the Royal Society, Latin was still used extensively in correspondence with those who did not speak English, but the first language of the institution was English. Already in the first half of the seventeenth century authors started to publish more frequently in their vernaculars, although they were still educated in Latin. Once the option of writing in the vernacular was opened, Latin would slowly take on a more passive role in the circulation of knowledge. It became a language that was more read than written. However, the following examples show three scientific authors who were able to alternate smoothly between Latin and their mother tongues in undertaking their scientific work; in the case of Galileo Galilei (1564–1642) this was Italian, for René Descartes (1596–1650) French, and for Jan Baptista van Helmont Dutch. Why did these authors, who all went through a Latin education system, decide on occasion to choose their mother tongues over the customary language of science? How did they attempt to justify their choices, and what was the effect on the reception of their works?

* * *

The example of Galileo is interesting, as most of his published work was in Italian, yet this did not impede the rapid spread of his fame far beyond the linguistic borders of that tongue. The dissemination of his works, however, took place especially in Latin—as in the case of one of his first publications, *Siderius nuncius* (Venice, 1610).¹⁷ After receiving letters from colleagues in Germany who were not able to read his Italian works, Galileo explained to his friend Paolo Gualdo why he decided to write mainly in Italian:

I wrote in the vernacular because I must have everyone able to read it, and for the same reason I wrote my last book in this language. I am induced to do this by seeing how young men are sent through the universities at random to be made physicians, philosophers, and so on; thus many of them are committed to professions for which they are unsuited, while other men who would be fitted for these are taken up by family cares and other occupations remote from literature. . . . Now I want them to see that just as nature has given to them, as well as to the philosophers, eyes with which to see her works, so she has also given them brains capable of penetrating and understanding them.¹⁸

Galileo's eagerness to reach out to those around him who would not have been able to attend university, yet were nevertheless curious to learn more about the world, is touching. But this passage also implicitly reveals his awareness of an increasing literacy among people who missed out on

¹⁶ Blair, "La persistence du latin comme langue de science à la fin de la Renaissance" (cit. n. 6), p. 29. The balance between Latin and vernacular did not change at the same pace in every linguistic region; see Burke, *Languages and Communities in Early Modern Europe* (cit. n. 7), pp. 65–71.

¹⁷ For research on Galileo's influence on the Italian language see Stillman Drake, "Galileo's Language: Mathematics and Poetry in a New Science," *Yale French Studies*, 1973, 49:13–27; and Andrea Battistini, "'Girandole' verbali e 'severità di geometriche dimostrazioni': Battaglie linguistiche ne *Saggiatore*," *Galilaeana*, 2005, 2:87–106.

¹⁸ Galileo Galilei to Paolo Gualdo, 16 June 1612, in *Le opere di Galileo Galilei*, ed. Antonio Favaro et al., 20 vols (Florence: G. Barbèra, 1890–1909), Vol. 11, p. 327, trans. in Stillman Drake, *Discoveries and Opinions of Galileo* (New York: Anchor, 1957), p. 84. Drake translated "vulgare" as "the colloquial tongue," which I changed to "the vernacular," a term now more commonly used.

a Latin education and were therefore outsiders to the knowledge communicated in that language. Galileo made a clear statement against the learned “*filuorichi*” (philosophers) and their Latin language, which rendered the content inaccessible to many. However, many people outside of Italy were not able to understand his Italian, which in turn meant that most of his Italian works were (quickly) translated into Latin, thus enabling them to reach a wider audience.¹⁹

* * *

With Descartes, we are dealing with an author who struck more of a balance in his decisions to write and publish either in Latin or in his mother tongue. According to the editors of his letters, more than half of them are in French. Descartes used Latin for formal letters, especially, as well as when writing to non-French correspondents.²⁰ His publications, too, were written in both Latin and French. His first published work, the *Discours de la méthode* (1637), appeared in French and includes a passage, in Part 6, in which Descartes explains why he chose to write in his mother tongue. Descartes states that he is writing in French, “la langue de mon país [the language of my country],” and not in Latin, “celle de mes Preceptuers [(the language) of my teachers].” The division between those who read French and those who read Latin was rendered in a more polemical tone when Descartes expressed his hope that those who had “natural minds” (*raison naturelle*—i.e., the less educated readers of French) might judge his ideas more positively than those who based their knowledge entirely on books.²¹ Descartes was not only writing for a French audience, seeking to educate them; he also expected them to be more receptive to his ideas because their thinking remained uncluttered by scholastic learning. His choice of language can therefore be interpreted as a provocation aimed at the old-fashioned scholasticism of his teachers (and university teaching more generally) and in support of the new style of science, which according to its defenders relied on the human *ratio* for analysis and interpretation.

Seven years after the publication of the French *Discours*, however, a Latin translation appeared under the title *Specimina philosophiae*. In a brief letter to the reader Descartes says: “Haec specimina Gallicè à me scripta, et ante septem annos vulgate, paullò post ab amico in linguam Latinam versa fuere, ac versio mihi tradita, ut quicquid in ea minus placeret, pro meo jure mutarem.”²² Although Descartes had his reasons for writing in the language of his own country, it was the Latin translation produced by a colleague and corrected by Descartes himself that formed the text most “seventeenth-century Cartesians and eighteenth-century historians of philosophy” used.²³ This demonstrates again how Latin retained its function as the language for the international communication of science.

¹⁹ Translation between vernacular scientific texts also happened; see Isabelle Pantin, “The Role of Translations in European Scientific Exchanges in the Sixteenth and Seventeenth Centuries,” in *Cultural Translation in Early Modern Europe*, ed. Burke and Hsia (cit. n. 13), pp. 163–179.

²⁰ René Descartes, *The Philosophical Writings of Descartes*, Vol. 3: *The Correspondence*, ed. John Cottingham, Robert Stoothoff, and Dugald Murdoch (Cambridge: Cambridge Univ. Press, 1991), p. x.

²¹ René Descartes, *Discours de la méthode* (Leiden: Ian Maire, 1637), p. 77.

²² “After these ideas were written by me in French, and first existed seven years in the vernacular, a little later they were turned into the Latin language by a friend, and the translation was delivered to me, so that I could change according to my judgment anything that did not quite please me.” René Descartes, *Specimina philosophiae* (Amsterdam: Louis Elzevir, 1644), sig. [b4]v. (Here and throughout this essay, translations are mine unless otherwise indicated.) For a full edition and analysis of the *Specimina philosophiae* see C. L. Vermeulen, “René Descartes, *Specimina philosophiae*: Introduction and Critical Edition” (Ph.D. diss., Utrecht Univ., 2007).

²³ Vermeulen, “René Descartes, *Specimina philosophiae*,” p. 29. See also Jean-Luc Marion, “Ouverture: Descartes aujourd’hui,” in *Problématique et réception du “Discours de la méthode” et des “Essais”*, ed. Henry Méchoulan (Paris: Vrin, 1988), pp. 9–22, esp. pp. 20–21.

* * *

My final example is the above-mentioned physician from Brussels, Jan Baptista van Helmont. In the introduction to his posthumously published medical book *Ortus medicinae*, Van Helmont sets out his view that a person's mother tongue is the language most conducive to the formation of ideas: "Verum enimvero omnis primae cogitationis obiectum, in verba abiens, in vernacula prius semper haberi, . . . vidi . . . Germanum aegrotantem sedentem vel iacentem, prout ipsum collocarent, sculptilis ad instar, qui nunquam ad interrogata reponere compos erat, nec intelligebat, quae vel eius uxor vel natorum quis alia quam propria lingua pronuntiarent, cum tamen intra domesticos parietes jugiter uteretur Italica lingua et Gallica." Van Helmont provides an interesting observation indicating how people's immediate thoughts find expression in their mother tongue: an injured or sick man reverts to speaking only his mother tongue even though he used to speak other languages daily. Van Helmont went so far as to claim that if men indeed conceived their first ideas in their mother tongue, then any rendering in another language would be "animae inconveniens et mirum [unsuitable and strange to the soul]."²⁴

Yet Van Helmont overtly contradicted himself by writing most of his texts in Latin, which in accordance with his own ideas about language represented a laborious and stilted mode of expression. Van Helmont did not reveal much about his practical reasons for writing in two languages. But in the introduction to the German translation of the *Ortus medicinae*, Christian Knorr von Rosenroth (1636–1689), the translator and a friend of Van Helmont's son, noted that Van Helmont had intended to write all his works in his mother tongue.²⁵ However, he went on to explain, Van Helmont was daunted by the prospect of having to invent many new phrases (*Redens-Arten*) to express his ideas. Van Helmont gave up his Dutch effort (printed as *Dageraed* [Amsterdam, 1659]) and wrote the bulk of his work in Latin. Apart from the idea of primacy of the mother tongue, Van Helmont also expressed a wish to write for his neighbors, and thus the local community, which would not necessarily have had access to Latin.

We have already seen this inclination to communicate with a local or regional audience in the vernacular and with a more international audience in Latin, showing that the different languages had different roles.²⁶ In the case of Van Helmont it also brings to the fore how authors negotiated the challenges and opportunities presented by multilingualism. After so many years of a monolingual Latin education and an entire medical degree in Latin, this language must have been the first and preferred language when it came to his professional occupation. Van Helmont was not trained to write about medicine in Dutch and might therefore have found this harder and, indeed, "strange" (*mirum*) to his soul. Despite his own ideas about mother tongue and familiarity, Van Helmont's choice of language in practice indicates the enduring role of Latin as a language for scientific communication in early modern Europe, closely tied to the processes of education.

²⁴ "That certainly every idea of first understanding, being changed into words, occurs always first in the mother tongue, . . . I have witnessed . . . in a German man, who, being ill and sitting or lying like a statue, just as they put him, was unable to reply to questions, nor did he understand what his wife or any of his children said in another than his proper language, although he usually spoke Italian and French at home." Jan Baptista van Helmont, *Ortus medicinae* (Amsterdam: Louis Elzevir, 1648), sig. 3^r. This introduction was initially written in Dutch; it was translated into Latin by Van Helmont's son and included in the first (posthumous) publication of the *Ortus medicinae*.

²⁵ Jan Baptista van Helmont, *Aufgang der Artzney-Kunst*, trans. Christian Knorr von Rosenroth (Sulzbach: Johann Andreae Endters Sel. Söhne, 1683), sig.)(iii[verso].

²⁶ See also Isabelle Pantin, "Latin et langues vernaculaires dans la littérature scientifique européenne au début de l'époque moderne (1550–1635)," in *Sciences et langues en Europe*, ed. Chartier and Corsi (cit. n. 6), pp. 43–58.

* * *

An examination of the role of Latin as a language of science in the seventeenth century demonstrates that it always operated in conjunction with other languages.²⁷ More than in earlier centuries, Latin as a language of education was joined by rising literacy in vernaculars. Authors of scientific texts were in fact multilingual and were therefore in many instances in a position to decide whether they were writing for an international audience of the university-educated learned or whether they were more interested in addressing a local audience in their mother tongue (or a second vernacular). This choice was contingent on many factors.

Chief among them was the question of audience. In the examples discussed, we have seen that there was an idealistic reason for writing in one's mother tongue: to reach a local audience that did not necessarily know Latin but was nevertheless interested in and entitled to the knowledge the author intended to share. Writing for fellow speakers of one's mother tongue had also, as Descartes and Van Helmont explained, a philosophical and political aim, since those readers had not been corrupted by scholastic learning and might therefore be more receptive to new ideas than those who went to university. This decision was therefore at times polemical and provocative, as it implicitly challenged more conservative institutions of traditional learning.

All in all, the choice of language for writing science had a major impact on the reception of these works in terms of the initial audience and the authority bestowed by the particular language. As we have seen, most works would eventually reach the European community at large after publication in Latin, not through the vernacular. Latin was therefore an intermediary and hegemonic language for science, hugely important for international communication and exchange in the seventeenth-century scientific community. Since there was as yet no alternative international language that could take over that role, Latin retained its dominant place. Authors who had a choice of language were able to put their multilingualism to use in order to reach various audiences, while making statements—implicit or more overt—about new directions in science.

²⁷ See also Ann Moss, "Being in Two Minds: The Bilingual Factor in Renaissance Writing," in *Proceedings of the Eighth International Congress of Neo-Latin Studies, Copenhagen, 12 August to 17 August 1991*, ed. Rhoda Schnur (Binghamton: State Univ. New York Press, 1994), pp. 61–74.

Russian and the Making of World Languages during the Cold War

Elena Aronova, *University of California, Santa Barbara*

Abstract: This essay uses the case of Russian, in its relation to other languages, to look at the ways in which the architects of internationalism in the aftermath of World War II established a new hegemony of world languages, responding to the challenge posed by the rise of Russian as a scientific and political language. What was initially a campaign by the Soviet delegation at UNESCO for one cause—recognition of the status of the Russian language within the organization—was turned by other delegations into a campaign for a different cause—multilingualism. Rather than establishing Russian on a par with English and French, the Soviet intervention helped to create a new triumvirate of world languages—Russian, Spanish, and Arabic—as these were recognized by international organizations such as the United Nations and UNESCO. The case of the rise of Russian as a language of science and politics helps to underscore the complexities and the ambiguities involved in the negotiation of the language regime, in which political arguments were translated into technological choices, the diplomats' problems were cast as a problem of communication, and the language in which political arguments were made oftentimes mattered as much as the arguments themselves.

In April 1949 David Zaslavskii, a sixty-nine-year-old Soviet journalist who started his career as a leader of the Bund (the Jewish Socialist movement in prerevolutionary Russia), wrote:

Распространение русского языка за рубежами нашего отечества—это явление чрезвычайной исторической важности. Оно свидетельствует о растущей мировой силе Советского Союза. . . . Миллионы . . . изучают русский язык. . . . На больших собраниях . . . демократических международных конгресс[ов] . . . сплошь и рядом не возникает необходимости в переводе с русского языка. Советских делегатов часто понимают когда они говорят по-русски. Русский язык стал мировым языком. . . . Последовательная смена мировых языков проходит через всю тысячелетнюю историю человечества. Латынь была языком античного

Elena Aronova is an assistant professor in the Department of History at the University of California, Santa Barbara. She has published on the history of data practices and environmental data collection and is writing a book on the rise of the studies of science in the Soviet Union and the United States during the Cold War. She recently coedited *Science Studies during the Cold War and Beyond: Paradigms Defected* (Palgrave, 2016) and *Data Histories* (*Osiris*, 32, 2017). Department of History, University of California, Santa Barbara, California 93106, USA; earonova@history.ucsb.edu.

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мира. . . . Французский язык был языком . . . феодальной эпохи. . . . Английский язык стал мировым языком капитализма. Заглядывая . . . в будущее, мы видим русский язык как мировой язык социализма [Это] первый мировой язык интернационализма. . . . Мировая наука . . . развивалась преимущественно на английском [и] французском языках, а также на немецком. . . . На русский язык смотрели пренебрежительно в мире ученых. . . . Это время отходит в прошлое. Ныне никто не может почитать себя ученым . . . если он не знает русского языка. . . . Во всех областях науки и техники советские исследователи идут впереди. . . . Приближается то время, когда иностранный ученый, не знающий русского языка, рискует поставить себя в неудобное и жалкое положение.¹

This fiery assessment was penned for a leading Soviet cultural and political newspaper by a journalist whose articles opened the ideological “anticosmopolitan” (anti-Western) campaigns of the late 1940s, so it is easy to dismiss it as a piece of Cold War political propaganda reflecting the rise of Russian nationalism within the multiethnic Soviet Union.² Yet it also reflected the unprecedented rise of Russian as both a political and a scientific language in the early years of the Cold War. Michael Gordin has shown that the rise of Russian to its position as the second most dominant scientific language—after English—in the 1950s and 1960s was driven and shaped by Cold War geopolitical and scientific rivalries. This essay extends this story into the realm of diplomacy and international affairs.³ By looking at discussions of the status of the Russian language in the United Nations Educational, Scientific, and Cultural Organization (UNESCO), I examine some of the ways in which the architects of the post–World War II international order established a new hegemony of world languages, responding to the challenge posed by the rise of Russian. This challenge was felt especially acutely within UNESCO, the U.N. agency whose very mandate was to use science to aid international governance. Scientific and technological achievements, marked by the atomic bomb that ended the American nuclear monopoly in 1949 and the launch of the first artificial satellite in 1957, propelled the Soviet

¹ “The spread of the knowledge of Russian beyond our fatherland’s borders is an extraordinarily important matter. It testifies to the growing world power of the Soviet Union. . . . Millions . . . are studying the Russian language. At the large conferences . . . of democratic international congresses . . . nearly always there is no need to translate from Russian. Soviet delegates are often understood when they speak Russian. The Russian language has become a world language. . . . The succession of world languages runs through all the millennia of mankind’s history. Latin was the language of the ancient world. . . . French was the language . . . of the feudal epoch. . . . English became the world language of capitalism. Looking . . . into the future, we see Russian as the world language of socialism. . . . [It] is the first world language of internationalism. . . . World science . . . developed predominantly in English [and] French, and also in German. . . . In the world of scientists, the Russian language was looked at disdainfully. . . . This time is moving into the past. Nowadays no one can call oneself a scientist . . . if he does not know Russian. . . . Soviet scientists are moving forward in all areas of science and technology. . . . The time is coming when a foreign scientist or scholar who does not know Russian language would risk putting himself in an awkward and pitiful position.” David Zaslavskii, “Velikii iazyk nashei epokhi,” *Literaturnaia Gazeta*, 1 Jan. 1949. (Here and throughout this essay, translations are mine unless otherwise indicated.)

² Besides Zaslavskii’s infamous involvement in the anticosmopolitan campaign in the 1940s, the journalist is remembered for his earlier denunciations of the poets Osip Mandelstam and Boris Pasternak and the composer Dmitrii Shostakovich. It is worth noting that Soviet anti-Western campaigns increasingly acquired a markedly anti-Semitic character in the late 1940s. Against this background, Zaslavskii’s essay can be read as a public expression of the loyalty to the titular, Russian, nation by a Soviet Jew at a time when Jews were targeted as “ideologically perverse” and “morally deficient.” For the changing contexts of the campaigns see Konstantin Azadovskii and Boris Egorov, “From Anti-Westernism to Anti-Semitism: Stalin and the Impact of the ‘Anti-Cosmopolitan’ Campaigns on Soviet Culture,” *Journal of Cold War Studies*, 2002, 4(1):66–80. On Zaslavskii see Evgenii Efimov, *Sumbur vokrug ‘sumbura’ i odnogo ‘malen’kogo zhurnalista’* (Moscow: Flinta, 2006).

³ Michael Gordin, *Scientific Babel: How Science Was Done Before and After Global English* (Chicago: Univ. Chicago Press, 2015). On the significance of the interlinkages between science and international affairs see John Krige and Kai-Henrik Barth, *Global Power Knowledge: Science, Technology, and International Affairs* (Osiris, 21) (Chicago: Univ. Chicago Press, 2006).

Union, and with it the Russian language, into international prominence. As Roger Revelle, a renowned American statesman of science, liked to repeat to his students, after *Sputnik* “the nation’s youngsters must learn either science or Russian!”⁴

Zaslavskii’s map of the world languages, rising and falling in their function as media of global communication, arranged the history of languages as a timeline, with each epoch represented by a single hegemonic language. Russian, which Zaslavskii portrayed as a similarly single dominant language of the future, was at the same time depicted by the Soviet journalist as in a state of transition from global insignificance to purportedly global dominance, surfacing at the present moment (ca. 1949) and unsettling the linguistic hegemony of the West. The sudden rise of the Russian language indeed posed a challenge to the architects of postwar internationalism, destabilizing a global linguistic order (imagined or real). The outcome of the challenge, however, was not what Zaslavskii has suggested: instead of establishing Russian on a par with English and French, the Soviet intervention triggered the establishment of a new triumvirate of secondary world languages—Russian, Spanish, and Arabic—as these were recognized by international organizations such as the United Nations and UNESCO.

RUSSIAN AS AN AUXILIARY

To be sure, Russian was not the first—or the only—scientific language to pose a challenge to international diplomacy. Yet the Russian language represents a particularly compelling case since, unlike other languages discussed in this Focus section, Russian in its modern form is relatively young. Its use as the dominant language of communication within a state—the Russian Empire—occurred later than was the case in other European countries. Russification—the use of the Russian language as the single official language throughout the empire—had been considered by Russian tsars since Catherine II as an important ingredient of state building, yet, in comparison with the impact of England, France, and Spain on their colonies—where the English, French, and Spanish languages were permanently imposed as the languages of government and education—Russia’s cultural and linguistic impact on its indigenous populations was more limited.⁵ Within the multinational Soviet Union, heir to the Russian Empire, the status of the Russian language underwent dramatic changes following the October 1917 revolution. Initially the Bolsheviks regarded Great Russian chauvinism as a more serious danger than local nationalism and emphasized linguistic autonomy. The early Soviet policy of *korenizatsiia* (nativization) required local administrations and courts to function in local languages, which were taught in schools to local populations, while the Russian language was used in the central government and in the army. In the early 1930s, following the brutal collectivization campaign, Stalin, whose own native tongue was Georgian, turned from early multilingualism to cultural and linguistic Russification, yet in many places the earlier policies continued to define the Soviet education system until the late 1930s. In 1938–1939, according to the Israeli scholar I. T. Kreindler, Uzbekistan offered instruction in twenty-two languages, Ukraine in seventeen, and Dagestan in twenty.⁶

World War II and the beginning of the Cold War marked a turning point for the status of Russian. At home, Stalin equated Soviet patriotism with Russian nationalism. In the climate of the nationalistic campaigns of the late 1940s, Russian was imposed as the “perfect foundation”

⁴ Revelle is cited in Nancy S. Anderson, *An Improbable Venture: A History of the University of California, San Diego* (La Jolla, Calif.: UCSD Press, 1993), p. 48. For discussion of the scientific agenda of UNESCO see Perrin Selcer, “Patterns of Science: Developing Knowledge for a World Community at UNESCO” (Ph.D. diss., Univ. Pennsylvania, 2011).

⁵ See David D. Laitin, *Identity in Formation: The Russian-Speaking Populations in the Near Abroad* (Ithaca, N.Y.: Cornell Univ. Press, 1998); and Alexander Etkind, *Internal Colonization: Russia’s Imperial Experience* (Cambridge: Polity, 2011).

⁶ I. T. Kreindler, “The Changing Status of Russian in the Soviet Union,” Research Paper no. 37, Hebrew Univ. Jerusalem, 1979, pp. 4–5. For the history of Soviet language policies see V. M. Alpatov, *150 iazykov i politika: 1917–2000* (Moscow: Kraft, 2000).

for “the cultivation of Soviet patriotism and national pride, love of the motherland, and loyalty to the ideas of communism.” The Russification drive, accompanied by an assault on the indigenous languages of the Soviet republics, continued after Stalin’s death in 1953, developing into what was tantamount to a policy of Russian linguistic hegemony.⁷ Abroad, concerted efforts were made to promote Russian as the international auxiliary language of the “East,” redefined along the lines of the Cold War. The policies of the Warsaw Pact and the Council for Mutual Economic Assistance (COMECON) were conditioned on the premise that Russian would serve as a vehicular language of communication throughout the Soviet “bloc.” The study of Russian was made mandatory for East European army officers, and it was taught as the first foreign language in schools in Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, and Romania. Despite the fact that the Russian language was increasingly seen in Eastern Europe as a tool of political domination, these efforts succeeded, even though the spread of the Russian language in the East was less significant than that of English in the West.⁸

Nowhere were the Cold War linguistic rivalries more explicitly manifested than in the United Nations, the world’s most international organization and, at the same time, a primary battleground between different states in the global Cold War for the symbolic recognition of their languages in the quest for status languages of international diplomacy.

THE UNITED NATIONS AND THE LANGUAGE REGIME OF POST-WORLD WAR II INTERNATIONALISM

When the United Nations was established during the closing months of World War II, its architects aspired to institute a regime of international governance that would break with the past.⁹ For the U.N., whose mandate was to prevent the apocalyptic consequences of a third world war, the past was epitomized by the League of Nations, which had failed to stabilize a world order in the aftermath of the first war. As a departure from the notoriously Eurocentric League of Nations, the United Nations, as its founding charter stated, was to be based on “the principle of the sovereign equality” of member-states. Most visibly, the principle implied the equality of communication. The League of Nations recognized two official languages—English and French—a reflection of the outcomes of World War I and British imperial aspirations. The U.N. recognized five—Chinese, English, French, Russian, and Spanish. The U.N. choices were, in turn, a reflection of the outcomes of World War II and new political alliances. Chinese, English, French, and Russian were the languages of the main allies in the war that formed the U.N. Security Council, which ratified the organization in 1945. German and Japanese were excluded as the languages of the defeated powers. Yet the logic did not work quite the same way for Spanish. The language of Francoist Spain, which was not admitted to the U.N. until 1955, was adopted because it was also the language of the largest linguistic “bloc” in the organization: of the fifty-one founding member-states, nineteen were Spanish-speaking Latin American countries.¹⁰

⁷ For the quotation see Michael G. Smith, *Language and Power in the Creation of the USSR, 1917–1953* (Berlin: Mouton de Gruyter, 1998), p. 164. See also Aneta Pavlenko, “Russian as a Lingua Franca,” *Annual Review of Applied Linguistics*, 2006, 26:78–99; and E. Glyn Lewis, *Multilingualism in the Soviet Union: Aspects of Language Policy and Its Implementation* (The Hague: Mouton, 1972).

⁸ See Gordin, *Scientific Babel* (cit. n. 3).

⁹ On the U.N.’s entangled politics see Mark Mazower, *No Enchanted Palace: The End of Empire and the Ideological Origins of the United Nations* (Princeton, N.J.: Princeton Univ. Press, 2009).

¹⁰ Humphrey Tonkin published extensively on U.N. language policies; see, e.g., “The Search for a Global Linguistic Strategy,” in *Languages in a Globalizing World*, ed. Jacques Maurais and Michael A. Morris (Cambridge: Cambridge Univ. Press, 2003), pp. 319–333.

The status of an official language of the U.N. was a proxy for the country's standing on the world stage among the architects of the postwar world order, so it is no wonder that the U.N. language regime was contested as soon as it was established. As decolonization unfolded, Arabic, Bengali, Hindi, Urdu, Portuguese, and Bahasa Indonesia were promptly proposed by their respective delegations as additional official languages. Of these candidates, only Arabic obtained the desired status. The language of five founding U.N. members, Arabic was first granted a "limited" official status in 1973, when it was the language of nineteen member-states and *after* it was adopted as an official language of UNESCO.¹¹ Arabic received full status as a U.N. official language only in 1980, after more than three decades of fierce lobbying.

The United Nations language regime established new hierarchies, but it also reproduced old ones. While the status of an "official" language granted symbolic recognition to a member-state, its actual use was limited to the U.N. constitution and its amendments, legal resolutions, and other official documents. In day-to-day operations, and, most important, in the internal discussions of committees, the United Nations carried over its predecessor's custom of using English and French as the primary means of communication, designating these two languages as "working" languages.

The distinction between "official" and "working" languages set the stage for the further proliferation of linguistic hierarchies. All five U.N. official languages were equally "authoritative," but Spanish, Russian, and Chinese were referred to in the U.N. resolutions as "nonworking official languages."¹² Spanish was a *de facto* working language along with English and French, but it was not recognized "officially" as such until 1948. Russian, nominally the native tongue of three U.N. founding member-states—the USSR, Ukraine, and Byelorussia—was often imposed as a *de facto* working language by the Soviet tactic of appointing representatives who did not (or refused to) communicate in any other language. Russian was officially granted the status of a working language in 1968, closing two decades of repeated requests and vocal protests on the part of the Soviet delegation; the adoption of Chinese followed in 1973, justified simply by the argument that all other official languages "have already been made working languages."¹³

The centrifugal push toward multilingualism driven by decolonization and a centripetal movement toward bilingual hegemony arranged different languages in hierarchical relations vis-à-vis the center and each other. The newly emerging hierarchies were flexible, temporary, and unsettled: different alliances were forged momentarily as more than one language gained political "weight" and "gravitated" toward the center. This political electrophoresis, which drove Spanish, Russian, and Chinese into an alliance in their quest for linguistic status, was brought into sharp relief in the debates over the status of the Russian language at UNESCO.

UNESCO AND THE "ISSUE OF THE RUSSIAN LANGUAGE"

Among U.N. agencies, UNESCO was the most committed to multilingualism. Multilingualism was the most direct expression of its ideal of "unity in diversity": for its architects, UNESCO's "very mission implied that the use of language was an end in itself and not merely a means to an end." At its inception, UNESCO recognized the largest set of languages, adopting Chi-

¹¹ Mala M. Tabory, "The Addition of Arabic as an Official and Working Language of the U.N. General Assembly and at Diplomatic Conferences," *Israel Law Review*, 1978, 13:391–410.

¹² "Proposal for the adoption of Spanish as one of the working languages of the General Assembly," 11EX/13, Annex 2: "Evolution of the present rules," 7 Oct. 1948, in UNESCO, *Records of the General Conference, Third Session, Beirut 1948* (Paris: UNESCO, 1949).

¹³ Resolution 3189, 2206th Plenary Meeting of the United Nations, 18 Dec. 1973. Through power-brokering and diplomacy, the USSR secured three separate seats at the U.N. for itself, Ukraine, and Byelorussia, even though the latter two countries were part of the USSR.

nese, English, French, Hindustani, Russian, and Spanish as official languages.¹⁴ The Russian language was granted this status even though the Soviet Union had boycotted the organization, which Stalin regarded as an instrument of Western cultural propaganda.¹⁵

Before the Soviet Union joined UNESCO after Stalin's death in 1953, the main issue with regard to UNESCO's language regime concerned the status of Spanish as a working language. Even though UNESCO recognized the largest set of official languages among U.N. agencies, its working languages remained English and French. Latin American delegations repeatedly petitioned for the adoption of Spanish as the organization's third working language on the grounds that a considerable proportion of the world's people were native Spanish speakers. Yet while appreciating "the force of the arguments," UNESCO's general conference resolved in 1947 that "the administrative difficulty and financial burden involved in increasing the number of working languages in UNESCO" justified the preservation of the bilingual status quo. Even after the U.N. added Spanish as a working language, its status in UNESCO remained "nonworking." The argument behind the decision was disarmingly practical: as the representative of Venezuela pointed out, speaking in French and arguing *against* the adoption of his mother tongue, "the debates will be never ending if translation is required into more than two languages": once an additional language is adopted, "a large number of countries would have the right to ask the same."¹⁶

When the Soviet Union joined UNESCO in 1954, it unsettled the tepid agreement on English-French linguistic hegemony. At the very first general conference attended by representatives of the Soviet Union, the Soviet delegation formally requested that Russian be used "on the same footing as French and English." Russian native speakers were members of only three UNESCO delegations—those of the USSR and of the Ukrainian and Byelorussian republics—a relatively insignificant number in comparison to Spanish-speaking UNESCO member-states. Yet, as Polish representative Michałowski put it (speaking in Russian), the Russian language, much like Spanish, "serves as the vehicle of communication at many [international] conferences . . . and is widespread in the countries—Members of this Organization," namely in Poland, Czechoslovakia, Hungary, and Cuba. The delegates of all the named countries concurred, joined by those of India and Uruguay. While fostering Russian, the delegates reintroduced the case for Spanish—literally in the same breath. When the Hungarian delegate Tamás endorsed the Soviet delegation's proposal for Russian, arguing that Russian has become "the medium of communication between dozens of nations," he did this *in Spanish* and underscored the fact: "I myself am Hungarian, and it gives me pleasure to speak in Spanish." This, Tamás emphasized, was what "the universality of Unesco" was about.¹⁷

Thus, what was initially begun by the Soviet delegation as a campaign for Russian was turned by other delegations into a campaign for multilingualism. It was this latter cause that proved to

¹⁴ For the quotation see Mala Tabory, *Multilingualism in International Law and Institutions* (Alphen aan den Rijn: Sijthoff & Noordhoff, 1980), p. 244. Regarding the official UNESCO languages see UNESCO, *Records of the General Conference, Second Session, Mexico 1947* (Paris: UNESCO, 1948), p. 64. The literature on UNESCO is vast; for a recent account see Poul Duedahl, ed., *A History of UNESCO: Global Actions and Impacts* (London: Palgrave Macmillan, 2016).

¹⁵ On Soviet participation in UNESCO see I. V. Gaiduk, "Sovetskii Soiuz i Itunesko v gody 'kholodnoi voiny,' 1945–1967," *Novaia i noveishaia istoriia*, 2007, 1:20–34.

¹⁶ UNESCO, *Records of the General Conference, Second Session, Mexico 1947* (cit. n. 14), p. 64; and "Décisions relatives aux comptes rendus in extenso des séances plénières de la Conférence générale," p. 3, Staff guidelines: "Langues de travail," UNESCO Archives, Paris.

¹⁷ UNESCO, *Records of the General Conference, Eighth Session, Montevideo 1954* (Paris: UNESCO, 1955), 5th Plenary Meeting, 15 Nov. 1954; for the comments see *ibid.*, II-16, pp. 206 (Michałowski), 208 (Tamás). In 1954 India was a Soviet ally and Uruguay had warned toward the USSR in the wake of the recent U.S.-backed coup in Guatemala.

be a winning strategy: Russian and Spanish were adopted as working languages in tandem.¹⁸ Moreover, the addition of Russian and Spanish set the stage for the later adoption of Arabic on the same footing. But how much further could the proliferation of world languages go? To argue for multilingualism as a political cause is not quite the same as to implement it in practice. Maintaining multilingualism is expensive, and it implies not only political choices but also technological ones.

TECHNOLOGIES OF TRANSLATION AND THE POLITICS OF CHOICE

In the realm of international organizations such as the United Nations, multilingualism was enabled by the technology of simultaneous translation. A small army of interpreters, sitting in sound-proof booths in the back of meeting rooms, speaking into the microphones and translating the delegates' speeches concurrently into all the official languages, became a familiar fixture of the international congresses in the aftermath of World War II.

The system itself, with its trademark equipment—the microphones, headphones, and interpreters' booths—was invented as a technological remedy for the deficiencies of the consecutive method of interpretation practiced at the League of Nations, which often slowed meetings to a snail's pace because of the frequent interruptions. Using telephone equipment, the British engineer Alan Gordon-Finlay, sponsored by the American businessman and philanthropist Edward Filene, designed a system to allow the translation of speeches from and into as many languages as needed, simultaneously and without interruption. After IBM turned the invention into a commercial product, patented in 1926, the IBM-Filene-Finlay system was tried at a League of Nations conference. The League's internal newsletter credited the new technology for liberating "persons imprisoned in their own language."¹⁹ Yet even after the system was permanently installed at the League's headquarters in Geneva in 1931, simultaneous translation as we now understand it was not practiced.²⁰ For one thing, the equipment was cumbersome; for another, the speaker did not have the opportunity to correct the interpretation—a great disadvantage in nuanced political negotiations. More to the point, the simultaneous method was most advantageous as a technical possibility when one wanted to *multiply* the number of languages into which a speech was translated. The prevailing trend of the time was, rather, the opposite—the quest to find, or to construct, a *single* international auxiliary language.²¹

Different versions of simultaneous interpretation systems surfaced in the 1920s and 1930s, including one designed in the Soviet Union and showcased in 1928 in Moscow at the congress of Communist internationalists, the Comintern. It was not until the aftermath of World War II, however, that simultaneous translation, dramatized at the Nuremberg Trials, became widely adopted in international settings around the world. The United Nations and its agencies promptly adopted simultaneous translation technology. By 1951, as a study conducted by UNESCO asserted, "the simultaneous system is . . . gaining headway in most of the larger UN and Specialized

¹⁸ The internal guidelines for the staff at UNESCO headquarters in Paris list English and French as the working languages between 1946 and 1954; the number was changed to four—English, French, Spanish, and Russian—in 1954: "Décisions relatives aux comptes rendus en extensor des séances plénières de la Conférence générale" (cit. n. 16).

¹⁹ "New 'Electric Interpreter' Aids Delegates in Geneva," *League of Nations News*, Aug. 1927, pp. 6–7. See also Francesca Gaiba, *The Origins of Simultaneous Interpretation: The Nuremberg Trial* (Ottawa: Univ. Ottawa Press, 1998).

²⁰ The system was used for the simultaneous reading of pretranslated speeches on the condition that the texts were made available by the speakers in advance; see Gaiba, *Origins of Simultaneous Interpretation*.

²¹ In the 1920s the League of Nations considered proposals to adopt Esperanto as a single international auxiliary language; see, e.g., "Esperanto as an International Auxiliary Language," Report of the General Secretariat of the Leagues of Nations, 1922. For a discussion of the international auxiliary language movement in the first decades of the twentieth century see Gordin, *Scientific Babel* (cit. n. 3).

Agency meetings, despite objections from some delegations.”²² Indeed, it was a technological choice compatible with the multilingualist agenda of politicians, educators, and scientific experts enmeshed in the issues surrounding decolonization, the Cold War, and the emerging civil rights movement.

Yet the actual use of simultaneous translation in the U.N. is an illustration of how illusory it would be to imagine a “technological fix” to a political problem. As historians of science and science studies scholars have often argued, technological choices are never neutral but are in an important sense co-produced with political and social power relations.²³ At the U.N. and its agencies, the technology of simultaneous interpretation, while enabling the proliferation of international languages, also served to reinforce linguistic hierarchies. As a UNESCO study of international conferences documented, traditional consecutive interpretation continued to be used as a technology of choice “for delicate political negotiations” and for translations into English and French.²⁴

The U.N. linguistic regime represented a “compromise,” in Humphrey Tonkin’s useful expression, between the competing pulls of multilingualism and linguistic hegemony. Political and institutional analyses of organizations such as the United Nations—as well as international scientific conferences—have shed light on the complexities of internal conflicts and material circumstances involved in making decisions concerning the language of communication that are inherently political. However, they have not always appreciated the extent to which these decisions were laden with deep-seated ambivalence, ambiguities, and subtle choices. The case of the rise of Russian as a language of science and politics helps to underscore the complexities and the ambiguities involved in the negotiation of the language regime, in which political arguments were translated into technological choices, the diplomats’ problems were cast as a problem of communication, and the language in which political arguments were made oftentimes mattered as much as the arguments themselves.

²² UNESCO, *The Technique of International Conferences: A Progress Report on Research Problems and Methods* (Paris: UNESCO, 1951), p. 29. On the Soviet system for simultaneous translation see E. Gofman, “K istorii sinkhronnogo perevoda,” *Tetradī perevodchika*, 1963, 1:20–26. Regarding the wider adoption of simultaneous translation see Gaiba, *Origins of Simultaneous Interpretation* (cit. n. 19).

²³ For the classic articulation of this argument see Langdon Winner, “Do Artifacts Have Politics?” *Daedalus*, 1980, 109(1):121–136; for its more recent rendering see Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, Mass.: MIT Press, 1996). On the notion of co-production see Sheila Jasanoff, ed., *States of Knowledge: The Co-Production of Science and Social Order* (London: Routledge, 2004).

²⁴ UNESCO, *Technique of International Conferences* (cit. n. 22), p. 29.