SCIENCE AND TECHNOLOGY STUDIES

Translating Science in the 18th and 19th Centuries

Interdisciplinary Perspectives

Edited by Alison E Martin and Susan Pickford

ROUTLEDGE

TRANSLATING SCIENCE IN THE 18TH AND 19TH CENTURIES

This book explores the role of translation in shaping the knowledge-sharing processes that were and are seminal to scientific endeavour. It considers the mechanisms by which eighteenth- and nineteenth-century European science writing travelled within and beyond its home continent and non-European science was taken up in a colonial context. Using insights from fields of research including book history and textual studies to investigate the paratextual framing, stylistic choices, rhetorical devices, and modes of expression deployed by scientific writers – key to shaping a work's credibility and its author's integrity – it argues that translators are central, yet largely overlooked, mediators in this creative process.

Encompassing West Africa, China, the Middle East, India, South America, Europe, and the Ottoman Empire, this volume comprises case studies working with around a dozen different languages to gain a sense of how scientific narratives were evolving both within and across an increasingly global intellectual commons in a key period in the development of the natural sciences, medicine, and technology.

Part of the Science and Technology Studies series, the volume will be indispensable for scholars and researchers of science and technology studies, philosophy of science, translation studies, gender studies, English literature, and philosophy in general.

Alison E. Martin is Professor of British Studies at the Johannes Gutenberg University Mainz (Campus Germersheim). She has published extensively on translation studies, with a particular focus on travel literature, scientific writing, and gender. Her most recent monograph, *Nature Translated: Alexander von Humboldt's Works in Nineteenth-Century Britain* (2018), explores the role played by Humboldt's female translators in the transmission

of scientific knowledge to a general audience in the nineteenth century. She is co-editor of *The Handbook of Women and Science since 1660* (2022).

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There is little doubt that science and technology are the most influential agents of global circulation of cultures. Science & Technology Studies (STS) is a well-established discipline that has for some time challenged simplistic understanding of science and technology (S&T) by drawing on perspectives from history, philosophy and sociology. However, an asymmetry between 'western' and 'eastern' cultures continues, not only in the production of new S&T but also in their analysis. At the same time, these cultures which have little contribution to the understanding of S&T are also becoming their dominant consumers. More importantly, S&T are themselves getting modified through the interaction with the historical, cultural and philosophical worldviews of the non-western cultures and this is creating new spaces for the interpretation and application of S&T. This series takes into account these perspectives and sets right this global imbalance by promoting monographs and edited volumes which analyse S&T from multicultural and comparative perspectives.

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INTRODUCTION

Alison E. Martin and Susan Pickford

By defining scientific communication as 'knowledge in transit', James Secord (2004) drew attention to translation's central, albeit often unsung, role in shaping the knowledge-sharing processes seminal to scientific endeavour. Crossing language barriers has been a constant of knowledge transfer since written records began: as early as the third millennium BCE, Mesopotamian clay tablets recorded early scientific knowledge in cuneiform script readable by speakers of non-cognate languages across hundreds of years (Geller 2023: 1). Translation has always been fundamental in fostering the dissemination of knowledge in 'ever-widening circles' (Burnett 2018: xi) that now span the globe, albeit with a highly uneven pattern of distribution. Modern science does indeed 'rest on the pillars of translated knowledge' (Montgomery 2017: 265).

Like many areas of scholarly inquiry, the history of science has undergone a 'transnational turn' in recent years: its practitioners have increasingly embraced global and transnational methodologies, looking beyond national borders to trace patterns of technological and scientific exchange and development (Manning 2018: 1–16). However, their approach to translation has typically been more descriptive than analytical, and it has rarely explored the issues raised by processes of language transfer in any depth (Manning 2018: 3). Only more recently has scholarship come to acknowledge translators as key figures who enable texts (and their readers) to overcome differences of time, space, and culture in the establishment of an intellectual commons of science (Manning 2018: 1–2). While their presence as mediating agents in professional science communication still today largely goes unreflected,

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some working in the field have recognised that they play a significant role in shaping the language and rhetoric of science (Montgomery 2017).

Conversely, Translation Studies has long displayed an interest in science writing, largely within a training context (Pinchuk 1977; more recently, Byrne 2014; Olohan 2015; Mitchell and Florescu-Mitchell 2022). Scholars in the field have begun to take an increasing interest in translation and science from a more theoretical perspective, led largely by Maeve Olohan (2011 with Salama-Carr; 2014a; 2014b; 2016; 2018a; 2018b). Reflecting increasing engagement with theoretical approaches, Marais (2023) devotes five of twelve chapters to conceptualisations of translation in the natural sciences, touching on fields including mathematics, computer science, and biology. Demonstrating the field's reactivity to current events, there has been a small cluster of works focusing on medical translation and multilingual health communication in response to the Covid-19 pandemic (Guidère 2020; Lee and Wang 2022; Blumczynski and Wilson 2023). However, more ground has still to be covered before we can legitimately assert that science translation is firmly anchored as an arena of enquiry *per se* in Translation Studies. A study of recent reference works reveals that its presence is patchy. While it warrants a lemma in its own right in the third edition of the *Routledge Encyclopedia of Translation Studies* (2019) and is granted ample coverage in the multi-volume *Histoire des traductions en langue française* [History of Translations in French] (Chevrel, D'hulst and Lombez 2012; Chevrel, Cointre and Tran-Gervat 2014; Chevrel, Banoun and Poulain 2019)[1], it is split into technical and medical translation in the 2022 *Cambridge Handbook of Translation* and receives no coverage at all in the 2022 *Routledge Handbook of Translation History* (Rundle, 2022). These lacunae are partly due to the fact that Translation Studies as a discipline gained significant momentum in the 1980s through input from scholars in Cultural Studies, whose focus was primarily on texts broadly categorised as 'literary', such as fictional prose, poetry, or drama, and partly a reflection of the expertise required to investigate what happens to scientific texts in translation. The coalescence of skills involved in following a scientific text as it circulates internationally necessarily demands proficiency in foreign languages (traditionally located in the Humanities), coupled with an openness to a scientific habitus. Despite efforts to increase cross-disciplinary dialogue, a systemic 'two cultures' divide still pervades higher education (particularly with regard to research funding) that has not been beneficial to historical research into scientific writing. In terms of translation history, in particular, much more needs to be done to respond to the call in Olohan (2014a) for a rapprochement with the transnational turn in the history of science.

There is certainly plenty of scope for ground-breaking research in this arena: in researching their 125-page chapter on eighteenth-century scientific translation for the *Histoire des traductions en langue française* (Bret and

Moerman 2014), Patrice Bret and Ellen Moerman compiled notes on several thousand titles covering every aspect of scientific endeavour from agriculture to zoology, most wholly unexploited by current scholarship. Beyond the information that their list can generate for us about trends in the movement of texts and knowledge between different scientific languages and cultures at particular junctures in history, it also has the potential to bring to light fascinating narratives about the translators themselves, often highly revealing of issues of power, status, and ideology. The pattern of language use in midwifery texts is a (relatively well documented) case in point. Where the history of scientific language in Europe shows a clear direction of travel from Latin to modern European vernaculars, midwifery demonstrates an unusual reverse pattern: works on women's reproductive health and obstetrics came to be written in the vernacular as early as the Renaissance, for use by female practitioners unschooled in Latin. Some such works then made the journey against the tide into Latin when it came to grounding the (often male) author's international authority and reputation (Worth-Stylianou 2007). Louise Bourgeois's pioneering 1609 study of obstetrics, *Observations diverses sur la stérilité, perte de fruict, fœcondité, accouchements et maladies des femmes et enfants nouveaux naiz* [sic] [Diverse observations on sterility, miscarriage, fertility, childbirth, and the diseases of women and newborns] was translated into Latin in 1619; it also entered English in 1656 in a version that significantly reworked Bourgeois's original in a pattern promoting the role of the 'chirurgeon' [sic], or man-midwife, making 'ce territoire gynocentré un territoire désormais androcentré' [this gynocentric territory a now androcentric territory] (O'Hara 2017; Forman Cody 2020).

Despite – or in response to – the relatively shallow roots of science writing in Translation Studies, some historians both of science and of translation have begun to investigate the power dynamics that determine which texts are selected for translation, by whom and for circulation in which other languages and scientific cultures. The idea that knowledge is historically contingent and that it has intellectual, but also cultural, political, economic, and aesthetic dimensions, underpins the epistemological perspective drawing the chapters in this volume together. One central concern is to investigate how, in very concrete terms, ideas, methods, and information circulated between language areas and scientific cultures and how, through analysis, debate, and even misunderstanding, they came to constitute what stood as 'knowledge'. Another is to understand more broadly what these movements tell us about developing self-reflection on the practice of translation. We therefore seek to understand better the contribution of translated scientific writing to cultural and social histories of knowledge (e.g. Cook and Dupré 2012) and what has recently been termed 'translation knowledge' (D'hulst and Gambier 2018), namely how societies reflect on the role of translators and translation in generating information. Although attention has been drawn

to the significance of this meta-level of analysis (Göpferich 2006), to date no historical study has investigated these questions through the lens of longer-term developments in a non-fictional genre such as scientific writing.

The collection of essays in Krause, Auxent and Weil (2023) offer compelling reading of the connections between translation and experience in the pre-modern world. The slightly earlier set of essays in Owen and Manning (2018) takes up the baton at the turn of the first millennium CE, exploring eight centuries of the global circulation of knowledge in translation through the four lenses of cartography, health and medicine, material construction, and astronomy. Picking up in turn where Abigail Owen and Patrick Manning's seminal volume leaves off, at the end of the eighteenth century, this edited collection zooms in chronologically to focus on the shorter *durée* of the long nineteenth century. Its starting point is the emergence from the second half of the eighteenth century onwards not only of scientific vernaculars, but also of modern infrastructures for the support and dissemination of multilingual scientific scholarship – the various scholarly societies, government funding streams, emergent print technologies, and so on that enabled a common discourse of science to go global. For instance, calls were made in post-revolutionary France for the establishment of translation bureaus to systematise imports of works on technology liable to be useful to the fledgling republic (Silvestre 1800). A few decades later, the reformist Egyptian leader Muhammad Ali (1769–1849) organised a number of scientific expeditions to Europe, requiring each participant to translate at least one book into Arabic and thereby building a corpus of several hundred titles; he also set up language schools to foster science translation skills, eventually leading to the establishment of the *Ghurfat al-Tarjama*, or translation chamber, in 1841, where specialist translators were trained to work on the natural sciences, medicine, and mathematics, among other topics (Ben Slimane 2021: 11). In this collection, Xiaoxing Jin's chapter on Charles Lyell in nineteenth-century China highlights the centrality of the Kiangnan Arsenal's *Guang fang yan guan*, or translation department, in facilitating the import of Western weapons technology. Equally significant was the non-governmental institutional infrastructure of scholarly societies, specialist publishers and the like, who sponsored, supported, and otherwise facilitated the dissemination of translated material. Sarah Qidwai's study of the scientific translations of Sayyid Ahmad Khan (1817–98) documents the administrative role of scientific and educational societies in colonial India.

One core aim of this collection, then, is to lay bare some of the mechanisms and processes by which ideas, institutions, and individuals acquired transnational cultural and intellectual authority in scientific communities. Using insights from a range of disciplines, including book history to study patterns of knowledge dissemination via print; digital humanities to investigate data management and database research with a study of medical

translations in the *TeLeMe* database of medical dictionaries; and literary studies focusing on the stylistic choices, rhetorical devices, and modes of expression deployed by scientific writers, we argue that translators are central, if still largely overlooked, mediators in this creative process and in the establishment of an international scholarly discourse of authority.

Drawing on translations of a wide range of text types penned and printed for a variety of scientific audiences, including specialist scientific treatises, handbooks, dictionaries and reference works, periodicals, and more 'popular' works intended for a broader readership, this edited volume investigates such patterns of information flow from several angles. It explores the collaborative exchanges and complex tensions between authors and translators, the role of translators as gatekeepers of knowledge, and the (in)visibility of women and other subaltern groups in knowledge-making processes. The period on which we focus in this volume was also central to nation-building and imperial expansion, and we explore how translation orchestrated dialogue between Western and Eastern scientific narratives or imposed new linguistic hierarchies upon them. This also raises questions about the relationship between 'indigenous knowledge' and 'scientific knowledge' and the potential power differential perceived between them (Menon 2022). Other aspects which this dialogue casts light upon involve the tension between what might be considered 'prestige' languages and accordingly privileged over other languages in multilingual environments (Kothari 2018).

The geographical dimensions of the practices of translation are also relevant in highlighting the different nodal points where information was generated, disseminated, and discussed. With the emergence of global technologies of knowledge exchange, we are also interested in how twentieth- and twenty-first-century (re-)translations of scientific writing from the late Enlightenment and Romantic periods revise and reframe texts to offer different readings and make new connections.

This volume therefore addresses three key methodological shifts in Translation Studies and the history of science. Firstly, and most centrally, it uses the linguistic turn in the history of science to explore how knowledge exchange was facilitated or hindered through circulation across languages, bearing in mind power asymmetries between dominant and dominated languages. Although the significance of language, translation, and translators as mediating figures in the circulation of scientific ideas has recently come to be recognised more fully (Montgomery 2010; Lightman 2015; Raj 2016; Sarukkai 2016), the current dominance of Global English presents a distortedly monolingual picture of historical scientific knowledge exchange, which ill reflects the multilingual and multinational world in which scientists have operated over centuries (Dupré 2018). The 'collapse into monolingualism', as Michael D. Gordin neatly terms the rapid emergence of a 'resolutely monoglot' international scientific community in the second half of the twentieth

century, was by no means a given, viewed from the perspective of data on scientific language a century earlier (2017: 2). For example, in Western science, English, French, and German were more or less level-pegging until the end of the nineteenth century, and it was only with the collapse of scientific German at the end of the First World War that English could begin its meteoric rise (Gordin 2017: 6–7; Ammon 2012: 338; Bret and Rossignol Puech 2019). This volume therefore seeks to capture something of the linguistic richness of scientific exchange two centuries or more ago and better understand how it influenced scientists' working practices.

Secondly, it uses the sociological turn in both disciplines to reveal the agents and networks that embodied the transnational circulation of knowledge. It also explores scientific translation as a knowledge-making practice that embodied a specific range of skills and know-how, which were acquired by individual agents in different ways and with different degrees of success. The role of the translator as an intermediary, who negotiates the transfer of knowledge from one language and culture to another (Schaffer et al. 2009) has shown that this group of agents can extend to businessmen, officials, spies, messengers, and other such 'brokers', who established and changed the paths of knowledge on a truly global scale, using existing commercial and transport networks, systems of patronage or correspondence for their own ends. Finally, the spatial turn in the humanities has called for closer investigation of the travelling nature of knowledge and its situated production and reception. Encompassing texts circulating within and beyond Western Africa, China, the Middle East, India, South America, Europe, and the Ottoman Empire, this volume comprises case studies working with around a dozen different languages to gain a sense of how scientific narratives were evolving both within and across Eastern and Western intellectual communities in a key period in the development of the natural sciences, medicine, and technology.

The volume's eleven contributions are divided into four thematic sections. The first, 'Translation, Science, and Knowledge', explores the mechanisms by which nineteenth-century European science writing travelled to other parts of the world and non-European science was taken up in a colonial context. The opening chapter by Sarah Qidwai studies the career of Sayyid Ahmad Khan (1817–98), founder of Aligarh Muslim University. It initially focuses on his 1844 Urdu translation *Teshil fi Jar-e Saaqil* [The Principles of Mechanics] relayed via Persian from an Arabic treatise from Yemen. It then turns to his translation work in the 1860s with the Ghazipur Scientific Society, bringing historical and scientific texts from English into Urdu. The chapter highlights the complexities that arise when examining scientific knowledge's reconfiguration in a multilingual colonial context with pre-existing knowledge communities and longstanding intellectual traditions: by incorporating individuals like Sayyid Ahmad, who were not strictly 'scientists' but rather polymaths

and technocrats, into the historical accounts, we gain a broader perspective of how scientific knowledge was disseminated in the nineteenth century.

Chapter two, by Claudio Soltmann, focuses on the role of translation within the transnational communication circuit for periodicals between South America and Great Britain during the 1830s and 1840s. The nineteenth century witnessed an unprecedented expansion of periodical publishing on a transatlantic scale. Included within magazine publications, notoriously eclectic in their content, were also snippets of reports and book reviews, given in translation from foreign press sources, that gave readers insights into scientific debates occurring elsewhere in the world. One such example was the Chilean periodical *El Araucano* [The Araucanian], which featured a series of brief translations of British reviews of astronomical observations of Halley's Comet in 1835. These were the work of the Venezuelan-Chilean polymath Andres Bello (1781–1865), who later incorporated them into his 1848 treatise *Cosmografía* [Cosmography]; his main source text was his Spanish translation of selected chapters from Herschel's *A Treatise on Astronomy* (1833) and other foreign scientific works. Drawing on periodical publications research and Translation Studies, the chapter examines how the mutable and ephemeral form of the periodical allowed for expanded textual discourse. Finally, it explores the various publishing and translation strategies conducted by the translator to update the British source texts in the periodical for Chilean readers.

The concluding chapter of this first section, by Xiaoxing Jin, examines the translation of Charles Lyell's *Elements of Geology* against the backdrop of China's late-nineteenth-century Self-Strengthening Movement. Employing the collaborative translation method known as *Heyi*, Hua Hengfang and Daniel McGowan sought to bridge linguistic disparities, fostering cooperation between Western and Chinese scholars. The translation of scientific terminology unknown to Classical Chinese presented a formidable challenge both culturally and linguistically. To surmount these obstacles, McGowan and Hua ingeniously harnessed sound symbolism to craft Chinese terms that resonated with English phonetics, while preserving an element of foreignness. The resultant work, *Dixue Qianshi* [A Brief Introduction to Geology], transcended strict adherence to the source material, purposefully omitting any intricate geological details to align itself with the Self-Strengthening Movement's emphasis on practical knowledge rather than theoretical complexities. Despite these adaptations, *Dixue Qianshi* cemented the study of geology within China's burgeoning academic institutions. This narrative of translation underscores the formidable challenges inherent in navigating linguistic and cultural disparities, illuminating the creativity intrinsic to the translation process.

The second section, devoted to 'Terminology and the Languages of Science', provides an in-depth study of the emergence of specialist multilingual

scientific discourse, and specifically, the role of terms and terminological complexity in this process. Mónica Martínez Gómez offers a study of the French naturalist Michel Adanson's recourse to Wolof terminology in his account of his travels in Senegal and its handling by the work's subsequent translators. Scientific expeditions to Africa increased markedly in number during the late eighteenth century, which led to an increase in specimens of unknown flora and fauna that needed somehow to be 'captured' terminologically by Western science. European natural philosophers and curators involved in processing these specimens had to circumvent numerous problems related to classification and nomenclature. Linnaean binomial nomenclature held that the native names of plants new to Western science were 'barbarous', imposing Latin generic names as the official nomenclature. Adanson, however, preferred to preserve the names indigenous to the area where the new specimens were found. Through close analysis of his principal work *Histoire naturelle du Sénégal* [Natural History of Senegal] (1757), the chapter explores Adanson's use of Wolof to represent the natural world of Senegal. The complexity of the scientific terminology related to conchology in particular, and the multilingual character of his travel account, led Adanson's eighteenth-century British and German translators to adopt the strategy of non-translation.

Pedro Navarro similarly focuses on issues of nomenclature, particularly the Linnaean binomial system. Scientific nomenclature had long sought to suppress the plurality of vernacular names for living beings in favour of a universal Latinized name: theoretically, the advent of standard nomenclature meant the names for various organisms would no longer be 'lost in translation'. Through an analysis of three Portuguese translations of Charles Darwin's *On the Origin of Species,* by Joaquim Dá Mesquita Paul (1913), Ana Afonso (2009), and Carlos and Anna Duarte (2014), the chapter explores how translators past and present have tackled the problem of scientific and common nomenclature. It concludes that the system of scientific nomenclature is not always very helpful for translators, because it makes the process more complex by adding a new layer of signifiers for each referent. The chapter also demonstrates that it is common for vernacular names to be used in a technical sense. Specialist translators thus benefit from acquiring 'tacit knowledge' and becoming 'interactional experts' on biological nomenclature.

The third chapter in this section on the languages of science, studies the role of dictionaries in streamlining the use of terminology. Bertha Gutiérrez Rodilla and Carmen Quijada Diez explore the extraordinary nineteenth-century boom in lexicographic works on medicine that took place in France (and to a lesser extent Germany) and spread rapidly to other European countries by means of translation. Spanish publishers brought out medical dictionaries translated from French and German alongside original works

by Spanish medical practitioners. Medical works included a wide range of information tailored for readers in the source culture. This caused all sorts of problems for translators, who had to choose between staying true to the original content and adapting it for a new audience. In some instances, this meant adapting the text to the ideology and morals of nineteenth-century Spain. Analysing these works sheds light on the role of translation in disseminating medical research. Such analysis is supported by the *Tesoro Lexicográfico Médico* [Spanish Medical Lexicographic Thesaurus, *TeLeMe*] project, a corpus of nineteenth-century Spanish medical dictionaries and encyclopaedias including some translated from other languages, mainly French and German.

The third section, 'Translation, Dissemination, and Nation', opens with a chapter by Susan Pickford, which studies the 1831 *Geological Manual* by Henry De la Beche (1796–1855), the first director of the British Geological Survey. The manual, hailed as groundbreaking, was published on the German market as the *Handbuch der Geognosie* in a translation by Ernst Heinrich von Dechen the following year, and as the *Manuel de géologie* in a French translation by André Brochant de Villiers in 1833. Both translators were professional geologists and educators. The chapter accounts for differences in their translatorial discourse in terms of the place of geology within the scientific field in each culture. Where the institutions of German geology were still largely influenced by Abraham Werner's late-eighteenth-century neptunism, French geologists were more broadly aligned with James Hutton's plutonist school. As such, von Dechen openly espoused a deliberately interventionist strategy in his paratextual commentary on the translation, claiming to be producing a 'Bearbeitung' (adaptation) of De la Beche's work on the grounds that it was of little relevance to the continental geologist. Brochant de Villiers – while acknowledging the relevance of von Dechen's changes and introducing some of his own – adopted the opposite strategy, claiming fidelity to the original on the grounds that the work's main interest lay in giving French geologists insights into the latest developments in British geology. Reflecting the multidirectionality of cross-cultural transfers in the genealogy of geological knowledge, De la Beche then incorporated material from both translations into subsequent editions of his own work. The chapter tracks the sedimentary accretion of research between the various editions of the manual in English and in translation and seeks to account for the difference in approaches between the French and German versions by addressing the question of how firmly established a professional geological habitus was in each national sphere.

M. Sait Özervarli's contribution questions how scientific translation became a relay for transmitting modern European discourses and competing ideologies in the last decades of the Ottoman Empire. It analyses scientific translations by Ottoman intellectuals with an interest in materialist-monist

thinking and explores the motives for employing translations instead of compilations of original-language texts to spread ideas and the emergence of counter-translations by other, more traditionalist thinkers. This chapter also draws attention to an important practice in the history of scientific translation, namely that of indirect (or relay) translation, in which a text does not pass straight from its source text and culture into the target language, but does so via a circuitous route. While the potential for misunderstandings, losses of meaning, and accuracy is immediately obvious to us today, the practice was commonplace both because it opened up the field to translators with other language combinations to be involved in the circulation of scientific material and, in some cases, actually speeded up processes of knowledge transfer. Another important aspect that Özervarli's contribution stresses is the role of institutions – here the *Babıâli Tercüme Odası* or Ottoman 'Royal Translation Office' – as centralised places of scholarly activity that also had the potential to introduce a certain systematisation to the translation of scientific works.

In the final chapter in this section on translation and nationhood, Laura Tarkka and Caroline Mannweiler study four translations of the Swiss physician Johann Georg Zimmermann's medical writings, notably his *Von der Erfahrung in der Arzneykunst* [On Experience in Medicine] (1763) and *Von der Ruhr* [On Dysentery] (1767). His first translator, Charles Rivington Hopson M.D., observed that Zimmermann was not only an esteemed physician but also a first-class 'German writer' indulging in 'high flights of metaphorical expression'. To see how contemporaries dealt with a 'philosophical' doctor who stressed the importance of careful observations while using imaginative rhetoric to guide the reason of his readers, this chapter compares the translation choices made by Jean-Baptiste Lefebvre de Villebrune M.D. in *Traité de l'expérience* [Treatise on Experience] (1774) and an anonymous translator in *A Treatise on Experience in Physic* (1778). Since Villebrune also translated *Von der Ruhr* as *Traité de la dyssenterie* [sic] in 1775, Hopson's earlier translation serves as a further point of comparison. The chapter aims to establish how Zimmermann's works, connecting medical reasoning with patriotic sentiment and policy-making, were adapted for readers in different polities.

The concluding section, 'Science, Translation, and Ideology', closes the book with two chapters addressing ethical issues in science translation. Vera Kutzinski focuses on the practice and ethics of translating Alexander von Humboldt by examining how Humboldt himself approached intercultural translation in his writings on the Americas and by thinking through the implications of his method for how one might render his work (and that of other scientific writers) in English at a remove of roughly two centuries. The questions addressed here are central to translators working today on the publication of new, modernised versions of texts previously issued a century

or more ago. Given that it is impossible to ignore the existence of earlier translations, how can we accommodate these in ways which respect the strategies of a translator working in a sometimes radically different context from the publishing landscape in which we now operate? Indeed, are we obliged to respect them, or can we also legitimately discredit their work as 'unprofessional', given that they were working without many of the (online) word-processing tools, reference works, or the professional mechanisms of training and support that exist today? What should the aims of a modern translator be – to generate a target text that has a high level of 'readability' and 'fluency', which Lawrence Venuti (2018) has memorably warned us go hand in hand with translatorial invisibility? More generally, Kutzinski's work raises important questions about the different values that knowledge holds to different audiences over time. This opens up new horizons for those working in the history of knowledge, which has recently turned to investigating with renewed vigour questions about actors and agency in the history of knowledge, constraints on knowledge actors, and forms of organisation and connection in knowledge communities (Östling, Larsson Heidenblad, and Nilsson Hammar 2023).

The possibilities or limitations on the movement of knowledge governed by the agents in the translation process forms the focus of the final chapter in this volume. Mary Orr's chapter builds on the feminist turn of the late 1980s, which began the work of excavating the scientific careers of women in the long nineteenth century as 'helpmeets' for their fathers, husbands, and brothers, by foregrounding women who clearly made primary scientific contributions. It further identifies the many secondary men forging careers in science as translator-disseminators by adopting the unusual approach of studying in detail translations by men of women-authored nineteenth-century science texts. While women were surprisingly active as translators of male scientific writing in the Victorian period – the British translations of Alexander von Humboldt's writing are a case in point (Martin 2018) – endorsement of scientific writing by women through translations done by men demonstrates how other models of female inclusion in the scientific community operated. For instance, W. H. Davenport Adams (1828–91) translated Athénaïs Michelet's work of natural history, *Nature or The Poetry of Earth and Sea*, for publication in 1872, while Gerson Hesse (n.d.) translated Mary Trimmer's *Natural History of the most Remarkable Quadrupeds, Birds, Fishes, Serpents, Reptiles and Insects* (1824) into French as *Abrégé d'histoire naturelle, contenant la description des principaux quadrupèdes, oiseaux, poissons, serpents, reptiles et insectes*, authored by 'Mary Trumer [sic]', in 1828. Orr's chapter not only highlights the complexities of attributing authorship – the far more eminent figure of Michelet's husband, the historiographer Jules, both overshadows her oeuvre and any claims she made to being the author of *Nature* – but also the difficulties of finding works by

women (in translation) in catalogue searches due to misspellings, changes of surname, and the like. Protocols of naming – and thus acts of acknowledgement of author and of translator – are just as important, Orr argues, when the translator is a man of a woman's text, especially when he is an important secondary figure in the relevant field of scientific endeavour.

Scientific and scholarly communication in the twenty-first century takes place within an 'English cosmopolis' (Manning 2018: 9). It is a double-edged sword, both inclusionary and exclusionary at the same time. The editors of this volume are aware of the irony of publishing a collection of essays on the translation of scientific knowledge in a monolingual format. We would therefore like to conclude the introduction by acknowledging our own academic privilege as native English speakers and by highlighting the language barriers faced by non-native-English-speaking (NNES) scholars, particularly those in the Global South. Non-native-English-speaking scholars face multiple hurdles in conducting research activities and building academic careers, from the extra time needed to read research papers published overwhelmingly in English to the challenges of attending and speaking at English-language conferences (Lenharo 2023). We therefore thank our NNES contributors for their additional labour in writing in English and echo recent calls (Amano, Ramírez-Castañeda, Berdejo-Espinola, Borokini, Chowdhury, Golivets et al., 2023) for concerted efforts at an institutional and societal level to improve language-related support for NNES scholars and to embrace linguistic diversity in international scholarship. Part of the solution may lie in emergent language technology: Zomer (2023) has developed a groundbreaking writing assistant for NNES scientists powered by machine learning and NLP models. The University of Queensland's *TranslatE: Transcending language barriers to environmental science* project is another instance of what can be done to overcome the risks of scientific monolingualism: it highlights the importance of 'the effective production and smooth flow of scientific information' (translate 2024) in protecting global biodiversity and provides vital data on the potential harms of the dominance of English in science. We need to do much more to harness a multiplicity of voices in response to the global challenges we face now, and in the decades to come.

Note

1 All translations are by the authors unless otherwise indicated.

References

Amano, Tatsuya, Valeria Ramírez-Castañeda, Violeta Berdejo-Espinola, Israel Borokini, Shawan Chowdhury, Marina Golivets, Juan David González-Trujillo, Flavia Montaño-Centellas, Kumar Paudel, Rachel Louise White, and Diogo Veríssimo. 2023. 'The Manifold Costs of Being a Non-native English Speaker

in Science', *PLoS Biology* 21(7). https://doi.org/10.1371/journal.pbio.3002184 (accessed 19 November 2023).
Ammon, Ulrich. 2012. '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* 3(2): 333–55.
Baker, Mona, and Gabriela Saldanha (eds). 2019. *Routledge Encyclopedia of Translation Studies*, third edition. New York/London: Routledge.
Ben Slimane, Mouheddine. 2021. *La terminologie scientifique française et sa traduction en arabe au XIXe siècle*. Paris: L'Harmattan.
Blumczynski, Piotr, and Steven Wilson (eds). 2023. *The Languages of Covid-19: Translational and Multilingual Perspectives on Global Healthcare*. New York/London: Routledge.
Bret, Patrice, and Ellen Moerman. 2014. 'Sciences et arts', in Yves Chevrel, Annie Cointre, and Yen-Maï Tran-Gervat (eds), *Histoire des traductions en langue française: XVIIe et XVIIIe siècles*, pp. 595–722. Lagrasse: Verdier.
Bret, Patrice, and Clément Rossignol Puech. 2019. 'Sciences et techniques', in Yves Chevrel, Bernard Banoun, and Isabelle Poulin (eds), *Histoire des traductions en langue française: XXe siècle*, pp. 1529–94. Lagrasse: Verdier.
Burnett, Charles. 2018. 'Foreword', in Abigail Owen and Patrick Manning. *Knowledge in Translation: Global Patterns of Scientific Exchange, 1000-1800 CE*, pp. xi–xii. Pittsburgh: University of Pittsburgh Press.
Byrne, Jody. 2014. *Scientific and Technical Translation Explained: A Nuts and Bolts Guide for Beginners*. New York/Abingdon: Routledge.
Chevrel, Yves, Lieven D'hulst, and Christine Lombez (eds). 2012. *Histoire des traductions en langue française: XIXe siècle*. Lagrasse: Verdier.
Chevrel, Yves, Annie Cointre, and Yen-Maï Tran-Gervat (eds). 2014. *Histoire des traductions en langue française: XVIIe et XVIIIe siècles*. Lagrasse: Verdier.
Chevrel, Yves, Bernard Banoun, and Isabelle Poulin (eds). 2019. *Histoire des traductions en langue française: XXe siècle*. Lagrasse: Verdier.
Cook, Harold J., and Sven Dupré (eds). 2012. *Translating Knowledge in the Early Modern Low Countries*. Berlin: LIT.
D'hulst, Lieven, and Yves Gambier (eds). 2018. *A History of Modern Translation Knowledge: Sources, Concepts, Effects*. Amsterdam: John Benjamins.
Dupré, Sven. 2018. 'Introduction: Science and Practices of Translation', *Isis* 109(2): 302–7.
Forman Cody, Lisa. 2020. 'Re-Presenting a Midwife Across Borders: Paratexts and Imagery in Translations of Louise Bourgeois' *Observations diverses*, 1609–1707', *Women's Studies* 49(3): 296–322. https://doi.org/10.1080/00497878.2020.1714390 (accessed 19 November 2023).
Geller, Markham. 2023. 'Prologue: Experiencing *Wissenstransfer* in the First Episteme: Mesopotamia', in Katja Krause, Maria Auxent, and Dror Weil (eds), *Premodern Experience of the Natural World in Translation*, pp. 1–6. New York/Abingdon: Routledge.
Göpferich, Susanne (2006). 'Transferwissenschaft: Eine Subdisziplin der Translationswissenschaft?', in Sigurd Wachter and Albert Busch (eds), *Wissenstransfer – Erfolgskontrolle und Rückmeldungen aus der Praxis*, pp. 167–87. Frankfurt am Main: Lang.
Gordin, Michael D. 2017. *Scientific Babel: The Language of Science from the Fall of Latin to the Rise of English*. London: Profile Books.
Guidère, Mathieu. 2020. *La traduction médicale à l'ère de la pandémie*. Paris: L'Harmattan.

Kothari, Rita (ed.). 2018. *A Multilingual Nation: Translation and Language Dynamic in India*. Oxford: Oxford University Press.
Krause, Katja, Maria Auxent, and Dror Weil (eds). 2023. *Premodern Experience of the Natural World in Translation*. New York/Abingdon: Routledge.
Lee, Tong King, and Dungkun Wang. 2022. *Translation and Social Media Communication in the Age of the Pandemic*. New York/London: Routledge.
Lenharo, Mariana. 2023. 'Science's Language Barrier: The True Cost for Non-Native Speakers', *Nature* 619: 678–9.
Lightman, Bernard. 2015. 'Scientific Naturalists and Their Language Games', *History of Science* 53(4): 395–416.
Malmkjær, Kirsten (ed.). 2022. *The Cambridge Handbook of Translation*. Cambridge: Cambridge University Press.
Manning, Patrick. 2018. 'Introduction: Knowledge in Translation', in Abigail Owen and Patrick Manning (eds), *Knowledge in Translation: Global Patterns of Scientific Exchange, 1000-1800 CE*, pp. 1–16. Pittsburgh: University of Pittsburgh Press.
Marais, Kobus (ed.). 2023. *Translation Beyond Translation Studies*. London: Bloomsbury.
Martin, Alison E. 2018. *Nature Translated: Alexander von Humboldt's Works in Nineteenth-Century Britain*. Edinburgh: Edinburgh University Press.
Menon, Minakshi. 2022. 'Indigenous Knowledges and Colonial Sciences in South Asia', *South Asian History and Culture* 13(1): 1–18.
Mitchell, James, and Anca Florescu-Mitchell. 2022. *A Practical Guide to Scientific and Technical Translation: Publishing, Style and Terminology*. London: World Scientific.
Montgomery, Scott L. 2010. 'Scientific Translation', in Yves Gambier and Luc van Doorslaer (eds), *Handbook of Translation Studies*, pp. 299–305. Amsterdam: Benjamins.
Montgomery, Scott L. 2017. *The Chicago Guide to Communicating Science*, second edition. Chicago/London: University of Chicago Press.
O'Hara, Stephanie. 2017. 'La représentation de Louise Bourgeois dans une traduction anglaise du XVIIe siècle: histoire de l'obstétrique, traduction et genre', in Laetitia Dion, Adeline Gargam, Nathalie Grande, and Marie-Élisabeth Henneau (eds), *Enfanter dans la France d'Ancien Régime*. Arras: Artois Presses Université. https://doi.org/10.4000/books.apu.10976 (accessed 19 November 2023).
Olohan, Maeve. 2014a. 'History of Science and History of Translation: Disciplinary Commensurability?' *The Translator* 20(1): 9–25.
Olohan, Maeve. 2014b. 'Gate-Keeping and Localizing in Scientific Translation Publishing: The Case of Richard Taylor and Scientific Memoirs', *British Journal for the History of Science* 47(3): 433–50.
Olohan, Maeve. 2015. *Scientific and Technical Translation*. New York/London: Routledge.
Olohan, Maeve. 2016. 'Science, Translation and the Mangle: A Performative Conceptualization of Scientific Translation', *Meta* 61: 5–21.
Olohan, Maeve. 2018a. 'Translating Cultures of Science', in Sue-Ann Harding and Ovidi Carbonell Cortés (eds), *The Routledge Handbook of Translation and Culture*, pp. 501–16. New York/London: Routledge.
Olohan, Maeve. 2018b. 'A Practice-Theory Analysis of Scientific Editing by Translators', *Alif: Journal of Comparative Poetics* 38: 298–328.
Olohan, Maeve, and Myriam Salama-Carr (eds). 2011. *The Translator* 17(2), Special Issue: Translating Science.
Östling, Johan, David Larsson Heidenblad, and Anna Nilsson Hammar. 2023. 'Introduction: Revisiting Agency in the History of Knowledge', in Johan Östling,

David Larsson Heidenblad, and Anna Nilsson Hammar (eds), *Knowledge Actors: Revisiting Agency in the History of Knowledge*, pp. 9–23. Lund: Nordic Academic Press.

Owen, Abigail, and Patrick Manning (eds). 2018. *Knowledge in Translation: Global Patterns of Scientific Exchange, 1000-1800 CE*. Pittsburgh: University of Pittsburgh Press.

Pinchuk, Isidore. 1977. *Scientific and Technical Translation*. London: André Deutsch.

Raj, Kapil. 2016. 'Go-Betweens, Travelers, and Cultural Translators', in Bernard Lightman (ed.), *A Companion to the History of Science*, pp. 38–57. Chichester: Wiley Blackwell.

Rundle, Christopher (ed.). 2022. *The Routledge Handbook of Translation History*. New York/London: Routledge.

Schaffer, Simon, Lissa Roberts, Kapil Raj, and James Delbourgo (eds). 2009. *The Brokered World: Go-betweens and Global Intelligence, 1770–1820*. Sagamore Beach, MA: Watson Publishing International.

Sarukkai, Sundar. 2016. 'Translation as Method: Implications for History of Science', *Indian Journal of History of Science* 51(1): 105–17.

Secord, James. 2004. 'Knowledge in Transit', *Isis* 95(4): 654–72. https://doi.org/10.1086/430657 (accessed 19 November 2023).

Silvestre, Augustin-François de. 1800. *Essai sur les moyens de perfectionner les arts économiques en France*. Paris: Imprimerie de Mme Huzard.

TranslatE. 2024. URL: https://translatesciences.com/ (accessed 10 September 2024).

Venuti, Lawrence. 2018. *The Translator's Invisibility: A History of Translation*, third edition. London: Routledge.

Worth-Stylianou, Valerie. 2007. *Les traités d'obstetrique en langue française au seuil de la modernité*. Geneva: Droz.

Zomer, Gustavo. 2023. *Supporting International Scientific Communication: The Development of a Writing Assistant Powered by an Intralingual Translation Engine for Users of English as a Second Language*. PhD dissertation, Centre for Translation Studies, University of Surrey.

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PART I

Translation, Science, and Knowledge

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1

KNOWLEDGE PRODUCTION AND SCIENTIFIC TRANSLATIONS IN NINETEENTH-CENTURY BRITISH INDIA

Sarah A. Qidwai

On 9 January 1864, at the inaugural meeting of the Scientific Society in Ghazipur, G. F. I. Graham, the assistant district superintendent of police, declared that 'for the first time in the annals of Hindustan has a Mohammedan gentleman, alone and unaided, thought over and commenced a Society in order to bring the knowledge and literature of the nations of the Western world within reach of the immense masses of the people of the Eastern [sic]' (Graham 1885: 72). The 'Mohammedan gentleman' in question was Sayyid Ahmad Khan (1817–98), then a subordinate judge in Ghazipur – as illustrated on a commemorative stamp from 1973 (Figure 1.1). Initially, the newly formed society's mandate included translating key texts from 'the arts and sciences' and collecting rare 'oriental' manuscripts (Muhammad 1978: 4–13). Several English sources were selected and then translated into Urdu by various members. Sayyid Ahmad himself had previous experience as a translator dating back two decades: for example, in 1844 he translated and published a manual entitled *Teshil fi Jarr-al Saaqil* [The Principles of Mechanics] (Panipati 1962: 74–95).[1] Yet, this society marked an important shift for him: it was his first time in charge of such a large-scale translation scheme.

Translators have shaped our understanding of how knowledge travels across geographic and cultural boundaries as much as they are responsible for our understanding of the contents of translations themselves. According to Marwa Elshakry and Carla Nappi, two broad historiographical turns have shaped the discussion of translations in the history of science (Elshakry and Nappi 2016: 372–86). The first turn, during the nineteenth and early twentieth centuries, was when scholars like George Sarton (1884–1956) wrote

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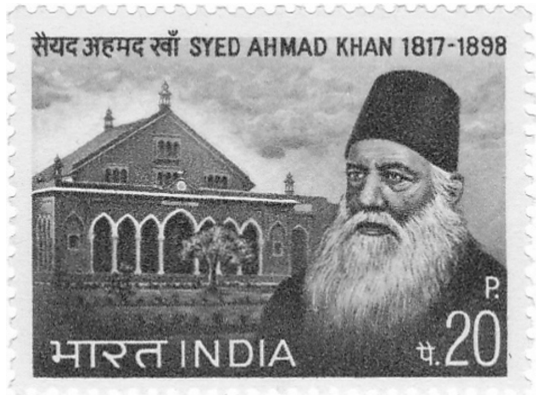

FIGURE 1.1 A Commemorative Stamp from 1973 with Sayyid Ahmad Khan's Portrait.

Source: Wikimedia Commons

universal histories of the progress of science, including Arab sciences and the so-called 'translation movement' from the Abbasid Caliphate (750–1258) in their narratives. Of course, such a broad understanding of universal history has long been criticized by historians, and new historiographical approaches have been adopted. The second historiographical turn, which took place in the late twentieth and into the twenty-first centuries, involves the inclusion of methods from the field of translation studies that point to new ways of looking at sources to move towards what Elshakry and Nappi call a 'poly-vocal' history of science (Elshakry and Nappi 2016: 383). This second turn is also tied to the context of translations and their role in fortifying colonial empires. While these two turns are representative of the shifting academic landscape, in their discussion of the first historiographical turn, Elshakry and Nappi account for new histories of the Arabs and of Islam published in the late nineteenth and early twentieth centuries which contributed to the consolidation and justification of colonial empires. For example, when discussing new works published by Orientalists in the nineteenth century, they reference a controversial publication by William Muir (1819–1905), *The Life of Mahomet* (Muir 1858). Muir, a Scottish Orientalist working for the East India Company, was the lieutenant-governor of the North-Western Provinces from 1868 to 1874. While Elshakry and Nappi contextualize the link between Orientalists and historians of science, other historical actors responded to these texts as well; in fact, Sayyid Ahmad was among those who responded to Muir. In this context, the historiographical turns sketched out by Elshakry and Nappi overlap to a certain extent: other historical actors in the nineteenth and twentieth centuries were grappling with the implications of translations and the place of Muslims and Islam in these historical

accounts, while themselves existing in colonial spaces. Including said narratives in historical case studies will present a more global and diverse picture of technical scientific translations in the nineteenth century and show how these practices were embedded in larger contexts such as the colonization of India.

Discussions of scientific translations in the nineteenth century lead us to another point – a shifting view of the supposedly universal 'language of science'. In *Scientific Babel*, Michael Gordin traces the origins of English as the so-called universal language of science, as it is viewed today (Gordin 2015). He explains that in roughly the 1850s, Latin's demotion as a lingua franca of science opened up a space for other languages to compete to become the dominant language of science, and this, in turn, led to the rise of what he labels the 'triumvirate languages' of English, French, and German (Gordin 2015: 54). These three acted as parallel scientific languages in Western Europe to an extent. However, following a complex set of major historical events, including World War II, English eventually broke away to dominate, and it was at this point that it assumed its central role as the language of science it is in the present day. In tracing this history, Gordin contends that his 'book pushes against its most straightforward reading: the seemingly inexorable rise of English' (Gordin 2015: 8). In so doing, he challenges the idea that it was inevitable that English would eventually end up as the language of science. His research provides a new lens through which to view discussions of translations of scientific works in the mid-nineteenth century.

While Elshakry and Nappi demonstrate links between translations, orientalism, and science in the mid-nineteenth century, Gordin's time frame indicates that the 'triumph' of English as the main language for scientific research lay in the future. Given this backdrop, this chapter explores two periods in Sayyid Ahmad's life where he was actively translating or supporting the translation of scientific texts. In the 1840s, Sayyid Ahmad took an interest in Arabic and Persian sources and acted as a translator himself. By the 1860s, he had stopped translating, choosing instead to set up a society for such a purpose. The major shift is the focus on translating English texts rather than Arabic or Persian. In both these narratives, the language he and other scholars translated works into was Urdu. In short, this case study traces the rise of English language translations while also emphasizing the importance of non-Western languages and local actors acting as translators.

Urdu and the History of Science

Following the Battle of Plassey in 1757, the British East India Company (EIC, est. 1600) administered parts of South Asia, gradually entrenching their control over the subcontinent (Metcalf and Metcalf 2008: 55). In 1837, the EIC made English, not Persian, the official language of the government.

Before this point, Persian served as the official language during the reign of the Delhi Sultanate (1206–1526) and it subsequently retained its status as the primary language under the Mughal Empire (1526–1857). During the initial years of the EIC's presence in South Asia, Persian retained its significance as an administrative language. British officials aimed to become proficient in Persian, viewing it as a tool to further their economic and colonial ambitions. When English was promoted to the EIC's official language, other vernacular languages were promoted alongside it, including Urdu (Rai 1984; Rahman 2011, 2012).

Urdu originated in North India in the thirteenth century. It uses a modified form of Perso-Arabic script, *nasta'liq*. Before it became universally known as Urdu, it was called by various names including Hindvi, Hindi, Dihlavi, Gujri, Dakani, and Rekhta. It retained this obscurity until at least the early nineteenth century. Urdu as a name for the language first appeared around 1780, gaining traction in the North-Western Provinces in particular. The development of the language coincided with the move of the Mughal capital to Shahjahanabad (Old Delhi) in 1639 (Rahman 2012). The early nineteenth century still saw frequent references to other vernacular forms of the same language, such as Hindustani and Hindvi, in print and by the British Government (Rai 1984; Rahman 2011, 2012).

How did Urdu become an important administrative language? Walter Hakala offers a useful summary in *Negotiating Languages*:

> Persian was spoken by few in South Asia as a first language, though it was used by many more as a second, largely written, language of education. It was this fact – Persian's status as a second language equally accessible to speakers of a variety of India's so-called vernacular languages – that contributed to its cosmopolitan character. A similar process enabled English to replace Persian in the nineteenth century as the preeminent language of statecraft across much of South Asia.
>
> *(Hakala 2016: 8)*

As Hakala points out, though English replaced Persian, there was a precedent for retaining local vernaculars. As a result, Urdu became a lingua franca for many in the North-Western Provinces and flourished due to the cosmopolitan nature of North India. This was a significant change: Urdu became a mediator between Persian and regional languages and part of the court system. In his 2003 preface to C. F. Andrews' 1929 biography *Zaka Ullah of Delhi*, Mushirul Hasan argues that following the decline of Mughal rule, 'the reason why Delhi's Muslim elite retained their position, if not predominance, is because Urdu remained the official language, and a necessary qualification for government employment' (Andrews 2003: x). This is evident from Sayyid Ahmad's own life. From the 1830s onward, the EIC took

an active role reforming educational institutions to reflect 'Western' learning (Zastoupil and Moir 1999). Urdu and its related vernacular languages were a source of debate not just for administrators who sought to translate scientific publications for government colleges, but also for learned societies. For Sayyid Ahmad, the fact that he did not communicate in English was not a hindrance to his career with the EIC.

Technical Translations

The concept of a learned society devoted to promoting arts, sciences, and literature and preserving the cultural and scientific heritage of the 'Orient' arose in colonial spaces during the latter half of the eighteenth century. In January 1784, William Jones (1746–94), a Justice of the Supreme Court at Fort William, circulated a letter to local British residents in the city of Calcutta featuring a plan to establish a society to encourage Oriental studies in the city (Metcalf and Metcalf 2008: 62). The Asiatic Society (est. 1784) was one of the earliest of its kind. Jones, now remembered as an eminent philologist, travelled to Calcutta at the invitation of Warren Hastings (1732–1818), the governor-general, to launch the society. Membership of such groups was often off bounds to Indians: they were not formally allowed to join the Asiatic Society until 1829. However, they still contributed to the society as translators and collaborators (Mitra 1885: 8).

Sayyid Ahmad's first appearance in an editorial capacity at the Asiatic Society came in 1860. The proceedings of the March 1860 Bengal branch meeting record the following:

> The Philological Committee recommend to the Council that the *Zeeah Burneah*, a Persian History of the reign of *Firuz Shah Toghluk*, should be published in the new series just commenced of the Bibl. Indica. Several MSS. have been collected to form an accurate text, and Moulavi Syud Ahmed Khan of Moradabad has offered to edit it. The work will fill about seven Fasciculi and as it relates to a very important and but little known period in the history of Muhammadan India, and as the book itself is extremely rare, it appears to the Committee on every account desirable to have it printed.
>
> *(Anon. 1860: 81)*

While scholars often refer to Sayyad Ahmad's admission to the Asiatic Society for Great Britain and Ireland in 1865, his presence in the Bengal group in 1860 is often overlooked. His nomination as potential editor for the *Zeeah Burneah* may seem surprising given that he was not yet officially a member of the society. Evidently, the Philological Committee was aware of Sayyid Ahmad's esteemed reputation as a Persian source translator. In

fact, Sayyid Ahmad had commenced his translation work a decade and a half earlier.

In 1844, Sayyid Ahmad presented *Teshil fi Jarr-al Saaqil* to Captain George William Hamilton, who served in India from 1823 to 1867, and Reverend James John Moore, a clergyman in Agra and secretary of the Agra School Book Society. The original Persian manual laid out the process of constructing machines that aided in farming and land cultivation. The origin of this translation is intriguing. In the preface to his translation, Sayyid Ahmad explains that the original source was an Arabic pamphlet (*risala*) written by Yemeni scholar Abu Zar Hakim, translated into Persian by a certain Abu Ali. While the exact identity of the original authors remains somewhat mysterious, Sayyid Ahmad certainly translated the text into Urdu. He wrote that 'when I mentioned this knowledge (*ilm*), they [Hamilton and Moore] liked it and wanted a translation (*tarjuma*)' (Panipati 1962: 75).

Circulation numbers for Sayyid Ahmad's translation of *Teshil fi Jarr-al Saaqil* are unknown. The intended audience for the translation was the Calcutta School Book Society, founded in 1817. As its name suggests, the society's objective was to produce textbooks for schools and madrasas in India. Contextually, this document is important for several reasons. It indicates that Sayyid Ahmad was interested in sharing knowledge from original source texts with fellow Indians by means of Urdu translations and that the original Persian-language text was inaccessible to those around him. It also demonstrates the importance of Sayyid Ahmad's networks, through both the EIC and his family, who publicized his translations. It also places him squarely within the translation debates related to the EIC's education policies.

In the text itself, Sayyid Ahmad states that he translated it while he was stationed in Fatehpur Sikri. He then explains that he wanted to describe five machines, discuss their relevance, and provide details about how to construct them. In describing them, he uses their Farsi names and then provides Hindi equivalents: *mehwar*, *mehal* or *dablaaq*, *bookra* or *charkha*, *ghootni*, and *lowlib*. Their various functions included lifting and transporting heavy loads, compressing matter, and breaking hard materials. Sayyid Ahmad also printed illustrations of all the machines in the text.

The *mehwar,* a pulley system for lifting heavy loads, gives an example of his explanations. The diagram and accompanying text demonstrate that a well-constructed *mehwar* could lift ten *maund* (roughly 373 kg). Sayyid Ahmad outlines the materials required for the device and how to put it together, tie the rope, and use it. He follows the same pattern for the other machines, explaining how to build them and describing their utility, providing step-by-step guides for each machine in his text. Even though he does not explicitly state this in the text itself, at several points in the years following its publication – including the inaugural meeting of the Scientific Society

in 1864 – Sayyid Ahmad stressed the importance of learning the principles behind land cultivation and farming practices to address the concerns of *zamindars* [landowners] and mitigate the brutal effects of famines in India. Under the EIC, the first major such disaster was the Bengal Famine of 1770: such events were often caused by mismanagement and worsened by colonial policies (Major 2020).

Two years after publishing *Teshil fi Jarr-al Saaqil* and moving to Delhi, Sayyid Ahmad published another translation. *Fawa'id Al-afkarfi iImal Al-firjar* [Advice for the Use of the Compass] was a text filled with diagrams that could be drawn with a *parkaar* [geometric compass]. It was an Urdu translation of a Persian source compiled by his own maternal grandfather, Khawaja Fariduddin (Panipati 1962: 97–201). In this text, Sayyid Ahmad highlights the fact that the knowledge contained in his grandfather's book had been lost over time. He explains at one point that the Arabs and *ajarn* (non-Arabic speakers) knew about it but now only the English and French could understand the instrument. A few examples referred to works by figures such as Archimedes. In fact, to illustrate this loss of knowledge, Sayyid Ahmad includes an idiom (*muhavaraa*) expressed by his grandfather in the preface, stating that he was frustrated because no one around him knew about the mathematical compass. He wrote that 'it came to a point that people would ask if *parkaar* (compass) is the name of some sort of animal' to show how unaware Indians were of the instrument and its purpose (Panipati 1962: 98). This quote suggests that the name *parkaar* was not associated with mathematics at the time: Sayyid Ahmad wanted to change that.

Sayyid Ahmad's grandfather, Khawaja Fariduddin, author of the original Persian source text, was an important figure at the Mughal courts and a well-known mathematician who learnt how to build scientific instruments like the compass. He studied under Tafazzul Hussain Khan (Schaffer 2009). Like his grandson, Fariduddin was a cosmopolitan figure: he travelled not only to Tehran for a meeting with the court of Fateh Ali Shah Qachar (1772–1834), the second Qajar dynasty shah, but also to Ava in Burma as an emissary to the Mughal emperor. He was invited by Maharaja Ranjit Singh (1780–1839), the leader of the Sikh empire, to Lahore, but declined the offer. Sayyid Ahmad grew up in his maternal grandfather's house, where he learnt about his life and publications.

Fawa'id Al-afkarfi iImal Al-firjar, like *Teshil fi Jarr-al Saaqil*, was translated at the request of Hamilton and Moore. It was printed by Sayyid Ahmad's brother, Sayyid Muhammad Khan (d. 1846), who in 1841 had established the Sayyid-al-Akbar lithographic printing press and newspaper in Delhi. This printing press, which later included moveable type, played a key role in disseminating Sayyid Ahmad's publications. In the preface, Sayyid Ahmad states that Moore suggested translating the work and sending a copy to the Calcutta School Book Society; he also mentions Aloys

Sprenger, the principal of Delhi College from 1845–47, suggesting that the translations depended on some form of sponsorship or patronage. The text itself is quite long and contains several dozen mathematical diagrams. Sayyid Ahmad explains that his grandfather compiled it as the result of his experiences in Lucknow in 1796, where he learnt about the instrument from General Claude Martin (1735–1800), an officer in the EIC army, and Gore Ouseley (1770–1844), a British entrepreneur and diplomat. They had an instrument that could draw a perfect circle, but they claimed not to know any more about it. He went to an auction (*nilaam*) in Calcutta and serendipitously found a mathematical compass and an Arabic book containing information about how to use the instrument.

After providing the context for the publication and how Khawaja Fariduddin compiled the original text, Sayyid Ahmad stated that his translation would not provide the explanation (*tarjuma*) for some Arabic words in the text because they were similar in Urdu. He did, however, use a few English words such as yard (*gaaz*) and foot (*kadam*) for some explanations. The units of measurement are equivalent in English and Urdu. The original Arabic and Persian content is translated into Urdu with references to Arabic, Persian, and English, making the translation a truly multilingual object.

The instructions are highly detailed. A simple circle is drawn by a compass, and the corresponding names for its sections indicated. The text then describes how to draw the lines and what each section of the circle represents. For example, the *kuther* is the diameter. The *wither* is a secant or line drawn in the circle that does not pass through the centre. The *markaaz* is the centre point. The rest of the text provides more complicated examples that build on this basic diagram. Overall, like *The Principles of Mechanics*, this text was a theoretical work. The mathematical diagrams become increasingly complex as the text progresses, indicating that the reader is expected to accumulate knowledge from one example to the next. When Sayyid Ahmad translated the work from Persian to Urdu, he kept certain words in Persian and Arabic rather than creating new words or meanings. It was circulated at the Delhi Vernacular Translation Society, established in 1843 to address the lack of suitable textbooks in vernacular languages for higher education in the North-Western Provinces of India, introducing Sayyid Ahmad to the intellectual community in the region. The Society later became a formal part of Delhi College (Pernau 2006).

Both initial translation projects were tied to learned societies founded by Europeans. *Principles of Mechanics* and *Advice for the Use of the Compass* were translated and published in line with the respective society objectives. However, the manuals and the translation process add a new angle to the account of scientific translations in imperial contexts. It was not a straightforward one-way process from English sources into non-Western languages. Rather, it represented an intersection of three important languages for Muslims

in nineteenth-century India – Arabic, Persian, and Urdu. As a result, the various language iterations of the manuals offer an interesting case study of how translations were produced in local settings, by whom and in what conditions.

Translations at the Scientific Society

Twenty years separate the publication of the two texts and the foundation of the Scientific Society in 1864. During this period, a significant event shifted the political landscape: the 1857 rebellions in North India resulted in the transition from EIC rule (1756–1858) to Crown rule (1858–1947) and the end of the Mughal Empire (Metcalf and Metcalf 2008: 92–3). After the rebellion, despite significant changes in governance, Sayyid Ahmad shifted to a defensive position on Islam and the place of Indian natives in governance. This affected his overall approach to British colonialism and collaboration. The Scientific Society was one such project to address issues in the region.

On 9 January 1864, the newly formed Scientific Society held its first meeting in Ghazipur. Sayyid Ahmad's outreach efforts proved fruitful, as 109 individuals became members of the society, with a significant number participating in the meeting at his home. During this initial gathering, Sayyid Ahmad articulated his vision for the society. He advocated for the publication of Urdu translations encompassing various fields, including history, natural philosophy, and political economy. While debating over what to name the newly formed group, G. F. I. Graham wrote that he 'would strongly recommend that the Society's present name [Scientific Society] be retained as it is short and comprehensive and includes everything relating to science, whether that be brought to the understanding of the people of this country by means of translation or by the means of lectures illustrated by instruments or models' (Graham 1885: 77). Some members felt that the name was too grand, but Graham, a friend of Sayyid Ahmad who helped draft the Society's bylaws, supported the name and agenda wholeheartedly (Lelyveld 1978: 78). Even if the society was simply translating scientific texts, it was still engaging in science education, one of its core objectives in Graham's view. While two decades previously, Sayyid Ahmad had worked as a translator and only published works upon request, the situation was quite different in the 1860s. A pattern was forming among Indian elite intellectuals such as himself. As Charu Singh has aptly noted,

> In the early nineteenth century, European officials and philologists had translated western scientific knowledge into South Asian languages as part of educational schemes for civilising colonial subjects. By the end of the century, Indian elites instead took the lead and began to forge terminologies to promote modern science in their languages.
>
> *(Singh 2022: 64)*

Singh asserts that by the end of the century, it was Indian elites who promoted modern science translations. Between these two phases, the Scientific Society offers a middle ground where European officials and Indian elites came together to promote translations of scientific concepts and principles. This is in line with Francis Robinson's claim that in the mid-nineteenth century, a new set of literary and scientific societies emerged in the North-Western Provinces of British India (Robinson 1974: 87). In essence, they were, to use Avril Powell's term, 'self-help' societies or educational improvement schemes for Indians (Powell 1993). These groups, often established by local elite Indian figures and aided by Europeans, addressed educational or social issues. The Scientific Society is one of the earliest of its kind, a society founded by an Indian Muslim for educational purposes that included translating historical and scientific texts in accordance with the timeline Singh (2022) presents.

With Graham's help, Sayyid Ahmad formulated the bylaws and presented them to the membership for approval. Initially, the bylaws stated that the Society's goals were to be concerned with translating and disseminating scientific and historical texts:

> (1) Translate into such languages as may be in common use among the people those works on arts and sciences, which being in English or other European languages are not intelligible to the Natives. (2) To search for and publish rare and valuable oriental works. No religious work will come under the notice of the Society.
>
> *(Muhammad 1978: 4)*

The bylaws also included a note about the Society's location; it was to be located in the same city as Sayyid Ahmad. This cemented his importance to the group right from the start. At its initial meeting, the Society's members voted in favour of all the proposed bylaws and discussed the membership structure. While previous intellectual societies in India were dominated by Europeans and initially excluded Indians, the Scientific Society's membership was structured differently, as the Society was primarily composed of Indians, all of whom were elite figures who could afford the membership fees. The meeting minutes reveal the careful consideration that went into the membership process, much of which was governed by regulations that resembled those of other British and European societies. There were three types of memberships: subscribing members, honorary members, and associates. Subscribing members were further split into ordinary and corresponding members. Ordinary members could attend meetings in person, while corresponding members were physically located far from the Society (e.g. members of the Muhammadan Literary Society in Calcutta and Europeans who had left India). Since they could not attend meetings in person, corresponding

members communicated with the Society through letters. The other two categories, honorary members and associates, were individuals that the Society recognized for their knowledge of science and literature or their services to the group. Honorary members had all the rights of ordinary members, while associates could not vote on matters related to the Society or hold any officer positions. There were no limits placed on the number of ordinary and corresponding members, but honorary members could not exceed ten and associates were capped at five. At all levels, membership required a vote, and the bylaws also stated that for an election to count, more than six members had to be present. The exception to this rule was, of course, the first meeting, where members simply wrote to Sayyid Ahmad and were admitted to the Society. Every subscribing member paid two rupees per month, since the Society had no founding endowment. Honorary members and associates were not required to pay fees. Overall, the minutes provide evidence of a robust and meticulously planned organization, modelled on British scholarly societies.

At the June 1864 meeting, the group finalized the list of books they wanted to translate. The final list of 28 texts is in line with the three categories outlined by Sayyid Ahmad in his opening address: history, natural philosophy, and political economy. In general, the texts were selected because they dealt with areas of history and science deemed by the Society's members as important for mass education. The list shows that members were chiefly concerned with subjects that would improve the quality of life for Indians and help them to develop technical skills with a basis in scientific disciplines. Sayyid Ahmad's speech at the first meeting laid out his objectives in founding the organization. With respect to history, he said, 'looking at the state of my fellow-countrymen's minds, I find that, from their ignorance of the past history of the world at large, they have nothing to guide them in their future career' (Graham 1885: 77). He went on to suggest a translation of Rollin's book on 'Ancient Races', especially his detailed accounts of 'their discovery of, and improvements on, the arts and sciences; as also their laws and systems of government, together with their virtues and vices' (Graham 1885: 78–9). He was not just interested in dates and descriptions; he wanted the Society to focus on improvements made by ancient civilizations in arts, science, and governance. He thought it vital to learn from the progress of previous civilizations and the history of science. In addition to the historical dimensions of science, Sayyid Ahmad stressed that it was important to learn about contemporary developments, such as the theory behind key concepts, such as steam, from the field of natural philosophy. He tied this view to a statement about learning farming practices from Europe to improve land cultivation, an intervention aimed at helping landowners in the region. Finally, political economy, which was defined in the nineteenth century as a scientific subject of study, was important

in comprehending the philosophical debates of the time and understanding how Indians were governed. Overall, the interventions of the Scientific Society, as expressed in Sayyid Ahmad's speech, focused on improving the status of Indians through readings in history, natural philosophy, and political economy.

Out of the 28 texts suggested, only two Urdu translations were printed in the first year, of Rollin's *The Ancient History of Egypt* and *History of China*. Parts of two other texts were also translated: 75 pages of Mrs. Foster's English translation of Dr. Condé's *History of the Dominion of the Arabs in Spain* and 50 pages of Samuel Maunder's *Scientific Treasury*. In the meeting minutes, Sayyid Ahmad outlined concerns expressed by some Society members at the slow pace of translation and defended the progress made. He argued that because the Society had moved from Ghazipur to Aligarh and expanded its mandate, the process of translating from English to Urdu was taking longer. He emphasized that the main reason for the apparent lack of progress was limited funds. It is clear that even in its first year, the society aimed to do more than simply translate texts.

The first few months of the group suggest that it was established to be a translation society focused on historical and scientific texts, but this changed after 13 March 1864 when the Society received a letter from corresponding member Seraj Husain. He suggested that the Society collect texts in other languages and secure land for a building. As a result of Husain's letter, a special general meeting was held on 16 August 1864 to discuss his suggestion, and the members present decided to take three measures in response. First, they attempted to secure land for a building where the Society could meet, with space for a library. Secondly, they collected publications for the library in languages including English, Persian, Arabic, Sanskrit, and Urdu. Thirdly, they collected descriptions of scientific instruments and agricultural machines used in Europe. After their meeting, all three new measures were incorporated into the Society's expanded objectives.

It was one thing to propose creating an institute; it was quite another to actually build it. At the meeting on 16 August 1864, members discussed the biggest hurdle to their new goal: a lack of funds. One member, Mohammed Inayetullah Khan, a *raees* [rich man] from Bheekumpoor, donated 1,000 rupees and encouraged others to follow suit. A subscription book was passed to members, who donated 8,980 rupees for the building and 3,041 rupees for securing and storing books and instruments. After raising funds, the Society had to purchase or rent land from the government. At the general meeting on 15 September 1864, members discussed sending an application to the district collector, James Prinsep. The application made three requests: for three acres of land in Aligarh, a public garden near the building so they could conduct experiments, and for the government treasury to hold their growing funds in deposit. All three requests were granted, doubtless

because Prinsep was a member of the Society. The land for the building was approved, and the cornerstone was laid on 20 November 1864.

The Society's first year was therefore quite active. The Society's first annual general meeting, held on 28 January 1865, provides a summary of the period. Its membership stood at 236, it employed four individuals, had translated 640 pages from English to Urdu, moved from Ghazipur to Aligarh, and petitioned for land to establish a building (Muhammad 1978: 68). The Society's expenses at this point included four regular employees: an English translator named Babu Ganga Prasad, an Urdu translator, Moulvi Faizul Husain, one unnamed *Moulvie* (an Islamic religious leader or scholar), and one *Mohurrir* (clerk or scribe). There were also expenses for the building, postage stamps, and publishers.

Conclusions

On 6 August 1867, at a Scientific Society meeting, Sayyid Ahmad informed members of his departure from Aligarh to take up the post of native judge in the city of Benares. Leaving the society behind was no easy task, but provisions were made for his absence. While he was away from Aligarh, he developed a plan to create a college for Muslims in North India. In 1875, he returned to Aligarh and established the Muhammadan Anglo-Oriental College (MAO). This institution, its publications, and his subsequent political agenda are what cemented his place as the nationalist figure he is remembered as today. During his time away from Aligarh, Sayyid Ahmad travelled to London; on his return in 1870, he established the Select Committee for the Better Diffusion and Advancement of Learning Among Muhammadans of India. Unlike the Scientific Society and Sayyid Ahmad's other previous ventures, no Europeans were included, but it did receive funding from government officials. Members of the committee included close friends and other employees of the British Raj. While the Select Committee acted as the catalyst for the MAO (est. 1875), in 1920, it was renamed Aligarh Muslim University and given the status of a university.

Polymaths like Sayyid Ahmad are not just important for understanding political and social history across the Islamic world. If we focus on that aspect of their work, their various entanglements with translating scientific material remain overshadowed. Individuals like Sayyid Ahmad are not hidden or unknown figures, but the sum of their work is so vast that we need to take a fresh look at them to find new insights. His translations into Urdu represented a unique trading zone, bringing Arabic, Persian, and English texts into a single setting. Local actors, both Indian and European, were heavily involved in the process and applied their own frameworks of understanding. Using Sayyid Ahmad as a case study proves fruitful for several reasons. The strongest of these is the fact that we can see an individual

change in their focus on the 'language of science'. Sayyid Ahmad's first foray into translations was during his early years as an employee of the EIC, when he translated Persian texts into Urdu. He would later establish his own society and take control of educational goals for Indian Muslims. However, translating scientific works to challenge authorities should not be treated as a uniquely non-Western phenomenon. Bernard Lightman presents a compelling narrative of the translation projects of scientific naturalists such as Thomas Henry Huxley, Charles Darwin, and John Tyndall (Lightman 2015: 395–416). Lightman argues that their translations of French and German texts were an attempt to import foreign modes of scientific thought and that this was part of a larger strategy to contest natural theology, which provided a justification for the power of the Anglican Church (Lightman 2015: 397). French and German science was politically important to British scientific naturalists in their reform efforts. Similarly, the Scientific Society was part of a broader mid-nineteenth-century trend of scientific translations, educational schemes, and power struggles in the Indian subcontinent. Thus, by incorporating individuals like Sayyid Ahmad, who were not strictly 'scientists' but rather polymaths and technocrats, into the historical accounts, a broader perspective of how scientific knowledge was disseminated in the nineteenth century emerges.

Note

1 All translations are by the author unless otherwise indicated.

References

Andrews, C. F. 2003 [1929]. *Zaka Ullah of Delhi*. Ed. by Mushuril Hasan and Margrit Pernau. Oxford: Oxford University Press.

Anon. 1860. 'Report', *Journal of the Asiatic Society of Bengal* 29: 81–5.

Elshakry, Marwa, and Carla Nappi. 2016. 'Translations', in Bernard V. Lightman (ed.), *A Companion to the History of Science*, pp. 372–86. Hoboken: John Wiley & Sons.

Gordin, Michael D. 2015. *Scientific Babel: How Science Was Done before and after Global English*. Chicago: University of Chicago Press.

Graham, G. F. I. 1885. *The Life and Work of Sir Syed Ahmed Khan C.S.I.* Edinburgh: William Blackwood and Sons.

Hakala, Walter N. 2016. *Negotiating Languages: Urdu, Hindi, and the Definition of Modern South Asia*. New York: Columbia University Press.

Lightman, Bernard V. 2015. 'Scientific Naturalists and Their Language Games', *History of Science* 53(4): 395–416.

Lelyveld, David. 1978. *Aligarh's First Generation: Muslim Solidarity in British India*. Princeton: Princeton University Press.

Major, Andrea. 2020. 'British Humanitarian Political Economy and Famine in India, 1838–1842', *Journal of British Studies* 59(2): 221–44.

Metcalf, B. D., and Metcalf, T. R. 2008. *A Concise History of Modern India*, second edition. Cambridge: Cambridge University Press.

Mitra, Rajendralala. 1885. *Centenary Review of the Researches of the Society, 1784–1883*. Calcutta: Thacker, Spink and Co.
Muhammad, Shan. 1978. *The Aligarh Movement: Basic Documents, 1864–1898*. Meerut: Meenakshi Prakashan.
Muir, William. 1858. *The Life of Mahomet and History of Islam to the Era of the Hegira*. London: Smith, Elder & Co.
Panipati, Muhammad Ismail. 1962. *Maqalat-i-Sir Syed*. Lahore: Majlis-e-taraqqi-e-Adab.
Pernau, Margrit (ed). 2006. *The Delhi College: Traditional Elites, the Colonial State, and Education before 1857*. New Delhi: Oxford University Press.
Powell, Avril. 1993. *Muslims and Missionaries in Pre-Mutiny India: London Studies on South Asia*, vol. 7. Richmond: Curzon Press.
Rahman, Tariq. 2011. *From Hindi to Urdu: A Social and Political History*. Karachi: Oxford University Press.
Rahman, Tariq. 2012. *A History of Language-Learning Among the Muslims of South Asia*. Lahore: Sang-e-Meel Publications.
Rai, Amrit. 1984. *A House Divided: The Origin and Development of Hindi/Hindavi*. Delhi: Oxford University Press.
Robinson, Francis. 1974. *Separatism among Indian Muslims: The Politics of the United Provinces' Muslims, 1860–1923*. *Cambridge South Asian Studies*, vol. 16. Cambridge: Cambridge University Press.
Schaffer, Simon. 2009. 'The Asiatic Enlightenments of British Astronomy', in Simon Schaffer, Lissa Roberts, Kapil Raj, and James Delbourgo (eds), *The Brokered World: Go-Betweens and Global Intelligence, 1770–1820*, pp. 49–104. Sagamore Beach, MA: Science History Publications.
Singh, Charu. 2022. 'Science in the Vernacular? Translation, Terminology and Lexicography in the Hindi Scientific Glossary (1906)', *South Asian History and Culture* 13(1): 63–86.
Zastoupil, Lynn, and Martin Moir. 1999. *The Great Indian Education Debate: Documents Relating to the Orientalist-Anglicist Controversy, 1781–1843*. Richmond: Curzon.

2

BRITISH ASTRONOMICAL TEXTS TRANSLATED IN NINETEENTH-CENTURY CHILE: ANDRÉS BELLO AS A PEDAGOGICAL TRANSLATOR

Claudio Soltmann

Introduction

Andrés Bello (1781–1865) deserves to be studied as one of the remarkable figures to play an active role in South American emancipation from the Spanish Empire, helping establish the complex organizational process of founding the new nation-states. His life has been explored in detail in recent decades: his intellectual itinerary has been studied thoroughly (Jaksic 2001).[1] Bello was born in Caracas in 1788 into a privileged family and showed an interest in science from his early years. After translating the foreign news about the accession of Joseph Bonaparte in 1808 to the Spanish throne, he actively participated in the complex and zigzagging independence processes of the emancipation of Venezuela from European colonial rule.[2] As a reaction towards Napoleonic political aspirations in the Americas, the Caracas Creole class established a Government *Junta* swearing allegiance to Ferdinand VII. In this new context, due to his expertise in the English language, Bello was appointed by the *Junta* as first officer of the Secretary of Foreign Affairs in 1810. He travelled to London in July of the same year on a diplomatic mission to gain British support against the French and to gain sympathy for the independence cause. The subsequent return of the Spanish monarchy and the successive overthrows of the new Venezuelan republics during the 1810s, together with great economic hardship due to lack of employment and funding in Britain, prolonged his stay in London until Venezuela's definitive independence in 1823. Bello spent nearly twenty years in exile in London before returning to Spanish America in 1829 to help establish the institutional foundations of the Chilean republic.

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He was an important Venezuelan-Chilean intellectual who left a rich legacy in multiple spheres of intellectual endeavour, particularly international and civil law, philology, and education. His contributions to Chilean civil law, international law, and his research on ancient Spanish philology and grammar have received considerable attention (Trujillo 2019). His legacy in other branches such as journalism and science popularization was also explored in the twentieth century, but not in great textual detail (Alvarez 1981; Grases 1981). Only recently has more attention been paid to the complex interdisciplinary framework of his journalism, incorporating fields of expertise including translation and science (Ramírez Errázuriz and Leyton Alvarado 2017; Latorre and Medel 2018; Ennis 2023). Considering his prolonged stay in Britain, further research on his role as a translator provides us with key information about the dissemination of scientific knowledge during a period of widespread political unrest within the new republics in South America.

A focus on the history of translation as well as translation as a phenomenon in various historical periods can provide a deeper understanding of the timespan under consideration (Rundle 2012). Work has previously been done on the common ground between various histories of disciplines such as science and translation (Olohan 2014), and over the past two decades, historians of science have gradually begun to turn their attention to translation to understand how processes of scientific communication represent what James Secord has influentially termed knowledge in transit (Secord 2004). Scientists have always worked in a multilingual world: a focus on translation allows transformations in scientific knowledge to be more closely scrutinized (Elshakry and Nappi 2016). Further studies have discussed the translation of science as a 'scientific practice in its own right' (Dietz 2016: 117). Authors like Nicolaas Rupke have focused on localizing the knowledge production process while considering the material and intellectual resources available to translators as well as their context (Rupke 2000). Another line of study arrives at similar conclusions, where the tangled relationship between history of science and history of translation allows historians to 'scrutinize the changes and transformations of scientific knowledge in motion' and understand translation as a procedure by which 'science and knowledge are transferred from one place to another, more often than not being altered in the process' (Dupré 2018: 303). Studying translations can offer 'the promise of a more connected history of science' since they help us to 'rethink geographies of knowledge' (Dupré 2018: 307).

In the case of Britain, technological advances in the printing trade and an increase in demand from an increasingly literate and leisured public during the opening decades of the nineteenth century determined the appearance of new literary productions, to facilitate forms of recreational learning. This phenomenon was the focus of Susan Sheets-Pyenson's innovative study on

the impact of popular science periodicals on a non-specialized readership (Sheets-Pyenson 1985). Jonathan Topham considers that 'cultural products designated as popular science and those activities designated as science popularization' have constituted a 'core aspect of the scientific enterprise' (Topham 2009: 16). Recent research has focused on various aspects of periodicals within scientific communities, in which science along with editing and publication practices in Britain built an image of a 'scientific nation' and constructed scientific communities within it (Belknap 2018; Dawson, Lightman, Shuttleworth, and Topman 2020). Reviews were particularly significant, understood by contemporary figures like the editor Josiah Conder in 1811 as 'a substitute for all other kinds of reading – a new and royal road to knowledge' (quoted in Cantor and Shuttleworth 2004: 2).

This uncovers a set of limitations to research, given the fragmentary survival of Chilean periodicals from the period (Subercaseaux 2010). Given the almost non-existent circulation of books and limited, ephemeral periodical press, focusing on the latter provides 'la medida del consumo en "tiempo real" de las producciones intelectuales' [the real-time measure of consumption of intellectual productions][3] (Payàs 2007: 39). Material conditions determined the spread of content in Chile during the first half of the nineteenth century, where the periodical rather than the book was the ideal medium *par excellence*. Since the nineteenth century, the study of the history of science in South American republics began with the relationship between nation-building and scientific practices in the South American republics (Sagredo Baeza 2010). Additionally, recent literature underlines how scientific practices in South America evidence their connection with the Spanish Enlightenment of the eighteenth century. At the same time, they show the small South American scientific community's commitment to the independence movement at the start of the nineteenth century and its growing ties with France and Britain (Martínez Hoyos 2019). The practice of translation is always present in the appropriation of foreign science, along with a dynamic nation-building endeavour which has not received enough attention as part of the knowledge production process.

Bello as a Science Popularizer: Selection and Re-contextualization

Bello sustained the idea of translation as an initial encounter with a branch of knowledge he wanted to teach to students and the general population. Following this idea, he translated mainly short, straightforward reviews and introductory chapters of books he found interesting. A popularizer of science, Bello may have published hundreds of scientific texts in Spanish-language journals in Venezuela, Britain, and Chile. The task of classifying his contributions and identifying his authorship is complex (Grases 1981: 471). His life in London between 1810 and 1829 was mainly influenced

by the emerging publishing context. This was the starting point for a journalistic career popularizing multiple branches of knowledge, including the natural sciences, physics, astronomy, and chemistry for Spanish-speaking readers living in London (Alvarez 1981). Although readership figures cannot be reconstructed, Bello's journalist endeavour was mainly aimed at very small groups of Spanish-speaking political refugee communities in London. The magazines sought to 'finance themselves through subscriptions' from the newly founded republics. Unfortunately, the precarious economic conditions, the political instability, and the long distance that had to be covered by the circulation of texts between Europe and South America made these projects short-lived (Guitarte 1966: 113).

Bello began to express his interest in natural sciences in journals edited by Spanish-speaking émigrés in London, such as *El Censor Americano* [The American Censor] (1820), published by the Guatemalan Antonio José de Irisarri (1786–1868) who later recruited Bello for the Chilean Foreign Office in 1828, *La Biblioteca Americana* [The American Library] (1823), published by members of 'A Society of Americans' in London, and *El Repertorio Americano* [The American Repertoire] (1826–27). While writing the 'Prospect' for *El Repertorio Americano*, Bello considered London the ideal place at the time for 'el vuelo del ingenio, las más profundas especulaciones científicas, las más animosas tentativas de las artes' [the flight of the intellect, the deepest scientific speculations, the most animated endeavours of the arts] (Grases 1973a: 2). Bello was already developing his own style of writing in exile in London during the 1820s, considering the strong multilingual context of the Somers Town neighbourhood where he lived, which was home to many Spanish-speaking liberal exiles from Spain and the old Spanish-American colonies. Such attitudes are related to the strong connection between exile and translation: 'Given the direct contact with the foreign language and culture, exile is a propitious context for carrying out translation, and for this reason it is no surprise that there have been so many translators amongst exiles, deportees, expatriates, refugees, émigrés, and displaced persons' (Pegenaute 2012: 112).

Yajaira Freites notes that during Bello's time in London, he published two geographical texts for *El Censor Americano* in 1820, a total of six texts for *La Biblioteca Americana,* and twenty for *El Repertorio Americano* between 1826 and 1827 (Freites 2014: 245).[4] For the last volume of *El Repertorio*, Bello wrote a brief review of Scottish physician Neil Arnott's recent work *Elements of Physics, or Natural Philosophy*. Bello also published a Spanish translation of the work's introduction, where he highlights the importance of making these types of works available for South American readers, because they approached science without advanced mathematical calculations.[5]

Bello praised Arnott's style of writing, drawing attention to the advantages of elegant, simple prose: 'Nada más ameno ni más elegante que el modo

con que el Dr Arnott ha tratado el asunto, despojándolo esmeradamente de las espinas que pudieran retraer al ignorante o al desaplicado' [Nothing is more enjoyable and elegant than the way in which Dr Arnott has presented his subject, painstakingly stripping away the thorns that might put off ignorant or casual readers] (Grases 1973b: 297). This was a feature which Bello would highlight as central to his choice of texts for translation; it also explains his future affinity for John Frederick William Herschel's *Treatise on Astronomy* (1833). Bello's most significant contribution to *El Repertorio Americano* was in fact the October 1826 article *Telescopios* [Telescopes], demonstrating his interest in astronomy at this early point. It informed the Spanish-speaking readership in London about the latest discoveries by the London optician Charles Tulley, who developed the achromatic telescope in 1822 (Grases 1973a: 160).

His interest in astronomy increased on his arrival in Chile in 1829. He began contributing to the state-funded weekly newspaper *El Araucano,* where he published texts on a broad variety of topics until 1850. This newspaper was a very modest four-page folded newspaper with an approximate print-run of 'fewer than 400 copies' (Bunster 1977: 75), read by the political, cultural, and economic upper classes in the country. Given the context of civil unrest and political anarchy in Chile in the early 1830s, Bello's main concern was to instruct, educate, and promote social order and stability, rather than to disseminate scientific knowledge without an extensive readership base.[6]

Bello noted in 1831 that journalists in Santiago had to work in a society where 'una discusión seria les incomoda y una materia científica les causa enfado' [any serious discussion discomforts them and any scientific topic annoys them] (Bello 1831a: 3). He argued that 'debe esparcirse la instrucción por todas las clases, elevándola no al grado que constituye ciencia, sino al que basta para que el hombre tenga medios de conocer sus deberes religiosos y sociales' [learning must extend to all social classes, and not be elevated to the rank that constitutes science, but should be sufficient to give men the means of knowing their religious and social duties] (Bello 1831b: 2). The particularities of Chilean society at the time, considering the postcolonial condition and the recent emergence of the early republican institutions, convinced Bello that people must know 'los modos sencillos de emplear la naturaleza para satisfacer sus necesidades y proporcionar sus goces' [the simple ways of nature to meet their own needs and to procure enjoyment] (Bello 1831b: 2). Selecting foreign texts for translation to overcome material and textual limitations in the target culture was significant in shaping the further development of scientific disciplines such as physics and astronomy in Chile during the first half of the nineteenth century. Bello encountered an interesting and complex challenge: what was the swiftest and most efficient way to spread basic scientific knowledge in a society where science was

almost non-existent? The question also highlights the sense of 'elegance' which Bello identified in authors able to write scientifically with the purpose of enlightening a largely uneducated population, instead of writing for a specialist audience.

Bello endorsed the idea of translation as the re-contextualization of the foreign work for a different knowledge community. Therefore, his practice of translation implied another challenge, giving translation significance as a tool for teaching society. Straightforward science was not enough: texts needed to be made accessible for a particular readership which did not have enough prior knowledge to understand them. Bello further expanded on the role of translation in the second part of an article titled 'Derechos de autores' [Copyright] published in *El Araucano* on 8 September 1848, where he provided a partial definition of translation as a process: 'adaptan una obra extranjera, introduciendo en ella alteraciones de alguna importancia' [adapting a foreign work by introducing alterations of some significance to it] (Bello 1982: 714). For Bello, the translation process was therefore akin to a process of creation and re-contextualization. In November 1831, he published a carefully edited version of his translation of Arnott's *Elements of Physics*, with the purpose of avoiding backlash from the Chilean Catholic Church (Soltmann 2021: 393–5). Bello's translation of Arnott's work can be seen as an example of the translator considering scientific discourse as a path that leads to God. As Bello argued in his influential *Discurso de instalación* [Inaugural speech] as Chancellor at the University of Chile in 1843,'Yo creo que existe, que no puede menos de existir, una alianza estrecha, entre la revelación positiva y esa otra revelación universal que habla a todos los hombres en el libro de la naturaleza' [I believe that there is, and can only be, a close alliance between practical revelation and that other universal revelation which speaks to all men in the Book of Nature] (Bello 1843a: 142). Bello should be seen as an intellectual from the Catholic Enlightenment who sought to unite reason with faith and knowledge. That way, the latter could only be furthered if it was united with the notion of religious revelation, which would provide it with a solid meaning. As he eloquently expounded in his *Discurso de instalación* by referring to the various scientific disciplines and religious dogma, 'todas las verdades se tocan' [all the truths touch on each other] (Bello 1843a: 141).

In March 1832, his first piece on comets was published in *El Araucano* as a brief set of reflections taken from the *Calendario y Guía del Forastero de Lima para el año 1829* [Calendar and Foreigner's Guide to Lima for the year 1829], by the Peruvian cosmographer José Gregorio Paredes (1778–1839). In June 1832, *El Araucano* published Bello's article *Estrellas fijas* [Fixed Stars] based on extracts from an 1814 edition of Joseph Delambre's *Astronomie théorique et pratique*. The article provided some basic definitions of the brightness of stars and outlined the Herschels' latest achievements in

counting stars and the significant advances made by their telescope (Bello 1832: 1).

Another factor explaining Bello's interest in astronomy was the appearance of Halley's Comet between 1835 and 1836, clearly visible in the clear night skies over Santiago. Bello took advantage of public interest in the comet to publish three articles on the event.[7] The first was 'Cometa de 1835' [the 1835 Comet], printed in *El Araucano* on 16 October 1835 (Bello 1835a). It featured Bello's translation of extracts from the review 'The Approaching Comet' published in *The Edinburgh Review* in April 1835, attributed by Bello to the Irish publisher Dionysius Lardner (1793–1859) (Bello 1835a: 2).[8] Bello's translations of extracts from this essay shed light on his writing style and the further value of such review articles in providing useful scientific content for the Chilean press. Review articles offered concise overviews of multiple works which were not available to Bello at the time. Moreover, it enabled him to condense the information that he would later use in his own texts on the subject, as was the case in *Cosmografía*. Here, the context, and the need to find simpler ways to bring natural phenomena to public attention, determined the selection of the content he was looking to translate and communicate.

Translation as an Initial Encounter: Bello's Interest in the Work of John Herschel

Bello's concern for public education and the need to further the development of science in Chile informed his selection criteria as a translator. As his translation of Arnott demonstrated, Bello prioritized works light on mathematical formulations and calculations, for readers without much mathematical expertise. Herschel's *Treatise on Astronomy* was therefore a welcome opportunity for Bello, since it broadly fell into this category.[9]

Bello first brought Herschel's *Treatise* to the attention of Chilean readers when reviewing a geographical treatise by the Argentinian politician Tomás Godoy Cruz (1791–1852) on 21 June 1839 in *El Araucano*. He pointed out the need for an 'obrita' [a very brief work] on astronomy for Chilean schools, adding that 'el trabajo de redactarla se facilitaria mucho con el auxilio del elegantísimo tratado de Astronomía de Herschel' [the drafting process would be much easier with the help of Herschel's very elegant *Treatise on Astronomy*] (Bello 1984a: 264). As was the case with Arnott, Bello praised the 'elegance' of Herschel's book, which 'contiene una descripción completa del sistema del universo, con todos los portentosos descubrimientos de los últimos años, y sin el embarazo de cálculos y fórmulas algebraicas' [contains a complete description of the system of the universe with all the wondrous discoveries of recent years, without the encumbrance of calculations and algebraic formulae] (Bello 1984a: 264).

Bello was similarly enthused by Herschel's *Preliminary Discourse on the Study of Natural Philosophy*. On 23 April 1841, he translated an extract from the second chapter in the form of an article titled 'Ciencias naturales (Herschel)', [Natural Sciences (Herschel)] printed in *El Araucano* (Bello 1841). In November 1843, the same periodical published his article on 'El Cometa de 1843' [The Comet of 1843], a translation of reports by the French astronomer François Arago (1786–1853) presented on 27 March and 3 April 1843 at the *Académie des sciences de Paris* (Bello 1843b). The publication of comet observations in 1843 also explains why scholars on Bello's work agree that he began drafting his major work on astronomy, *Cosmografía,* only after 1843. An early draft of this major work was first printed on 7 February 1845, when Bello contributed an early version of the chapter 'Los Cometas' [Comets] to *El Araucano*. Bello noted in the title that the article 'se ha extractado de la Astronomía de Sir John F.W. Herschell [sic], y forma uno de los capítulos de un tratado de cosmografía para el uso de los colegios, por A.B.' [was extracted from Sir John F.W. Herschel's Astronomy and is one of the chapters of a cosmography primer for use in schools, by A.B.] (Bello 1845a: 1). On 28 March 1845, an early version of the sixth chapter of *Cosmografía* was likewise published in *El Araucano* as 'Constitución física del sol' [Physical Constitution of the Sun]. Bello appended a footnote signed 'A.B.' to the title, pointing out that the text was a chapter from 'a draft of a cosmography treatise based on Biot, Herschel, and other authors' (Bello 1845b: 1). The note provides more details on the major work, which was to contain 'catorce capítulos y llevará al fin una lámina con figuras que faciliten la inteligencia de algunos fenómenos celestes' [fourteen chapters, concluding with a page of figures to facilitate learning of some heavenly phenomena] (Bello 1845b: 1). Four days after a loud detonation followed by a trail of smoke in the skies over Santiago on 7 April 1845 caused panic in the streets, *El Araucano* printed a brief article titled 'Aerolitos' [Aeroliths], based on basic definitions from the *Encyclopédie Moderne, ou Dictionnaire abrégé des sciences, des lettres et des arts* [Modern Encyclopaedia or Abridged Dictionary of the Sciences, the Letters, and the Arts] by the French jurist Eustache Marie Courtin (1769–1839) (Bello 1845c). This article later became the seventh chapter of *Cosmografía*.

Along with early drafts of chapters of *Cosmografía*, Bello published a brief text titled 'Astronomía' [Astronomy] on 25 April 1845 in *El Araucano* summarizing Arago's reports in the *Journal des Debats* [Journal of Debates] in November 1844 about the recent increase in the range of astronomical instruments (Bello 1845d). This indicates that Bello was drafting his major work while at the same time gathering further references from ongoing observations: extracts from Arago's reports were incorporated into *Cosmografía* chapters as footnotes.

Andrés Bello as Translator

Bello found a creative way to incorporate fresh observations taken from reviews into his own treatise. While drafting chapter eight of his *Cosmografía,* on the size of the moon, he decided to include observations from a review article by George Thomas Fisher in *The Westminster & Foreign Quarterly Review* in January 1847.[10] Bello briefly translated a note about recent observations of the moon gleaned from Lord Rosse's six-foot telescope, at the time the largest in the world:

> The Moon has necessarily rendered it an object of the greatest interest, and it has, perhaps, in a greater degree that the other celestial orbs, been subjected to the scrutinizing observations of the telescope. Since the completion of the great instrument of Lord Rosse, that nobleman has frequently observed it […]. With regard to the mountains, a great number of them are isolated peaks, such as Teneriffe [sic].
>
> *(Fisher 1847: 364)*

> Mirada con el gran telescopio de lord Ross [sic], se presenta la luna como un globo de plata derretida, percibiéndose distintamente sobre su superficie todos los objetos de una extensión de 90 o 100 metros. Podría divisarse en ella con facilidad un edificio como el de la Catedral de Santiago.
>
> [As seen through the great telescope of Lord Ross, the Moon presents itself as a globe of molten silver: any object measuring 90 or 100 metres can be descried distinctly. A building such as Santiago Cathedral could easily be made out].
>
> *(Bello 1984a: 115)*

Bello incorporated the recent observations made using Rosse's telescope to expand his treatise, but at the same time he localized the size comparison the peaks of Tenerife to a referent familiar to his Santiago readers. He added a more visually striking image, describing the moon as a 'globe of molten silver', to capture the imagination of his readers.

When Bello published 'Los Cometas' [Comets] in February 1845, he was clearly aware of its intertextuality, combining its main source text, his own translation of chapter ten, 'Of Comets', from Herschel's *Treatise of Astronomy*, with recent comet observations published in Europe: 'Cuando se escriben estas líneas (enero de 1845) tenemos a la vista en el hemisferio del sur otro hermoso cometa; acerca del cual aguardamos el resultado de las observaciones de los astrónomos europeos' [As these lines are being written (January 1845), we have another beautiful comet in sight in the southern hemisphere; we await the observations by European astronomers]

(Bello 1845a: 1). Bello was also aware of the ephemeral nature of data and information in the context of ongoing improvements to observation methods. Natural phenomena could now be observed and recorded better than was the case in older books: as a result, a sense of the discontinuity and ephemerality of earlier texts was always present. The publication of Alexander von Humboldt's *Cosmos* in 1847 could have been a major reason for Bello to delay the publication of his own work, to obtain valuable data from Humboldt's newly published work to enrich the *Cosmografía*. For example, Bello translated a brief paragraph from Herschel's *Treatise* and then 'complemented' it with additional information for the Chilean readership:

> The **highest mountain known** does not exceed five miles in perpendicular elevation: this is only one 1600th part of the earth's diameter.
>
> *(Herschel 1836: 27)*

> La altura del **Dhawalagiri**, que pertenece a la cordillera de Himalaya, y es el monte más elevado que se conoce, no es igual a 1/1600 del diámetro de la tierra*
>
> *[Bello's footnote]: Algunos hacen subir la altura del Dhawalagiri hasta 8556 metros, que es algo mas de un mil y seiscientos avos del diámetro terrestre; pero no se puede mirar con tanta confianza esta medida, como la de Jawagir en la misma cordillera (7848 metros), que es la cumbre más alta que ha podido medirse con exactitud. En Bolivia el Sorata sube a 7696 metros, y el Illimani a 7315, descollando ambos sobre el Chimborazo (6530), y todos ellos sobre el Monte Blanco de Europa (4808) (Humboldt, Cosmos).
>
> [Some put the height of Dhawalagiri as high as 8,556 metres, which is not over one part over one thousand six hundred times of the earth's diameter; but this measurement cannot be looked upon with as much confidence as that of Jawagir in the same range (7,848 metres), the highest summit ever to be accurately measured. In Bolivia, Sorata rises to 7,696 metres and Illimani to 7,315, both towering over Chimborazo (6,530), and all of them dwarfing Europe's Mont Blanc (4,808) (Humboldt, Cosmos)].
>
> *(Bello 1984a: 9–10)*

Here, Bello not only adds information to Herschel's paragraph, such as the exact name of the highest known mountain ('Dhawalagiri') and its location in the Himalayas, but he also omits the references given in miles and provides new data using the metric system with the help of Humboldt's *Cosmos,* published during the drafting process for *Cosmografía*. Bello valued Humboldt's scientific authority and completed the paragraph with a

footnote acknowledging *Cosmos* as the source of the data. Bello's work translating and drafting *Cosmografía* extended from 1843 to 1848 and constituted an ongoing process of updating with new references reflecting the latest scientific discoveries.

The Afterlife of Periodical Publication: Modernization and Annotation

Bello noted in his caution to *Cosmografía*: 'me atrevo a esperar que este trabajo será de utilidad a las personas de toda edad y sexo que deseen formar una mediana idea de las estupendas maravillas de la creación en el departamento científico' [I venture to hope that this work will be of some use to persons of all ages and genders who wish to form an average idea of the remarkable wonders of creation in the scientific department] (Bello 1984a: 4). *Cosmografía* was positively received by the South American intellectual elite; however, it was difficult for scientific education to percolate down to common readers easily during his time, due to issues of literacy. Bello's contributions did, however, reach members of the political class who in the year to come developed a broader education policy. The Argentinian intellectual Bartolomé Mitre (1821–1906), writing in the newspaper *El Comercio de Valparaiso* [The Trade of Valparaiso], considered Bello's work on cosmography as 'el primer tratado que se haya escrito hasta ahora […] sobre cosmografía en el hemisferio del sur, tiene la ventaja para los países meridionales de América de las aplicaciones y ejemplos australes' [the first treatise ever written […] about cosmography in the southern hemisphere, it holds the advantage for South American countries of offering applications and examples of relevance to the south] (Mitre 1848: 1). The positive reception of Spanish-American readers like Mitre echoed Bello's purpose as a translator. Translation was necessary because South American readers required a 'local' oeuvre adapted to their own circumstances. The process of translating needed to be a dynamic and creative process walking a fine line between translation, rewriting, and editing, all with a view to educating an audience with little scientific culture of their own. Bello also equated translating and teaching: 'El profesor que adapta a sus propias nociones una obra extranjera, y que le da de este modo una estampa de individualidad, enseñará mejor con ella' [a teacher who adapts a foreign work to his own ideas provides it with a stamp of individuality and he will teach better with it] (Bello 1982: 714).

As a popularizer of astronomy and a translator, Bello was ahead of his time, recognizing that the skies over Chile had vast potential for the study of astronomy. He was conscious that the publication of *Cosmografía* in 1847 was an early milestone marking Chile as a major centre for astronomy in the southern hemisphere, noting:

> la oportunidad de dar principio al cultivo de un ramo científico hasta ahora desconocido entre nosotros, y […] pondrá a Chile por su situación

> austral y la serenidad de su cielo, en aptitud de contribuir de algún modo al progreso general de la ciencia [The opportunity to begin cultivating a currently unknown branch of science [...] will enable Chile's current southern condition and serene skies contribute in some way to the general progress of science].
>
> *(Bello 1981: 224)*

The US Naval Officer and astronomer James Melville Gilliss (1811–65) was thrilled at the development of a new arena for astronomy in the southern hemisphere, leading an expedition to Chile in 1849 to conduct observations of Venus and Mars. The expedition was mounted in response to a proposal by the German astronomer Christian Ludwig Gerling (1788–1864) to establish an observatory in the southern hemisphere as part of a 'global astronomy project that would connect different observatories on opposite sides of the world' (Sanhueza-Cerda and Valderrama 2020: 190). Together with his crew, Gilliss established an astronomical observatory at Santa Lucia Hill in Santiago, formalizing the beginning of astronomical research in Chile in the year 1850. The minutes of an academic council on 13 April 1850 at the University of Chile, where Bello was by then chancellor, record the relevance of his translation as noted by a member of the university, the Polish-Chilean scientist Ignacy Domeyko (1802–89): 'El señor Gilliss desearía que los jóvenes supiesen el inglés para que les pudiera franquear sus mejores libros. En todo caso deberán tener el trabajo de astronomía de Herschell (sic) original o traducido' [Mr Gilliss wishes that the youth knew English so that he could send them his best books. Either way they should possess Herschel's work on astronomy, in the original edition or translated] (Bello 1984b: 256). Publishing *Cosmografía* could be seen as a propaganda exercise by Bello to boost the practice of astronomy in the country and symbolically mark Chile on the map as a major centre for astronomical research. His efforts laid the foundations for Chile's major role in modern astronomy, given that today it hosts 42% of the world's astronomy infrastructure and has the largest astronomical project in existence, the ALMA (Atacama Large Millimetre/submillimetre Array) Observatory in the Atacama Desert, due to its outstanding observation conditions (Rampazzo 2016: 36).

Conclusions

Bello's translation extracts shifted between periodicals, books, and beyond, developing their own afterlives as he updated the originals with data and observations from recent studies published in the periodical press. In this case, the translation effort can be seen as an emergent process of knowledge production where, in line with Dupré, 'strategies of the translators and attitudes towards translations have depended on ideas about the

nature of science, which were also shaped by geopolitical factors' (Dupré 2018: 304). The 'ephemeral' review articles published in Europe put down roots in Chilean soil as Bello mined them for data to improve the draft of *Cosmografía*. Bello's task as translator did not just ensure the utility of Herschel's *Treatise* and extracts from reviews and other works which he used during the drafting process for a segmented and emergent Chilean readership. It also materialized into a complex process of transformation resulting in a new treatise intended as a useful educational aid for readers eager to develop a new scientific culture in South America. Research of this kind enables us to recognize the outstanding characteristics of individual figures in the History of Science in South America.

Recent approaches studying scientific practices in South America during and after the colonial period have opened up a research path towards finding other outstanding figures of science on this continent (Sagredo Baeza 2010; Valenzuela Matus 2019). Bello's legacy as the great South American figure of the Catholic Enlightenment is very much an integral part of such approaches. However, his work also presents us with a set of difficulties and challenges regarding how we focus on the local audiences and readership of these remarkable authors. More data relating to nineteenth-century periodical sources and more in-depth archival research could help us to start reconstructing the dialogue between the (admittedly small) readership of the time, while a comprehensive review of archive material on reading practices of the period would shed new light on reception and provide hints about the complexities of the scientific process. In this case, understanding the writer's attitude towards the audience could become a key feature in uncovering more of the scenario in which Bello operated during his time. Future research focused on the audience, rather than just on the authors, could thus provide us with insights into the complexities of establishing modern science in Chile during the first half of the nineteenth century.

Notes

1 Research for this chapter was funded by a doctoral grant from the Gerda Henkel Stiftung.

2 Bello grew up in a Creole family linked to the colonial administration of the Spanish vice-royalty of New Granada. He developed an early interest in foreign languages and literature and subsequently the natural sciences. Alexander von Humboldt and Aimé Bonpland came to Caracas at the end of 1799, when Bello was 18 years old, and he accompanied them on an expedition to the mountains near Caracas (Amunátegui, 1882: 26).

3 All translations are by the author unless otherwise indicated.

4 In *El Censor Americano*, the two geography texts were translations by Bello of extracts from Humboldt's *Voyage aux régions equinoxiales du Nouveau Continent, fait en 1799–1804* [Voyage to the Equinoctial Regions of the New Continent, Conducted between 1799 and 1804]. The texts were titled

'Consideraciones sobre la primera población y las antigüedades de América' [Considerations on the First Populations and Antiques in America] and 'Topografía de la provincia de Cumaná' [Topography of the Province of Cumaná] (Freites 2014: 246). In *La Biblioteca Americana*, Bello published articles in 1823 highlighting the botanical and geological aspects of South America and Asia (e.g. 'Cultivo y beneficio del cáñamo', 'Cordillera de Himalaya'), along with texts reflecting his long-standing interest in smallpox ('La viruela') and vaccination. The texts were seen to disseminate knowledge about South America to intellectual circles in London who cultivated a sense of curiosity about the region.

5 When translating the title of Arnott's *Elements of Physics or Natural Philosophy*, Bello added the description 'treated without calculations and mathematical formulations' [*tratada sin cálculos i formulas matemáticas*] (Bello in Grases 1973b: 296). Bello also highlighted the necessity of setting aside the Latin language corpus of scientific texts since the Spanish Colonial period. The need to establish Spanish as the national language encouraged translation as a means of providing scientific knowledge for Spanish Americans in their own language (Grases 1973b: 297–8).

6 There are no figures about the levels of literacy in Chile during the 1830s. The first statistical figures for Chile, considered a state policy rather than a task conducted only by the Catholic Church, were published in 1854. This statistical census provided for the first time literacy figures about the general population. They indicated that out of a total population of 1,439,120 inhabitants, only 15% of men and 9% of women in Chile could read, while only 13.5% of men and 7.8% of women could write. In terms of population distribution, 70% of the Chilean population lived in rural areas, while the largest urban areas such as Santiago and Valparaiso presented higher literacy levels: Valparaiso recorded 23% among men and 16% among women, and for Santiago, it was 18% among men and 15% among women (Serrano, Ponce de León and Rengifo 2012: 124–6).

7 A further article by Bello following the comet was published in *El Araucano* on 23 October 1835, offering a description of its appearance in the sky over Santiago: 'Su tamaño es como el de una estrella de primera magnitud, su luz algo amortiguada, y su cola bastante perceptible, aun a la vista desnuda' [Its size is like that of a first magnitude star, its light is somewhat dim, and its tail is quite noticeable even to the naked eye] (Bello 1835b: 1).

8 Bello concludes with an extract from the Académie de Sciences de Paris which contains information on the comet's calculated location in the visible night sky. Lardner's review essay contained commentary on three recent works: *Des Comètes en général, et en particulier de celles qui doivent paraître en 1832 et 1835* [Comets in General and Particularly Those Due to Appear in 1832 and 1835], by the French astronomer François Jean Dominique Arago (1786–1853), published in 1834; *Notice sur la Comète de Halley et son retour en 1835* [Remarks on Halley's Comet and its Return in 1835] by the French astronomer Philippe Gustave de Pontecoulant (1795–1874), published in 1835; and Herschel's 1833 *Observations on Bielas' Comet*, part of the Memoirs of the Royal Astronomical Society.

9 According to the catalogue of Bello's personal library, he owned three of Herschel's works: two editions of *A Preliminary Discourse on the Study of Natural Philosophy,* one printed in Philadelphia in 1840, the other in New York in 1855, an 1839 edition of *A Treatise on Astronomy* printed in Philadelphia, and a copy of 'The Telescope' from the *Encyclopaedia Britannica* printed in Edinburgh in 1861 (Velleman 1995: 190–1). The examination process of Herschel's texts must have been equally complex for Bello alone. In an annotation on his draft of *Cosmografía*, Bello expressed gratitude to the Spanish

engineer Andrés Antonio Gorbea (1792–1852) who revised the first chapters of his translation. Like Bello, Gorbea lived as an exile in London during the 1820s; he then came to Chile in 1826 as a mathematics teacher. He founded the Faculty of Physical Sciences and Mathematics at the University of Chile in 1843.

10 The text reviewed five recent works on astronomical observations, two by J. P. Nichol: *Contemplations on the Solar System* (1844) and *Thoughts on some Important Points Relating to the System of the World* (1846); Robert James Mann's *The Planetary and Stellar Universe* (1845); the *Comptes rendus des séances de l'Academie des Sciences* [Accounts of the Meetings of the Academy of Sciences], published in Paris (1846); and the *Philosophical Transactions of the Royal Society of London for the Year 1840*. This allowed Bello to glean ideas and initial data from publications to which he did not have access.

References

Alvarez, Federico O. 1981. *El periodista Andrés Bello*. Caracas: La Casa de Bello.

Amunátegui, Miguel Luis. 1882. *Vida de Andrés Bello*. Santiago: Imprenta de Pedro G. Ramírez.

Belknap, Geoffrey. 2018. 'Illustrating Natural History: Images, Periodicals, and the Making of Nineteenth-century Scientific Communities', *BJHS* 51(3): 395–422.

Bello, Andrés. 1831a. 'Editorial', *El Araucano*, 26 February: 3.

Bello, Andrés. 1831b. 'Instrucción pública', *El Araucano*, 3 December: 2–4.

Bello, Andrés. 1832. 'Estrellas fijas', *El Araucano*, 30 June: 1–3.

Bello, Andrés. 1835a. 'Cometa de 1835', *El Araucano*, 16 October: 1–2.

Bello, Andrés. 1835b. 'Cometa', *El Araucano*, 23 October: 4.

Bello, Andrés. 1841. 'Ciencias naturales (Herschel)', *El Araucano*, 23 April: 1–2.

Bello, Andrés. 1843a. 'Discurso pronunciado en la instalación de la Universidad de Chile el día 17 de septiembre de 1843', *Anales de la Universidad de Chile* 1: 139–52.

Bello, Andrés. 1843b. 'El cometa de 1843', *El Araucano*, 3 November: 1.

Bello, Andrés. 1845a. 'Los cometas', *El Araucano*, 7 February: 1–2.

Bello, Andrés. 1845b. 'Constitución física del sol', *El Araucano*, 28 March: 1–3.

Bello, Andrés. 1845c. 'Aerolitos', *El Araucano*, 11 April: 1.

Bello, Andrés. 1845d. 'Astronomía', *El Araucano*, 25 April: 1–2.

Bello, Andrés. 1981. *Obras Completas,* vol. 19, Mensajes y textos de gobierno. Caracas, La Casa de Bello.

Bello, Andrés. 1982. 'Derechos de autores', in *Obras Completas*. Vol. 18: Temas jurídicos y sociales, pp. 707–17. Caracas: La Casa de Bello.

Bello, Andrés. 1984a. *Obras Completas,* vol. 24: Cosmografía y escritos de divulgación. Caracas: La Casa de Bello.

Bello, Andrés. 1984b. 'Pondera la importancia que para Chile y la ciencia tendría el establecimiento permanente de un Observatorio Astronómico en Chile. Consejo Universitario, sesión del 13 de abril de 1850', in Andrés Bello, *Obras Completas*, vol. 22, Temas educacionales II, pp. 256–7. Caracas: La Casa de Bello.

Bunster, Enrique. 1977. *Crónicas portalianas*. Santiago: Editorial del Pacífico, 1977.

Cantor, Geoffrey, and Sally Shuttleworth. 2004. 'Introduction', in Geoffrey Cantor and Sally Shuttleworth (eds), *Science Serialized. Representations of the Sciences in Nineteenth-Century Periodicals*, pp. 1–16. Cambridge & London: The MIT Press.

Dawson, Gowan, Bernard Lightman, Sally Shuttleworth, and Jonathan R. Topham (eds). 2020. *Science Periodicals in Nineteenth-Century Britain. Constructing Scientific Communities*. Chicago & London: The University of Chicago Press.

Dietz, Bettina. 2016. 'Introduction: Special Issue Translating and Translations in the History of Science', *Annals of Science* 73(2): 117–21.
Dupré, Sven. 2018. 'Introduction: Science and Practices of Translation', *Isis* 109(2): 302–7. https://doi.org/10.1086/698234
Elshakry, Marwa and Carla Nappi. 2016. 'Translations', in Bernard Lightman (ed.), *A Companion to the History of Science*, pp. 372–86. Oxford: Wiley Blackwell.
Ennis, Juan Antonio. 2023. 'Philology and Translation on the Way to a New World: Andrés Bello, translator', in Delfina Cabrera and Denise Kripper (eds), *The Routledge Handbook of Latin American Literary Translation*, pp. 13–29. New York: Routledge.
Fisher, George Thomas. 1847. 'Revelations of the Telescope', *The Westminster & The Foreign Quarterly Review* 46: 335–80.
Freites, Yajaira. 2014. 'Andrés Bello: lengua, ciencia, universidad como expresión de independencia americana', *Quipu* 16(3): 235–62.
Herschel, John F. W. 1836. *A Treatise on Astronomy. A New Edition with a Preface, and a Series of Questions for the Examination of Students by S. C. Walker.* Philadelphia: Carey, Lea & Blanchard.
Jaksic, Ivan. 2001. *Andrés Bello: Scholarship and Nation-Building in Nineteenth-Century Latin America*. Cambridge and New York: Cambridge University Press.
Grases, Pedro (ed.). 1973a. *El Repertorio americano. Londres, 1826–1827.* Vol. 1. Caracas: Edición de la Presidencia de la República.
Grases, Pedro. 1973b. *El Repertorio americano. Londres, 1826–1827.* Vol. 2. Caracas: Edición de la Presidencia de la República.
Grases, Pedro. 1981. *Estudios sobre Andrés Bello II. Temas biográficos, de crítica y bibliografía*. Barcelona: Seix Barral.
Guitarte, Guillermo L. 1966. Juan García del Río y su Biblioteca Columbiana (Lima, 1821). Sobre los orígenes de La Biblioteca Americana (1823) y El Repertorio Americano (1826–1827) de Londres. *Nueva Revista de Filología Hispánica* 18(1/2): 87–149. https://doi.org/10.24201/nrfh.v18i1/2.1547
Latorre, Guillermo, and Rodrigo Medel. 2018. *Andrés Bello científico: Escritos publicados (1823–1843)*. Santiago: Universitaria.
Martínez Hoyos, Francisco. 2019. 'La ciencia de la independencia en Hispanoamérica: el conocimiento al servicio de la nación, 1788–1830', in Carolina Valenzuela Matus (ed.), *Tendencias y perspectivas de la cultura científica en Chile y América Latina, siglos XIX–XXI*, pp. 19–50. Santiago: Ril editores.
Mitre, Bartolomé. 1848. 'Bibliografía. Cosmografía o Descripción del Universo conforme a los últimos descubrimientos, por A. B', *El Comercio de Valparaíso*, 24 May: 1–3.
Payàs, Gertrudis. 2007. La biblioteca chilena de traductores o el sentido de una colección', in G. Payàs (ed.), *Biblioteca chilena de traductores: ordenada por José Toribio Medina*, pp. 23–68. Santiago: Centro de investigaciones Diego Barros Arana.
Pegenaute, Luis. 2012. 'United Notions: Spanish Translation History and Historiography', in Isabel García-Izquierdo and Esther Monzó (eds), *Iberian Studies on Translations and Interpreting*, pp. 105–21. Frankfurt am Main: Peter Lang.
Olohan, Maeve. 2014. 'History of Science and History of Translation: Disciplinary Commensurability?', *The Translator* 20(1): 9–25.
Ramírez, Errázuriz Verónica, and Patricio Leyton Alvarado. 2017. Andrés Bello y la difusión de la astronomía: educación y retórica científica. *Asclepio. Revista de Historia de la medicina y de la ciencia* 69(2): 1–15.
Rampazzo, Roberto. 2016. 'Extragalactic Astronomy: From Pioneers to Big Science', in Mauro D'Onofrio, Roberto Rampazzo, and Simone Zaggia (eds), *From the*

Realm of the Nebulae to Populations of Galaxies. Dialogues on a Century of Research, pp. 1–92. Cham: Springer International Publishing.
Rundle, Christopher. 2012. 'Translation as an Approach to History', *Translation Studies* 5(2): 232–40.
Rupke, Nicolaas. 2000. 'Translation Studies in the History of Science: The Example of *Vestiges*', *BJHS* 33: 209–22.
Sagredo Baeza, Rafael (ed.). 2010. *Ciencia-Mundo. Orden republicano, arte y nación en América*. Santiago: Editorial Universitaria/Centro de Investigaciones Diego Barros Arana.
Sanhueza-Cerda, Carlos and Lorena B. Valderrama. 2020. 'Finding a Point of Observation in the Global South: C. L. Gerling and J. M. Gilliss Correspondence (1847–1856)', *Journal for the History of Astronomy* 51(2): 187–208.
Secord, James. 2004. 'Knowledge in Transit', *Isis* 95(4): 654–72.
Serrano, Sol, Ponce de León, Macarena and Francisca Rengifo (eds). 2012. *Historia de la educación en Chile (1810–2010)*. Tomo I Aprender a leer y escribir (1810–1880). Santiago: Taurus.
Sheets-Pyenson, Susan. 1985. 'Popular Science Periodicals in Paris and London: The Emergence of a Low Scientific Culture, 1820–1875', *Annals of Science* 42: 549–72.
Soltmann, Claudio. 2021. 'Andrés Bello como lector y traductor de *Elements of Physics or Natural Philosophy* de Neil Arnott (1831)', *História Unisinos* 25(3): 386–98.
Subercaseaux, Bernardo. 2010. *Historia del libro en Chile. Desde la Colonia hasta el Bicentenario*. Santiago: Lom.
Topham, Jonathan, 2009. 'Rethinking the History of Science Popularization/Popular Science', in Faidra Papanelopoulou, Agustín Nieto-Galan & Enrique Perdiguero (eds), *Popularizing Science and Technology in the European Periphery, 1800-2000*, pp. 1-20. Farnham: Ashgate.
Trujillo, Joaquín, 2019. *Andrés Bello: Libertad, imperio y estilo*. Santiago: Roneo.
Velleman, Barry L. 1995. *Andrés Bello y sus libros*. Caracas: La casa de Bello.

3

‘TOKENS’ REMAINED ‘TOKENS’

Charles Lyell’s *Elements of Geology* in China

Xiaoxing Jin

Introduction: Translation, the Self-Strengthening Movement, and Lyell’s *Elements of Geology*

In 1861, the Qing government launched the Self-Strengthening Movement (1861–95), the official effort to graft Western technology onto a Confucian cultural base. This movement was also a product of a series of military defeats and concessions to foreign powers, and of the need for a new strategy to strengthen the moribund Qing regime and find a place for China in a transformed international ecosystem by learning from the West. One of the earliest Qing officials who proposed the need for the Chinese to learn from the West, Wei Yuan 魏源 (1794–1857), argued in his monumental 1843 *Haiguo Tuzhi 海國圖志* [Atlas and Annals of Overseas Countries], ‘Shiyi changji yi zhiyi 師夷長技以制夷’ [Subdue the barbarians by learning from their valuable technologies].[1] Yet Wei passed away before the Qing government began the Self-Strengthening Movement. Champions of ‘Self-Strengthening’, many of them admirers of Wei, asserted, in the words of Feng Guifen 馮桂芬 (1809–74), who was known for his interest in Western technology by which states can become wealthy and strong: ‘what we have to learn from the [Western] barbarians is only one thing, [...] effective guns [...]. We may use barbarians to attack barbarians, and use barbarians to negotiate with barbarians’ (Kuhn 2002: 52–5; Fairbank and Teng 1979: 53). This helps to clarify why only the Western scientific knowledge underpinning technologies was contemplated as fundamental in late Qing China.

Hence, a series of military establishments emerged, encompassing educational and translational roles, to provide instruction in Western technologies. The Kiangnan Arsenal held the distinction of being the most prominent

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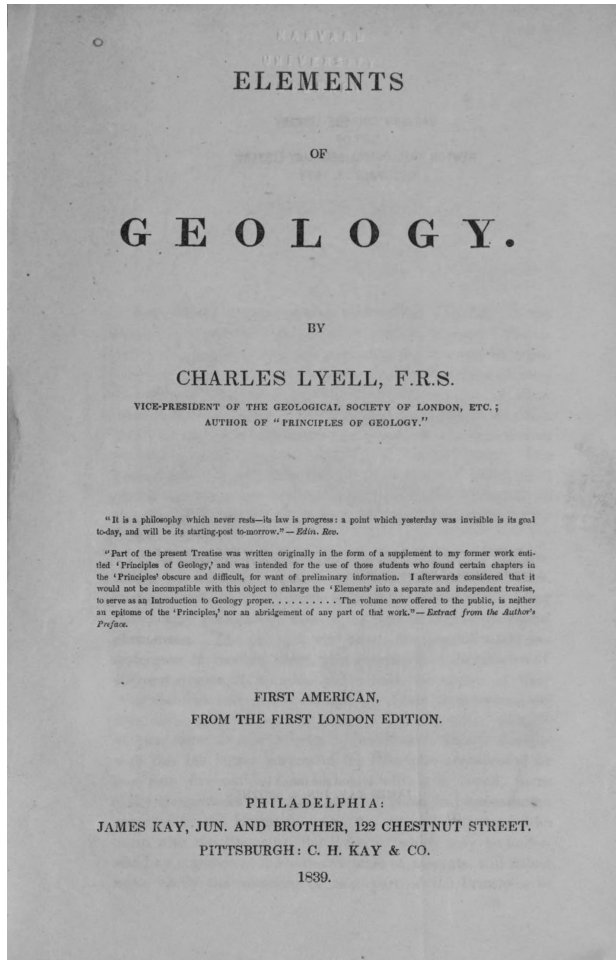
arsenal during the late Qing period in China. Within this establishment, the employment of foreign advisers, primarily Protestant missionaries commissioned by organizations such as the Church Missionary Society (established in 1799) and the American Baptist Historical Society (established in 1853), aimed to foster the development of what Meng Yue referred to as 'hybrid sciences' (Meng 1999). The emergence of these sciences was the result of collaborative endeavours involving missionary advisers, translators, and Chinese *chouren* 疇人 who possessed specialized knowledge in mathematics, artisanship, and astronomy. Together, they had the necessary skills to replicate successfully Western weaponry (Meng Yue 1999: 13–20). This arsenal was much more than an armament factory, since it comprised four institutions, three of which were educational. There was a Translating Department, which formed a school for training translators and linguists (*Guang fang yan guan*), and a school for training skilled workers, in addition to the machine shop where arms and ammunition were manufactured. The translation of works focusing on science and technology came to form part of military strategy, which is further proof that, in a sense, the strategy was to weaponize Western science and technology to help China defeat its opponents (Meng 1999: 30; Bennett 1967: 18; Elman 2005: 370–1; Xiaobing Li 2012: 190).

In 1867, Zeng Guofan 曾国藩 (1811–72), the most powerful Qing official during that time, established the Translating Department within the Kiangnan Arsenal with the primary objective of translating technical works, particularly those related to the military, for the Qing government. Of necessity, this undertaking led to the study of foundational sciences. Responding to the military-focused translation initiative, John Fryer 傅蘭雅 (1839–1927), an Anglican missionary who oversaw the Translating Department at the Kiangnan Arsenal, procured approximately 190 books from the United Kingdom between 1868 and 1870. Among these acquisitions was the *Elements of Geology* (1838) (Figure 3.1) by the prominent geologist Sir Charles Lyell (1797–1875), which was intended to be a fourth volume of Lyell's monumental *Principles of Geology* (published in 1830–33 as a three-volume work). The Chinese translation of Lyell's *Elements*, titled *Dixue Qianshi* 地學淺釋 [A Brief Introduction to Geology], was completed between 1871 and 1873 (Figure 3.2). The translators were Daniel MacGowan 玛高温 (1815–93), an American Baptist missionary, and Hua Hengfang 華衡芳 (1833–1902), a Chinese mathematician. The Chinese version of the *Elements* became a standard geological textbook for the educational institutions established during the Self-Strengthening period.

Scholars have approached the subject of *Dixue Qianshi* and modern Chinese geology from various directions. In her 2014 monograph, *Unearthing the Nation*, Grace Shen focuses on the early 1900s and Republican China, examining the intricate relationship between science and



ELEMENTS

OF

GEOLOGY.

BY

CHARLES LYELL, F.R.S.

VICE-PRESIDENT OF THE GEOLOGICAL SOCIETY OF LONDON, ETC.;
AUTHOR OF "PRINCIPLES OF GEOLOGY."

"It is a philosophy which never rests—its law is progress: a point which yesterday was invisible is its goal to-day, and will be its starting-post to-morrow."—*Edin. Rev.*

"Part of the present Treatise was written originally in the form of a supplement to my former work entitled 'Principles of Geology,' and was intended for the use of those students who found certain chapters in the 'Principles' obscure and difficult, for want of preliminary information. I afterwards considered that it would not be incompatible with this object to enlarge the 'Elements' into a separate and independent treatise, to serve as an Introduction to Geology proper. . . . . The volume now offered to the public, is neither an epitome of the 'Principles,' nor an abridgement of any part of that work."—*Extract from the Author's Preface.*

FIRST AMERICAN,
FROM THE FIRST LONDON EDITION.

PHILADELPHIA:
JAMES KAY, JUN. AND BROTHER, 122 CHESTNUT STREET.
PITTSBURGH: C. H. KAY & CO.
1839.

FIGURE 3.1 Title Page of the first American edition of *Elements of Geology* (1839), based on the first London edition of 1838.

Source: Harvard-Yenching Library of Harvard College Library, Harvard University

nationalism. Chinese geologists faced the formidable task of establishing scientific authority while concurrently safeguarding their native identity, as they connected the survival of the nation with the recognition of their scientific endeavours (Shen 2014: 8–16). In an article titled 'The Method and Source of Adding Subheadings to *Dixue Qianshi*', Sun Xiaofei and Nie Xinling conduct a comparative study on the differences in textual presentation between *Dixue Qianshi* and the *Elements of Geology*. The authors explore the techniques and underlying rationale employed in the incorporation of subheadings and contend that this investigation sheds light on

FIGURE 3.2 Title Page of *Dixue Qianshi* in its First Chinese Edition (Shanghai: Kiangnan Arsenal, 1873).

Source: Harvard-Yenching Library of Harvard College Library, Harvard University.

the intricate process of translating the text (Sun and Nie 2015: 413–23). Wu Fengming's research, 'The Charm of a Western Translated Work: The Influence of *Dixue Qianshi* during the Late Qing Dynasty's Reform Movement', explores the sociopolitical impact of Lyell's work during the late 1890s, particularly within the context of the Hundred Days' Reform (1898) (Fengming 2007: 55–9). Furthermore, Wang Yangzong's study, 'A New Examination of Translated Books by the Jiangnan Arsenal', offers a comprehensive overview of the background and circumstances surrounding the translation of Lyell's *Elements of Geology* (Wang 1995: 3–18).

While acknowledging the considerable attention given to Lyell's *Elements* in China, there is a significant gap in research regarding its relationship with the goals of the Self-Strengthening Movement and the underlying philosophy of translation behind *Dixue Qianshi*. This chapter aims to provide a contextual understanding of Lyell's work within the framework of China's Self-Strengthening efforts, focusing on the mission and importance of translation during the late nineteenth century. The subsequent sections explore three main areas. First, an inquiry investigates the translators, their roles in the Self-Strengthening Movement, and their unique translation approach

known as *Heyi* [co-translation or collaborative translation], which shared similarities with the method employed by certain Jesuits in the late Ming and early Qing dynasties. Second, a comparative analysis is conducted between *Dixue Qianshi* and Lyell's *Elements* to examine the selection, omission, addition, and transformation of texts, as well as the standardization of scientific terms and the creation of Lyellian terms in Classical Chinese using sound symbolism. Lastly, the study assesses the philosophy of translation proposed by various scholars in order to evaluate the significance of *Dixue Qianshi* in late nineteenth-century China. McGowan and Hua encountered hurdles encompassing linguistic ambiguities, a restricted grasp of Western geology, and impediments in scientific education. Their translation aligns with the perspectives of translation philosophers regarding the impossibility of achieving perfect translations and the inherent instability of language. Translation, at its core, can be construed as an expression of 'tokenization', a process that carries the risk of oversimplifying, sustaining stereotypes, and commercializing cultures. Consequently, this perpetuates inequalities and imbalances across the spheres of politics, culture, and science, especially in relation to dominant and marginalized perspectives.

Translation at the Kiangnan Arsenal and *Heyi*

Within the Kiangnan Arsenal, the Translating Department employed nine Protestant missionaries, including Alexander Wylie 偉烈亞力 (1815–87), Young J. Allen 林樂知 (1836–1927), Daniel McGowan 瑪高溫, and John Fryer 傅蘭雅. Although proficient in spoken colloquial language, most of them had limited expertise in Classical Chinese writing. Furthermore, the department employed 50 local staff members, such as Xu Shou 徐壽 (1818–84), Li Shanlan 李善蘭 (1810–82), and Hua Hengfang 華衡芳, who were recruited from the ranks of the marginalized literati. Participation in the pursuit of 'Western Studies' or involvement in translation was not the primary choice for individuals who had achieved success in the Imperial Exam. Instead, it represented a secondary and less prestigious avenue, often pursued by those who had not realized their aspirations of securing an official career due to their inability to pass the Imperial Exam (Schwartz 1964: 25). Notably, the occupation of translating scientific texts did not find widespread favour among the mainstream Chinese literati. This lack of enthusiasm can be partly attributed to the fact that the field of sciences remained largely detached from the Imperial Exam system during that era.

Hua Hengfang and Xu Shou, hailing from the same hometown, rose to prominence as highly distinguished experts in the domains of science and technology during the Self-Strengthening Movement. They were self-taught scientists who made substantial contributions to the field of 'Western Studies', which encompassed diverse disciplines like mathematics, astronomy, and

physics. Despite Hua Hengfang's failure in the more esteemed civil examinations, he had a passion for scientific subjects and was actively engaged in conducting experiments. Teaming up with Xu Shou, Hua embarked on a series of investigations that involved notable experiments, including the examination of light refracted through a prism, as well as the study of projectile motion displayed by a bullet (Kong, Tong and Fang 2012; Wang 1995: 60–74). Through their collaborative efforts, Hua Hengfang and Xu Shou demonstrated their exceptional expertise and dedication to scientific exploration, thus playing a pivotal role in advancing 'Western Studies' during the Self-Strengthening Movement.

In the early 1850s, Hua travelled to Shanghai and met John Fryer and the British Protestant Christian missionary Alexander Wylie, who helped Hua to find a position at the London Missionary Society Press (or Inkstone Press 墨海書館) in Shanghai. At that time, the Inkstone Press was the beachhead for translating Western works. Zeng Guofan, the founder of the translation department at the Kiangnan Arsenal, quickly recognized the importance of this activity, expressing it in his own words as 'Translation is the foundation of industry' (cited in Kong, Tong and Fang 2012: 91; Sun 2016: 27). Owing to his scholarly interest in scientific subjects and experience in translation, Hua Hengfang was soon chosen to work as a translator in this institution.

One of Hua Hengfang's regular translation partners, Dr Daniel Jerome MacGowan (1815–93), an American Baptist medical missionary, worked part-time as a translator while in China. After completing his medical education, MacGowan felt compelled to pursue missionary work, and he and his wife arrived in China in 1847, where he established a medical mission in Ningbo, Zhejiang Province. As a medical missionary, MacGowan was known for his medical expertise, and he helped train local doctors, and provided health care to common Chinese people who would not have had access to medical treatment otherwise. In addition to his medical work, MacGowan was highly respected by both the Chinese and foreign communities and was appointed as the United States Vice Consul in Ningbo. MacGowan returned to the United States in 1862, where he served as a military doctor during the Civil War before moving to Shanghai in 1867 to continue his medical mission. He became a part-time translator at the Kiangnan Arsenal in 1868 (Xie 2010: 123–6; Xiong 2011: 533–5).

Hua Hengfang and McGowan, in accord with the rules at the Kiangnan Arsenal, focused on translating books related to science and technology, with a particular emphasis on practical applications. Hua's translation repertoire consisted of 19 books, all of which were related to science and technology. This included three books on geology, three on navigation, three on meteorology, and ten on mathematics (Kong, Tong, and Fang 2012). Hua's initial venture into translating geology was Charles Lyell's *Elements of Geology*. The primary objective of this translation was to advance

knowledge of the Earth and assist in the exploration of coal and iron mines. In the early 1860s, the Qing government prioritized industrial modernization and actively pursued the discovery of coal mines and iron ore deposits. This pursuit of industrial development generated a need for practical expertise in the field of geology.

In the 1870s, there were multiple geological works available in China apart from *Dixue Qianshi*. These included *Taixi caimei tushuo* 泰西採煤圖說 [An Illustrated Guide to Searching the Coal Mines in the West] released by the Kiangnan Arsenal. Hua Hengfang and McGowan also translated the work of American mineralogist James Dwight Dana (1813–1895), titled *Manual of Mineralogy* (1848), which was given the Chinese title *Jinshi Shibie* 金石識別 [Manual of Metal and Stone] (Ruan 2020). Hua recognized that these works were insufficient as they lacked a comprehensive understanding of the layers of the Earth. This made Lyell's *Elements of Geology* particularly valuable as it addressed this knowledge gap. Much like in other geological texts, Hua and McGowan sought to incorporate a profusion of illustrations, with *Dixue Qianshi* featuring 716 meticulously rendered images by the Shanghai-based artist Zhao Hong 趙宏 (Figure 3.3 and Figure 3.4) (Sun 2016). The initial edition of Lyell's *Elements* contained 294 figures, while the sixth English edition, translated at the Kiangnan Arsenal, expanded to a remarkable 768. This expansion is indicative of the substantial growth in the number of illustrations across subsequent revisions of the source text. However, it is worth noting that due to the excision of a portion of Lyell's original text, approximately 50 images were omitted in the Chinese translation, as exemplified below.

Determining the extent of circulation of *Dixue Qianshi* beyond science and technology institutions like the Kiangnan Arsenal is difficult. In the

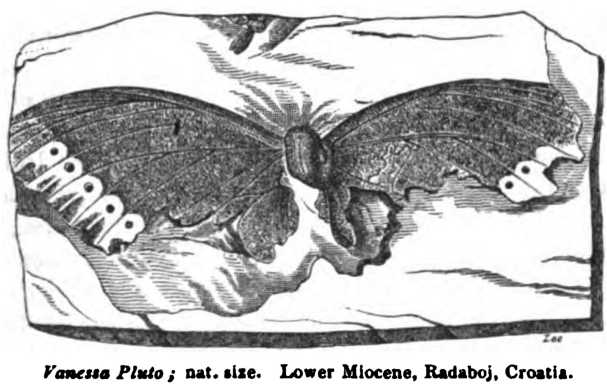


FIGURE 3.3 Illustration of a Wing of a *Vanessa pluto* Butterfly in the Marlstone of Radaboj in Croatia, Figure 179 of Lyell's *Elements*, Sixth Edition.

Source: Harvard-Yenching Library of Harvard College Library, Harvard University.

FIGURE 3.4 The Chinese Caption Reads "Na Si Po Luo Du 納斯潑羅都" (*Vanessa Pluto*).

Source: Harvard-Yenching Library of Harvard College Library, Harvard University

1870s, the domains of science and technology were largely distinct from the Imperial Examination, which was the primary concern of the scholarly elite. As previously noted, the translators involved in the process, such as Hua Hengfang, were regarded as peripheral literati. From the perspective of those who excelled in the exam, the translations produced by institutions like the Kiangnan Arsenal were criticized for their poor stylistic quality. That said, these criticisms focused on style rather than factual accuracy, as the Chinese literati had limited scientific knowledge during that era. Liang Qichao (梁啟超, 1873–1929), who acquired almost all the translations published by the Kiangnan Arsenal, expressed dissatisfaction, stating that they were often disorganized, inconsistent, incorrect, and crude (Liang 1989: 67–8). Consequently, due to their inferior quality, the Kiangnan Arsenal translations did not sell well beyond the newly established institutions during the Self-Strengthening period (Lei 2008: 62). It can therefore be inferred that individuals from highly educated classes, particularly those who excelled in the Imperial Exams, did not wholeheartedly embrace Western science books, partly due to the claimed deficiencies in the translations.

Another drawback in the translation of *Dixue Qianshi* can be attributed to the translation method employed by Hua Hengfang and MacGowan. Hua mentioned in the Introduction that MacGowan had limited proficiency in Chinese and relied on body language for communication, while Hua himself had limited knowledge of English (Lyell 1873: Introduction). Hence, the Kiangnan Arsenal implemented a translation approach called *Heyi* 合譯 [collaborative translation], which bore resemblance to the method utilized by certain Jesuits in the late Ming and early Qing dynasties (Hsia 2011). This method necessitated close communication, consultation, and cooperation between the interpreter and the recorder. The Westerner would orally convey a rough Chinese rendition of the original work, which would then be transformed into written Classical Chinese by their Chinese counterpart after extensive discussions and elimination of potential misunderstandings. The Chinese translators had minimal or no expertise in foreign languages, and at the same time, missionaries often manipulated the meaning of texts to serve their own interests. As a result, achieving fidelity in translation was challenging, if not impossible (Bennett 1967: 29; Ke and Li 2016: 84; Lei 2008: 62). This sheds light on why MacGowan and Hua's introduction of Lyell's theory in *Dixue Qianshi* was marred by numerous issues, as demonstrated below.

Translating the *Elements*

Sir Charles Lyell's *Principles of Geology*, published in three volumes by John Murray in London from 1830 to 1833, solidified his reputation as a notable geological theorist. Within this comprehensive publication, the fourth book, originally part of the third edition of *Principles*, was later released as a separate monograph titled *Elements of Geology* in 1838. Over the course of its existence, this standalone work underwent significant revisions and saw six editions published between 1838 and 1865. Notably, Lyell deliberately ensured its affordability, making it widely accessible to a diverse range of readers, as he had envisioned. Lyell's book played a crucial role in establishing the credibility of uniformitarianism, initially proposed by the Scottish geologist James Hutton (1726–97) in his 1795 work, *Theory of the Earth* (Hutton 1899). Uniformitarianism posits that the same geological processes currently observed have been responsible for shaping the Earth's surface over time, operating consistently. One important issue that separates Lyell from the uniformitarianism proposed by Hutton is the thesis of actualism that he also embraces. This assumes that the same uniform causes acting at present did so in the past, but also at the same rate and intensity as now observable (Rudwick 2008). This was a fundamentally innovative epistemological claim. Lyell's publication, building upon the foundations laid by earlier geologists like Jean-André Deluc (1727–1817) and others, advanced the field of geology

by introducing significant principles. These included the prioritization of stratigraphy as a reliable method for determining the relative ages of rock formations; Lyell established the concept of fossil succession as a valuable tool for establishing the chronological order of geological events and delved into the correlation between the geographical distribution of organisms and the transformative processes shaping the Earth. These groundbreaking contributions, spanning from the eighteenth to the nineteenth century, provided the framework for modern geology and have had a lasting influence on the discipline (Bowler and Morus 2010: 104–55). Furthermore, Lyell challenged the then-prevailing concept of catastrophism advocated by the likes of the French palaeontologist Georges Cuvier (1769–1832) and Lyell's Oxford mentor William Buckland (1784–1856), and instead promoted a gradualist perspective on Earth's changes (Bowler and Morus 2010: 104–55; Rudwick 2008). Lyell sided with Hutton and criticized Abraham Gottlob Werner (1749–1817), a prominent Prussian geologist, who held a bias against Plutonism and favoured Neptunism, disregarding the role of volcanic activity in shaping the Earth's surface (Lyell 1856). This contradicted the idea of consistent geological processes over time. Initially met with scepticism, Plutonism gradually gained acceptance as evidence supporting the theory accumulated. Lyell challenged the catastrophic theory by studying Mount Etna, demonstrating gradual changes as the cause of Earth's transformations. He used geological proof to establish the Earth's age, refuting the notion of a young Earth (Lyell et al. 1998: 137–42).

The translation into Chinese of Lyell's *Elements* took place between 1871 and 1873, and it was distributed by the Kiangnan Arsenal. Needless to say, Hua adhered to the traditional Chinese vertical writing style without modern punctuation (Figure 3.5): the Western horizontal style and punctuation were only adopted in the mid-1910s (Jin 2020: 62).

Lyell's footnotes were intentionally omitted, possibly to circumvent technical details deemed extraneous for a general readership that lacked substantial scientific training. In the context of traditional Chinese vertical script devoid of punctuation, the presentation of footnotes, referred to as commentary traditions, diverged from Western or contemporary publishing norms. For instance, in works like Yan Fu's *Tianyan Lun* 天演論 (On Natural Evolution), instead of employing footnotes or endnotes, Yan opted to incorporate his own explanatory comments, designated as 'An 案' [literally 'note'], as distinct paragraphs (Jin 2022: 696–702). However, this approach was not adopted in the case of *Dixue Qianshi*, as Hua and McGowan were cognizant of their non-specialist status in the field of geology. During the late Qing dynasty in China, however, the importance of Lyell's work in the field of geology was not fully comprehended. Prior to the publication of *Dixue Qianshi*, only a small number of monographs on the subject had


理曼以次數名石
百年前有地學之士名理曼者分石爲三類一爲一次石
如鎔結者熱變者皆歸此類二爲二次石如水層石三爲
三次石如新層及衆盧維恩皆歸此類其意以一次石爲
最古二次石爲稍新三次石爲最新故以次數名之
其所謂一次石者如合拉尼脫尼斯其石中絕無生物之
形迹亦絕無他石糜碎而成之據其造化之法從化學來
故謂其成石之時必比生物早疑初有地球時已有此石
故以爲一次石
其所謂二次石者因其中屢有砂及石子及生物之殭石

FIGURE 3.5 Hua Adhered to the Conventional Chinese Vertical Writing Format.
Source: Harvard-Yenching Library of Harvard College Library, Harvard University

been written by missionaries in China (Jin 2020: 114–38). In order to cater to the unfamiliar Chinese audience, Hua Hengfang and McGowan decided to enhance Lyell's original text with additional explanations in simpler language. For instance, in Chapter Eight of *Dixue Qianshi*, the translators introduced information about two contrasting theories, Neptunism and Plutonism, which were entirely new concepts for the Chinese during the late Qing period. As Hua and McGowan explained:

> 維納兒之偏見因其不講火造化而獨講水造化故凡見火造化之石皆以為其甚細無關於地學變化之理又以為火山吐火流石乃偶然之變非亙古至今所恆有此其說所以多疑也。
>
> *(Lyell 1873: 4)*

> [Werner's bias, due to his exclusive focus on Neptunism without mentioning Plutonism, led to a tendency to regard rocks of Plutonic origin as lacking in substance. Furthermore, the idea that volcanic eruptions

> and lava flows are mere chance occurrences, rather than a constant presence throughout geological history, is inconsistent with the principles of geological change. This is why this theory [Neptunism] is viewed with scepticism.]

The translators proceeded to clarify that Neptunism proposed the formation of rocks, including igneous rocks, through precipitation from a primitive ocean, while Plutonism argued that igneous rocks originated from molten magma that cooled and solidified beneath the Earth's surface. However, it should be noted that this type of explanation is not commonly found in *Dixue Qianshi*. Both Hua and McGowan, despite their dedication, lacked prior knowledge in geology, which made the translation process arduous. Hua's involvement in the task saw him fall ill for several months (Lyell 1873), while McGowan, burdened by his demanding medical practice in Shanghai, relied on verbal dictation to convey the text to Hua, who transcribed it at McGowan's residence or office. The text was subsequently organized at Kiangnan Arsenal.

Despite successfully translating all thirty-eight chapters of Lyell's work, their limited geological proficiency hindered the translation's accuracy. As a result, some geological background information was omitted, likely due to the belief that Chinese readers, unfamiliar with the subject, would consider such details less significant. As previously mentioned, during the Self-Strengthening Movement, the focus was primarily on practical knowledge, with less emphasis on theoretical or non-essential information. For instance, a portion of the second paragraph in Chapter Fourteen, titled 'Miocene Period',[2] was omitted in the Chinese translation:

> The strata which we meet with next in the descending order are those called by many geologists 'Middle Tertiary', for which in 1833 I proposed the name of Miocene, selecting the 'faluns' of the valley of the Loire in France as my example or type. I […] call these falunian deposits Upper Miocene, to distinguish them from others to which the name of Lower Miocene will be given. The latter were classed by me in former editions of this work as Upper Eocene […]. The term 'faluns' is given provincially by French agriculturists to shelly sand and marl spread over the land in Touraine […], just as the 'crag' was formerly much used to fertilize the soil in Suffolk.
>
> *(Lyell 1856: 210)*

The paragraph that was left out in *Dixue Qianshi* provided important background information that set the foundation for Lyell's subsequent exploration of the formation of sedimentary rocks and fossils in the French Miocene strata. Lyell utilized the concept of fossil succession to establish a relative

chronology of rock formations. He expanded upon the work of his predecessors, examining fossil collections from different layers of rocks and suggesting that certain fossils can indicate specific periods in Earth's history (Rudwick 2008). Furthermore, he postulated that the distribution of plants and animals could be elucidated by the movement of continents and fluctuations in climate. Lyell extensively investigated the correlation between the geographical distribution of species and transformations in the Earth's surface over time (Lyell 1856: 95; 127–46). These principles had already laid the foundation for the development of biostratigraphy, which encompassed the classification of the Miocene period into Upper and Lower divisions, the origin of the term 'faluns', and the identification of distinct sandstone and limestone in different regions.

Through his explorations in diverse locations, Lyell observed that sediments from the same geological era exhibited distinctive patterns of ore deposition. Of particular note, the Loire River bed primarily consisted of sand and limestone, housing a variety of intact, curved, and fragmented shells and corals. Furthermore, Lyell mentioned architectural rocks composed of shattered shells, corals, and lime binder, which bore a resemblance to the coralline crag found in Suffolk in terms of texture (Lyell 1856: 210–16). The exclusion of such contextual information in *Dixue Qianshi* cannot be solely attributed to the translators' limited comprehension of geology. It is likely that the Chinese populace during the Self-Strengthening Movement considered this type of knowledge as lacking direct relevance to their immediate concerns. Similar instances can be observed in the section in Chapter Eight titled 'On the Term "Transition"':

> The poet Waller, when lamenting over the antiquated style of Chaucer, complains that 'We write in sand, our language grows, And, like the tide, our work o'erflows'. But the reverse is true in geology; for here it is our work which continually outgrows the language. The tide of observation advances with such speed that improvements in theory outrun the changes of nomenclature; and the attempt to inculcate new truths by words invented to express a different or opposite opinion, tends constantly by the force of association, to perpetuate error; so that dogmas renounced by the reason still retain a strong hold upon the imagination.
>
> *(Lyell 1856: 89–90)*

In this paragraph, Lyell criticizes Werner's term 'transition', which was originally used to describe a mineral characteristic but later became associated with sedimentary formations that were considered older than the oldest of the secondary series. Geologists began to use the term for other rocks with similar fossils, but many of these rocks did not exhibit the same mineral texture as those originally labelled as transition. Conversely, some secondary

rocks exhibited a semi-crystalline and almost metamorphic aspect, and thus also deserved to be called transition. In the Swiss Alps, rocks that had been considered transition were later recognized as belonging to the newest of the secondary groups, and some were even found to be members of the lower tertiary series. Lyell used the narratives of Edmund Waller (1624–87) and Geoffrey Chaucer (1340–1400) to condemn Werner and his adherents for introducing novel terminology without adequate empirical support. However, this historical background was not available to Hua, or to Chinese readers unfamiliar with Waller and Chaucer. Furthermore, the late Qing Chinese had no necessity to validate the authenticity of expressions such as 'transition' to locate their mineral and coal deposits.

Hua and McGowan demonstrated minimal enthusiasm for geological methodologies, leading to the removal of a substantial portion of the geological methodology from the translation. In Chapter Fourteen of *Elements of Geology*, Lyell introduced crag from the Miocene period in Touraine, France, and from the Pliocene period in Suffolk, England. Through the description of the different shapes, shell thickness, weight, and size of fossil snails such as *Voluta lamberti*, Lyell aimed to illustrate that they formed in different historical periods and underwent different geological changes during different geological periods. However, *Dixue Qianshi* only listed two types of crag and provided a brief introduction before abruptly ending.

On other occasions, the translator chose to alter or trim the original text, as in the following paragraph:

> The species are, for the most part, marine, but a few of them belong to land and fluviatile genera. […] Remains of terrestrial quadrupeds are here and there intermixed, belonging to the genera Dinotherium, […] Mastodon, Rhinoceros, Hippopotamus, Chæropotamus, Dichobune, Deer, and others, and these are accompanied by cetacea, such as the Lamantine, Morse, Seacalf, and Dolphin, all of extinct species.
>
> *(Lyell 1856: 211)*

This was rendered as follows:

> 大約鹹水造化者居多亦有土中及淡水中生物又有四足哺乳類之骨名待怒希里恩才強的恩言此獸之形狀可畏也又有大牙獸獨角獸鯨魚等無之骨其形與今有所者不同，蓋其種已絕矣。
>
> [There are also bones of quadruped mammals, such as Nu Li Xi En and Cai Qiang De En. The shapes of these beasts are frightening. There are also bones of creatures that no longer exist, such as Mastodon, Rhinoceros, and Dolphin. Their forms are different from those of modern creatures, and their species have gone extinct.]
>
> *(Lyell 1873: 1(b))*

Our attention is drawn to the odd terms 'Nu Xi Li En' [怒希里恩] and 'Cai Qiang De En' [才強的恩], which would not only confuse people in late nineteenth-century China but also present-day Chinese readers. Considering their pronunciation and Hua Hengfang's Wuxi dialect, it is probable that these two terms refer to the first two genera mentioned in the paragraph, *Dinotherium* and *Mastodon*. It is evident that Hua did not provide translations for the other ten species mentioned by Lyell, either because there were no existing Chinese words for them or because Hua faced difficulties in creating additional onomatopoeic terms to translate their names. The translation of terminologies in *Dixue Qianshi* presented significant challenges, primarily due to its status as one of the earliest Western works being translated into Chinese during the Self-Strengthening period.

In various instances, Hua Hengfang encountered the need to invent additional terms based on their phonetic resemblance. These sound-based terms comprised a substantial portion of the scientific vocabulary found in this particular monograph. For instance, 'granite' was rendered as 'He La Ni Tuo' [合拉尼托], while 'gryphaea' was transformed into 'Ge Li Fei Ye' [葛里非耶]. Given Hua's limited knowledge of geology, he had to coin these terms to convey geological epochs in a similar fashion. Thus, 'Devonian' became 'Ti Fu Ni An' [提符尼安], 'Laurentian' was translated as 'Luo Leng Xu An' [落冷須安], 'Cambrian' took the form of 'Kan Pei Li An' [堪培里安], 'Permian' became 'Po Er Mi An' [潑而彌安], 'Trias' was rendered as 'Tuo Lai Yue Si' [脫來約斯], and 'Cretaceous' was expressed as 'Ke Li Dui' [克里兌]. These terms continue to pose challenges for Chinese readers in terms of comprehension.

The assimilation and standardization of Hua Hengfang's nomenclature presented formidable challenges to prospective translators. This was a common occurrence during the Self-Strengthening Movement when the translation of scientific terms faced significant difficulties owing to the limited emphasis on standardization. Even within the Kiangnan Arsenal, geological books did not adhere to consistent terminology. An example of this can be seen in John Fryer's editing of the geological textbook *Dixue Xuzhi* 地學須知 [Essentials of Geology], which departed from the norms established by Hua and McGowan (Fryer 1897: 35–50). For instance, Fryer substituted Hua and McGowan's term 'Ge Li Fei Ye' with 'Ha Luo' [蛤螺] for 'Gryphaea'. This substitution was made because 'Luo' [螺] signifies the shell of a snail or a general spiral shape, which better captures the essence of gryphaea. Similarly, Fryer translated 'granite' as 'Hua Gang Shi' [花崗石] instead of McGowan's 'He La Ni Tuo' [合拉尼托]. This choice was straightforward since granite is a type of stone ('Shi' [石]). Fryer may have been dissatisfied with the onomatopoeic terms used in *Dixue Qianshi*. Leveraging his superior proficiency in Chinese, Fryer possessed the ability to create new terms based on Chinese linguistic rules.

Another monograph, John Fryer's translation of *The Prospector's Handbook* by the British mining expert John William Anderson (1833–1900), entitled *求礦指南* [*Ch'iu k'uang chih-nan*] in Chinese, also made significant advances in geological terminology, surpassing the translations of McGowan and Hua (Anderson 1897; Fryer 1899). Progress was achieved through Fryer's adoption of alternative terms to improve the accuracy and precision of the translation. For example, he used 'Chan Mei Ceng' [產煤層, the Layer of Coal] to translate 'carboniferous', replacing Hua's 'Ka Pu Ye Fei La Si' [卡蒲業非拉斯], which was a purely phonetic rendition. Fryer's translation aligns more closely with the modern term 'Shitan Ji' [石炭紀, Carboniferous] as 'Mei' and 'Shitan' are synonymous in Chinese. In a similar fashion, Fryer substituted 'Baishifen Ceng' [白石粉層] for Cretaceous, replacing 'Ke Li Dui' [克里兌] used in *Dixue Qianshi*. The modern translation for 'cretaceous' is 'Baie Ji [白堊紀], which is synonymous with Fryer's 'Baishifen Ceng'. The fundamental distinction between Hua and McGowan's translations and Fryer's resides in their methodological approach: the former employed sound symbolism or phonetic transcription devoid of substantial semantic depth, while the latter coined innovative terms deeply rooted in their meaningful context within the target language.

This sheds light on why John Fryer was regarded as China's leading translator in the late nineteenth century. Prior to his appointment as the Agassiz Professor of Oriental Languages at the University of California, Berkeley in 1896, Fryer had undertaken the translation of 129 monographs from English into Classical Chinese, employing the *Heyi* method with various Chinese collaborators (Bennett 1967: 36–9). Fryer's decision not to adopt McGowan and Hua's terminologies did not stem from a lack of interest in standardizing scientific terms; on the contrary, he was a pioneer in advocating for standardization. Fryer recognized the paramount importance of standardizing scientific terminology in ensuring clear and precise communication among scientists and translators. Such standardization not only facilitated the replication of experiments, it also fostered interdisciplinary collaboration, accelerated the organization of scientific knowledge, enabled effective communication, and ultimately contributed to scientific progress. However, Fryer believed that before standardizing terms, translators should create terms that made sense in the target language, which could then be adopted by future translators. In this regard, McGowan and Hua fell short. As the director of the Translating Department of the Kiangnan Arsenal, Fryer made significant efforts towards the standardization of scientific terminology during the Self-Strengthening Movement. Historical records indicate that he advocated for the standardization of scientific terms in conferences held in 1868 and 1890, although his proposals did not garner substantial enthusiasm from other participants (Bennett 1967: 32–3). The limited enthusiasm towards standardizing scientific terminologies among the Chinese can be

partially attributed to the absence of a well-established scientific community during that period. The formation of such a community was still a future development, as described in the research of Zuoyue Wang, Peter Buck, and my own studies published in other sources (Wang 2002: 291–332; Buck 1980; Jin 2020: 55–6). During the Self-Strengthening Movement, science in China, specifically Western science, was primarily defined by practical technologies, while its epistemological and metaphysical values were largely overlooked.

From a broader perspective, the limited emphasis on standardizing scientific terms within the Chinese context could be attributed to a prevailing perspective regarding the origin of sciences. Intellectuals in China during that period, while recognizing the value of Western military technologies, held the belief that all Western knowledge was essentially derived from China to a certain extent. This practice contributed to the preservation of self-esteem and dignity during the Self-Strengthening Movement. Benjamin Elman highlights this assumption, which was evident in numerous Imperial Exams of the time that operated under the belief that the natural sciences, encompassing disciplines such as optics, astronomy, physics, medicine, and various technological innovations, originated in China. Consequently, the Chinese regarded the 'restoration' of their own 'ancient lost learnings' (referring to scientific knowledge) as a pivotal undertaking in their pursuit of wealth and power (Elman 2005: 114). Linguistically, the absence of standardized scientific terms can be partly attributed to the influence of diverse local dialects among Chinese translators. Zhou Youguang (1906–2017), a Chinese linguist, pointed out the existence of over 80 mutually unintelligible dialect systems, each with its own distinctive accents, in China (Wu and Li 2009). National language standardization did not occur until the 1950s. These factors had a notable impact on the field of translation, particularly for dialect-speaking translators like Hua, who employed strategies such as sound symbolism to create new terms. This approach aligns with Carla Nappi's concept of 'miscellanies in translation', where translators navigate through different linguistic categories and dialects to establish equivalents for terms, ideas, and sounds (Nappi 2021: 461). Hua and McGowan's translation work serves as an exemplification of this practice as they actively engaged in category shifting and adaptation to ensure effective communication.

On Translation

Dixue Qianshi, the Chinese translation of Lyell's *Elements of Geology*, deviates from a strictly faithful rendition. However, it would be an oversimplification to categorize this translation as inherently flawed, as it aligns with the perspective on translation articulated by prominent French philosopher

Jacques Derrida (1930–2004). Derrida challenges the conventional understanding of translation by positing that it entails a process of rewriting rather than a mere transfer of meaning. His viewpoint emphasizes the intrinsic instability, indeterminacy, and playfulness of language, where meanings are continually deferred. As a result, each translation is shaped by interpretation and influenced by a multitude of historical, cultural, and sociopolitical factors, which inevitably affect the movement of meaning across diverse linguistic contexts (Derrida 2016; Derrida 1988; Kujundzic 2021: 282–91). Similarly, in his seminal essay 'The Task of the Translator' [*Die Aufgabe des Übersetzers*], German philosopher and cultural critic Walter Benjamin (1892–1940) argued that achieving a perfect translation is an impossibility due to the inherent differences between languages. Benjamin highlighted the importance of preserving the foreignness of the original text, underscoring the notion of untranslatability and the inherent limitations of language itself. He urged translators to employ creative strategies in order to surmount these challenges (Benjamin 1968: 69–82; Dorsch 2018). The translation process carried out by McGowan and Hua serves as an illustration of these difficulties. They skilfully manoeuvred through the uncertainties of language, made careful decisions, and grappled with gaps and omissions in the text. They were fully aware that achieving a faithful translation that captured Lyell's original principles was unattainable owing to the limited understanding of Western geology, and Western science in general, during China's early Self-Strengthening period. These difficulties were further compounded by the challenges faced in science education during the Self-Strengthening Movement. The dominance of classical literature and Confucian teachings in traditional Chinese education hindered the assimilation of Western scientific ideas, while the scarcity of qualified instructors and appropriate teaching materials in science and technology posed significant obstacles.

Conclusions

During the late Qing dynasty, the Self-Strengthening Movement accorded practical skills and applied sciences higher priority than abstract scientific principles. Only Western scientific knowledge and techniques that directly served industrial, military, and infrastructure development were considered valuable. As a result, McGowan and Hua chose to disregard certain Lyellian principles that were not immediately relevant to the concerns of the Qing government. This decision was influenced by the need for translations during the Self-Strengthening Movement to align with the movement's objectives. Within this historical context, it is reasonable to argue that *Dixue Qianshi* played a pivotal role in advancing the study of geology in the newly established institutions under the self-strengtheners. It also contributed to the progress of scientific education that was favoured by the late Qing Chinese

intellectuals. The translation of *Elements of Geology* serves as evidence of the broader efforts made by Chinese scientists to modernize the nation and bridge the gap between the Chinese and Western educational systems. It highlights the crucial role that translation plays in facilitating the transfer and assimilation of scientific knowledge during transformative periods in a nation's history. On the other hand, the translations from the Kiangnan Arsenal, being of subpar quality, did not experience significant success beyond the newly established institutions during the Self-Strengthening period. It is reasonable to assume that only a small number of literati who had successfully passed the Imperial Exam had the chance to read about Charles Lyell through these translations. Furthermore, even fewer individuals gained a comprehensive understanding of the fundamental principles of Lyellian theory from these translated works.

The translation of the *Elements of Geology* into *Dixue Qianshi* may have undergone an 'unequal process', as discussed by Lydia Liu in *Tokens of Exchange: The Problem of Translation in Global Circulations*. The concept of cultural translation emphasizes its engagement with social, historical, and ideological dimensions. Translation itself can be viewed as a form of tokenization, where certain texts become representative tokens that can potentially reinforce imbalances and commodification. This tokenization process can lead to simplifications, stereotypes, and the commodification of cultures, perpetuating power differentials and imbalances in politics, culture, and science between dominant and marginalized voices (Liu 2000: 9–11; 74–5). In the case of *Dixue Qianshi*, the translation involved China and the United Kingdom, as the latter was a major global power at that time. During the late nineteenth century, science in the United Kingdom underwent a transformation from an amateur pursuit to a formalized and specialized field of study. United Kingdom scientists established networks and communities that fostered collaboration and intellectual exchange. Simultaneously, foreign powers were exerting control over specific regions in China, eroding its sovereignty. Therefore, the translation of Lyell's *Elements of Geology* should be seen as the product of an uneven process marked by disparities in national power and scientific knowledge. *Elements of Geology* and *Dixue Qianshi*, in this context, served as symbols reflecting the level of scientific development in their respective countries.

McGowan and Hua strove to overcome challenges in their co-translation, known as *Heyi*. However, they faced technical difficulties, especially with scientific terms absent from the Classical Chinese lexicon. At that time, the Chinese-English dictionary system was still in its early stages. Fryer endorsed the standardization of scientific terms for clear communication, experiment replication, collaboration, and knowledge organization. He believed in creating meaningful target language terms before standardization, a perspective lacking in McGowan and Hua. They used sound-symbolization,

creating Chinese terms resembling English pronunciation like 'Cai Qiang De En', 'He La Ni Tuo', and 'Ke Li Dui'. They consciously retained the foreignness of these terms, recognizing their translation difficulty. This underscores the notion of Lyell's significant geological concepts as 'tokens of exchange', as suggested by Liu, wherein translingual translatability relies on the equivalence of meaning-value between the source and target languages (Liu 2000). In *Dixue Qianshi*, these concepts were rendered into their Chinese counterparts, although the localized meaning-value or price of these Lyellian tokens may not have been fully established. Consequently, the tokens continued to retain their nature as tokens. Despite this, McGowan and Hua engaged in a creative and transformative process, addressing linguistic gaps, differences, and deferrals between English and Classical Chinese. The translation process of *Dixue Qianshi* involved navigating the linguistic and cultural gaps between English and Classical Chinese, as well as addressing the limited knowledge of Western geology among Chinese readers at the time. McGowan and Hua conducted a creative and transformative process to adapt and convey Lyell's geological principles in a manner that would be accessible and relevant to the Chinese audience.

Notes

1 All translations are by the author unless otherwise indicated.
2 Lyell did not coin the term 'Miocene'. It was actually introduced by Swiss palaeontologist and geologist Louis Agassiz (1807–73) in 1833 to describe a specific period in Earth's history characterised by certain fossil assemblages.

References

Anderson, John W. 1897. *The Prospector's Handbook*, seventh edition. London: C. Lockwood and Son.
Benjamin, Walter, and Hannah Arendt (eds). 1968. *Illuminations*, trans. Harry Zohn. New York, NY: Harcourt, Brace & World.
Bennett, Adrian. 1967. *John Fryer: The Introduction of Western Science and Technology into Nineteenth-Century China*. Cambridge, MA: Harvard University Press.
Bowler, Peter J., and Iwan Rhys Morus. 2010. *Making Modern Science: A Historical Survey.* Chicago: University of Chicago Press.
Buck, Peter. 1980. *American Science and Modern China, 1876–1936*. Cambridge: Cambridge University Press.
Derrida, Jacques. 1988. *The Ear of the Other: Otobiography, Transference, Translation*. Lincoln, NE: University of Nebraska Press.
Derrida, Jacques. 2016. *Of Grammatology,* trans. Gayatri Chakravorty Spivak. Baltimore, MD: Johns Hopkins University Press.
Dorsch, John. 2018. *Walter Benjamin and 'The Task of the Translator': An Interpretation Based on His Influence by Phenomenology*. Munich: Grin Verlag.
Elman, Benjamin A. 2005. *On Their Own Terms*. Cambridge, MA: Harvard University Press.

Fairbank, John King, and Ssu-yü Teng. 1979. *China's Response to the West: A Documentary Survey*. Cambridge, MA: Harvard University Press.
Fengming, Wu. 2007. 'The Charm of a Western Translated Work: The Influence of *Dixue Qianshi* during the Late Qing Dynasty's Reform Movement', *Guo tu zi yuan* 9: 55–9.
Fryer, John. 1897. Dingyou Year of Guangxu Emperor '地學須知 Dixue Xuezhi', in John Fryer (ed.), *Xixue Gezhi Daquan* 西學格致大全, pp. 35–50. Hong Kong: Xianggang Shuju香港書局.
Fryer, John. 1899. *Ch'iu k'uang chih-nan,* trans. P'an Sung. Shanghai: Kiangnan Arsenal.
Hsia, Florence. 2011. *Sojourners in a Strange Land: Jesuits and Their Scientific Missions in Late Imperial China*. Chicago and London: University of Chicago Press.
Hutton, James. 1899. *Theory of the Earth, with Proofs and Illustrations*. London: Geological Society.
Jin, Xiaoxing. 2020. 'The Evolution of Evolutionism in China, 1870–1930', *Isis* 111(1): 46–66.
Jin, Xiaoxing. 2022. 'The Evolution of Social Darwinism in China, 1895–1930', *Comparative Studies in Society and History* 64(3): 690–721.
Ke, Zunke, and Bin Li. 2016. 'Spencer and Science Education in China', in Bernard Lightman (ed.), *Global Spencerism*, p. 84. Leiden: Brill.
Kong, Guoping; Jianhua Tong, and Yunjia Fang. 2012. *Huahengfang-Zhongguo Jindai Kexue de Xianxingzhe*. Beijing: Science Press.
Kuhn, Philip. 2002. *Origins of the Modern Chinese State*. Redwood City, California: Stanford University Press.
Kujundzic, Dragan. 2021. 'Jacques Derrida's TR: Trace, Translation, Deconstruction', *Delos* 36(2): 282–91.
Lei, Qili. 2008. 'Wangqing minchu de yinshua jishu yu wenhua shengchan'. *Journal of East China Normal University* (Philosophy and Social Sciences) 5: 62.
Li, Xiaobing (ed.). 2012. *China at War: An Encyclopedia*. Santa Barbara, CA: ABC-CLIO.
Liang, Qichao. 1989. *Yinbinshi heji,* vol. 1. Beijing: Zhonghua Book Company.
Liu, Lydia. 2000. *Tokens of Exchange: The Problem of Translation in Global Circulations*. Durham, NC: Duke University Press.
Lyell, Charles. 1856. *Elements of Geology*, sixth edition. London: John Murray.
Lyell, Charles. 1873. *Dixue Qianshi,* vol. 1, trans. Daniel MacGowan and Hua Hengfang. Shanghai: Kiangnan Arsenal.
Lyell, Charles. 1988. *The Past is the Key to the Present*. Andrew C. Scott and Derek John Blundell (eds.). London: Geological Society.
Meng, Yue. 1999. 'Hybrid Science versus Modernity: The Practice of the Jiangnan Arsenal, 1864–1897', *East Asian Science, Technology, and Medicine* 16: 13–52.
Nappi, Carla. 2021. 'Full, Empty, Stop, Go: Translating Miscellany in Early Modern China', in Lawrence Venuti (ed.), *The Translation Studies Reader,* pp. 453–65. Abingdon and New York: Routledge.
Ruan, Siyu. 2020. *Shibie jinshi: Meiguo kuangwuxue zai wanqing de chuanbo yu zaisheng* 識別金石: 美國礦物學在晚清的傳播與再生, PhD dissertation. National Taiwan University, Taiwan.
Rudwick, Martin J. S. 2008. *Bursting the Limits of Time: The Reconstruction of Geohistory in the Age of Revolution*. Chicago, IL: University of Chicago Press.
Schwartz, Benjamin. 1964. *In Search of Power and Wealth*. Cambridge, MA: Belknap Press.
Shen, Grace Yen. 2014. *Unearthing the Nation: Modern Geology and Nationalism in Republican China*. Chicago: University of Chicago Press.

Sun, Xiaofei. 2016. *A Study on the Chinese Version of Dixue Qianshi in Late Qing Dynasty*, PhD dissertation. Mongolia Normal University, China.
Sun, Xiaofei, and Fuling Nie. 2015. 'The Method and Source of Adding Subheadings to *Dixue Qianshi*', *The Chinese Journal for the History of Science and Technology* 36(4): 413–23.
Wang, Yangzong. 1995. 'A New Examination of Translated Books by the Jiangnan Arsenal', *Zhongguo Keji Shiliao* 2: 3–18.
Wang, Yusheng. 1995. 'Hua Hengfang: Innovators and Disseminators of Modern Science in China', *Ziran Bianzhengfa Tongxun* 2: 60–74.
Wang, Zuoyue. 2002. 'Saving China through Science: The Science Society of China, Scientific Nationalism, and Civil Society in Republican China', *Osiris Second Series* 17: 291–332.
Wu, Weiping, and Zhaolin Li (eds). 2009. *Linguistics and Teaching Chinese as a Second Language*. Hong Kong: Hong Kong University Press.
Xie, Zhensheng. 2010. 'The First Missionary in Modern Ningbo: McGowan', *Ningbao Shiwei Dangxiao Xuebao* 2: 123–6.
Xiong, Yuezhi. 2011. *The Introduction of Western Learning to Late Qing Society*. Beijing: China Renmin University Press.

PART II

Terminology and the Languages of Science

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MICHEL ADANSON'S *HISTOIRE NATURELLE DU SÉNÉGAL* (1757) AND HIS USE OF WOLOF IN SCIENTIFIC TERMINOLOGY

Mónica Alessandra Martínez Gómez

Introduction

Far from being simply about lone travellers wandering through unknown lands, exploration has always been a fundamentally collective experience involving many different people in many kinds of relationships. One of the key relationships is with the people native to the area being explored, the best guides to and guardians of the natural world around them. Subjected to new diseases on their arrival, explorers were obliged to trust traditional native knowledge. As witnesses to the effectiveness of such plant-based medicines, European explorers were curious to learn more, with the aim of cultivating these specimens in botanic gardens or exhibiting them in museums or cabinets of natural curiosities. This is clear evidence that 'travellers never leave home, but merely extend the limits of their world by taking their concerns and apparatus for interpreting the world along with them' (Schiebinger 2004: 87).

Inspired by the 'contact zone' (Pratt 1992), Londa Schiebinger (2004) coins the term 'biocontact zone' to refer to this contact between the European traveller and the native informants who were valuable sources for understanding traditional medicine related to plants and their multiple uses and properties. This native information was just another element in the chain along which knowledge travelled. It was, however, possible to gain direct access to this valuable information by speaking the local language and coming into direct contact with the natural world. Michel Adanson was one naturalist who ventured to learn Wolof because he realized that 'les nègres ont parmi eux des gens qui s'attachent à connaître les vertus de leurs plantes et ont des termes propres pour exprimer ce qu'ils veulent dire et que tous

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n'entendent point' [the Negroes had a deep knowledge of the plant properties and had specific terms to express what they wanted to say that other people did not understand] (Adanson 1748, quoted by Seydi 2011: 207).[1]

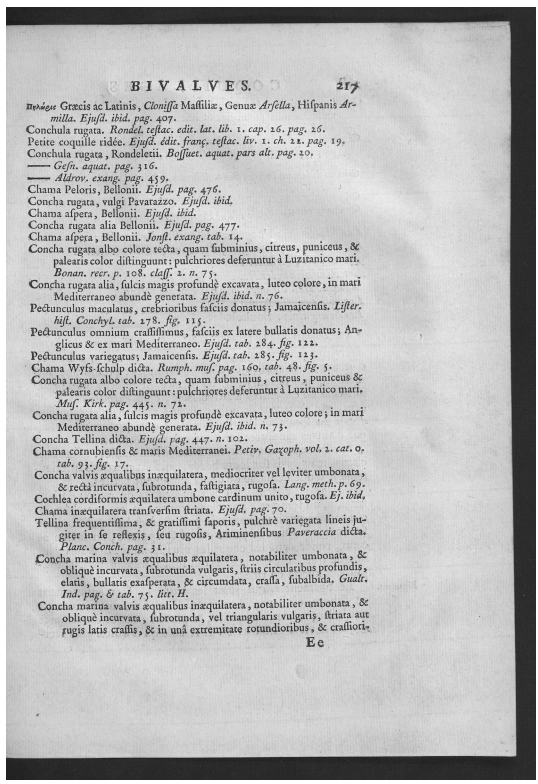
The sponsors who financed scientific expeditions frequently placed constraints on what naturalists could research. For instance, Adanson, as a bookkeeping clerk for the *Compagnie des Indes* [French East India Company], had to return to the island of Gorée instead of continuing his research in Gambia. In addition, the Company exerted censorship over Adanson's free opinions on commercially sensitive subjects such as slavery. His detailed description of the economic activities and natural resources useful for the Company reflects his desire to place 'science in the service of the French empire', although he shows, at the same time, a personal curiosity for the Senegalese natural environment (Martin & Becker 1980: 724).

Arguably overshadowed by more famous botanists like Carl Linnaeus, Adanson considered the complexity of naming new specimens involved in the production of a scientific text. As Nathalie Vuillemin puts it, the essential problem inherent in scientific writing was the way in which the text conveyed and created an imaginary, a world vision derived not only from a succession of events but also from their significance in the mind of an individual or for the spirit of an age (2009: 13). Even though only the first part of Adanson's huge collection relating to his journey to Senegal was published, it is clear how valuable it remained for the eighteenth-century scientific community (Carteret 2012; 2014). It opened him the doors to the Royal Society of London and the Académie des Sciences [Academy of Sciences] in Paris. His scholarly merit was recognized by the latter with the award of a 'High Approbation', a certificate issued by the institution's evaluation committee and signed by the permanent secretary, deeming the work worthy of publication. In the case of Adanson's *Histoire naturelle du Sénégal* [Natural History of Senegal], the evaluators were no lesser figures than Bernard de Jussieu and René-Antoine Ferchault de Réaumur. The outstanding recognition Adanson received and the importance of the information he provided on the natural history of Senegal roused the interest of other European nations, including Germany and Great Britain. The first to take the lead were the British, with the first anonymous translation published in 1759. The German translations, by two naturalists and physicians, Johann Christian Daniel von Schreber and Friedrich Heinrich Wilhelm Martini, were both published in 1773.

One particularity of the *Histoire naturelle du Sénégal* lies in its multilingualism. Eighteenth-century scientific texts had characteristics we might think of as more typical of fictional prose. This allowed travellers to exploit the creative elements of language to frame their observations. Taking advantage of this, Adanson presented a *métissage* of various scientific names for the same species. For example, for the species 'La Clonisse' (*Venus verrucosa*, or warty venus) in his *Histoire naturelle du Sénégal: Coquillages*

[Natural History of Senegal: Shells], he introduced first a list of several Latin names (Figure 4.1) followed by the given name in Marseille (*Clonisse*), Venice (*Biverone*, *Piperone*, or *Piverone*), Genoa (*Arselle*), Rimini, Ravena and Ancona (here he noted that it used to be called *Poverazos*, now *Paveraccia*), Spanish (*Armilla*) and Senegal (*Boukch*) (Adanson 1757: 217–18; Figure 4.2).

This *métissage* proved challenging to his British and German translators, who eliminated the *Histoire naturelle du Sénégal: Coquillages*, the second part of the *Histoire naturelle du Sénégal,* from their translations. Martini openly reflected in his preface on the challenge of translating African terms for specimens: 'Herr Adanson hat sich an sehr vielen Stellen bloß afrikanischer Benennungen bedienet [sic]; ich habe bei manchen Merkwürdigkeiten viel Mühe gehabt, zu erraten, was er eigentlich dadurch andeuten wollen [sic]' (Adanson 1773: 3) [Mr Adanson has used African names on many occasions; some curious terms have caused me much trouble in guessing what he actually meant]. As a result, Martini chose to use Latin terminology



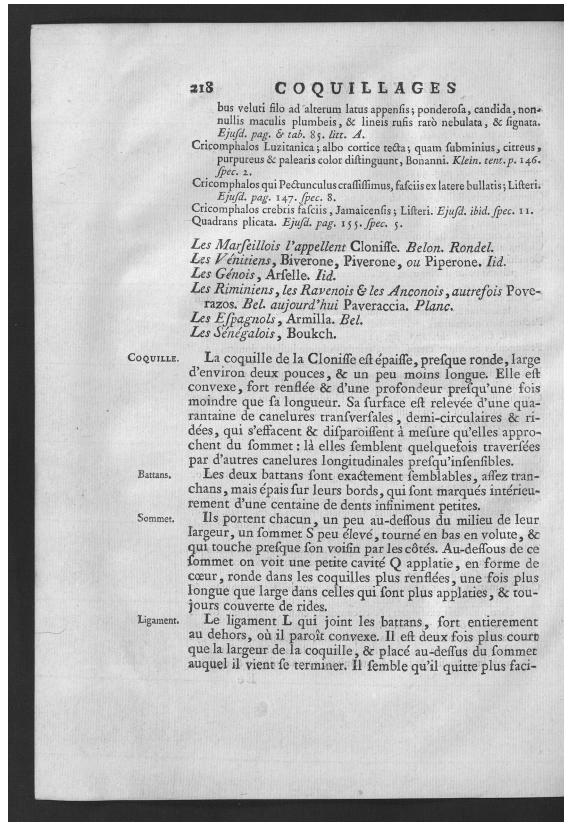
BIVALVES. 217

πελάγος Græcis ac Latinis, *Cloniſſa* Maſſiliæ, Genuæ *Arſella*, Hiſpanis *Armilla*. *Ejuſd. ibid. pag.* 407.
Conchula rugata. *Rondel. teſtac. edit. lat. lib.* 1. *cap.* 26. *pag.* 26.
Petite coquille ridée. *Ejuſd. édit. franç. teſtac. liv.* 1. *ch.* 21. *pag.* 19.
Conchula rugata, Rondeletii. *Boſſuet. aquat. pars alt. pag.* 20.
—— *Geſn. aquat. pag.* 316.
—— *Aldrov. exang. pag.* 459.
Chama Peloris, Bellonii. *Ejuſd. pag.* 476.
Concha rugata, vulgi Pavarazzo. *Ejuſd. ibid.*
Chama aſpera, Bellonii. *Ejuſd. ibid.*
Concha rugata alia Bellonii. *Ejuſd. pag.* 477.
Chama aſpera, Bellonii. *Jonſt. exang. tab.* 14.
Concha rugata albo colore tecta, quam ſubminius, citreus, puniceus, & palearis color diſtinguunt: pulchriores deferuntur à Luzitanico mari. *Bonan. recr. p.* 108. *claſſ.* 2. *n.* 75.
Concha rugata alia, ſulcis magis profundè excavata, luteo colore, in mari Mediterraneo abundè generata. *Ejuſd. ibid. n.* 76.
Pectunculus maculatus, crebrioribus faſciis donatus; Jamaicenſis. *Liſter. hiſt. Conchyl. tab.* 278. *fig.* 115.
Pectunculus omnium craſſiſſimus, faſciis ex latere bullatis donatus; Anglicus & ex mari Mediterraneo. *Ejuſd. tab.* 284. *fig.* 122.
Pectunculus variegatus; Jamaicenſis. *Ejuſd. tab.* 285. *fig.* 123.
Chama Wyfs-ſchulp dicta. *Rumph. muſ. pag.* 160. *tab.* 48. *fig.* 5.
Concha rugata albo colore tecta, quam ſubminius, citreus, puniceus & palearis color diſtinguunt: pulchriores deferuntur à Luzitanico mari. *Muſ. Kirk. pag.* 445. *n.* 72.
Concha rugata alia, ſulcis magis profundè excavata, luteo colore, in mari Mediterraneo abundè generata. *Ejuſd. ibid. n.* 73.
Concha Tellina dicta. *Ejuſd. pag.* 447. *n.* 102.
Chama cornubienſis & maris Mediterranei. *Petiv. Gazoph. vol.* 2. *cat.* 0. *tab.* 93. *fig.* 17.
Concha valvis æqualibus inæquilatera, mediocriter vel leviter umbonata, & rectâ incurvata, ſubrotunda, faſtigiata, rugoſa. *Lang. meth. p.* 69.
Cochlea cordiformis æquilatera umbone cardinum unito, rugoſa. *Ej. ibid.*
Chama inæquilatera tranſverſim ſtriata. *Ejuſd. pag.* 70.
Tellina frequentiſſima, & gratiſſimi ſaporis, pulchrè variegata lineis jugiter in ſe reflexis, ſeu rugoſis, Ariminenſibus *Paveraccia* dicta. *Planc. Conch. pag.* 31.
Concha marina valvis æqualibus æquilatera, notabiliter umbonata, & obliquè incurvata, ſubrotunda vulgaris, ſtriis circulatibus profundis, elatis, bullatis exaſperata, & circumdata, craſſa, ſubalbida. *Gualt. Ind. pag. & tab.* 75. *lit. H.*
Concha marina valvis æqualibus inæquilatera, notabiliter umbonata, & obliquè incurvata, ſubrotunda, vel triangularis vulgaris, ſtriata aut rugis latis craſſis, & in unâ extremitate rotundioribus, & craſſioris.

Ee

FIGURE 4.1 Latin Names for the Shell Called 'La Clonisse' in the *Histoire naturelle du Sénégal: Coquillages* [Natural History of Senegal: Shells]

Source: Universitätsbibliothek der LMU München W 4 H.nat. 1



218 COQUILLAGES

bus veluti filo ad alterum latus appenſis; ponderoſa, candida, nonnullis maculis plumbeis, & lineis rufis rarò nebulata, & ſignata. *Ejuſd. pag. & tab.* 85. *litt. A.*

Cricomphalos Luzitanica; albo cortice tecta; quam ſubminius, citreus, purpureus & palearis color diſtinguunt, Bonanni. *Klein. tent. p.* 146. *ſpec.* 2.

Cricomphalos qui Pectunculus craſſiſſimus, farciis ex latere bullatis; Liſteri. *Ejuſd. pag.* 147. *ſpec.* 8.

Cricomphalos crebris farciis, Jamaicenſis; Liſteri. *Ejuſd. ibid. ſpec.* 11.

Quadrans plicata. *Ejuſd. pag.* 155. *ſpec.* 5.

Les Marſeillois l'appellent Cloniſſe. *Belon. Rondel.*
Les Vénitiens, Biverone, Piverone, *ou* Piperone. *Id.*
Les Génois, Arſelle. *Id.*
Les Riminiens, les Ravenois & les Anconois, autrefois Poveraзos. *Bel. aujourd'hui* Paveraccia. *Planc.*
Les Eſpagnols, Armilla. *Bel.*
Les Sénégalois, Boukch.

COQUILLE. La coquille de la Cloniſſe eſt épaiſſe, preſque ronde, large d'environ deux pouces, & un peu moins longue. Elle eſt convexe, fort renflée & d'une profondeur preſqu'une fois moindre que ſa longueur. Sa ſurface eſt relevée d'une quarantaine de canelures tranſverſales, demi-circulaires & ridées, qui s'effacent & diſparoiſſent à meſure qu'elles approchent du ſommet: là elles ſemblent quelquefois traverſées par d'autres canelures longitudinales preſqu'inſenſibles.

Battans. Les deux battans ſont exactement ſemblables, aſſez tranchans, mais épais ſur leurs bords, qui ſont marqués intérieurement d'une centaine de dents infiniment petites.

Sommet. Ils portent chacun, un peu au-deſſous du milieu de leur largeur, un ſommet S peu élevé, tourné en bas en volute, & qui touche preſque ſon voiſin par les côtés. Au-deſſous de ce ſommet on voit une petite cavité Q applatie, en forme de cœur, ronde dans les coquilles plus renflées, une fois plus longue que large dans celles qui ſont plus applaties, & toujours couverte de rides.

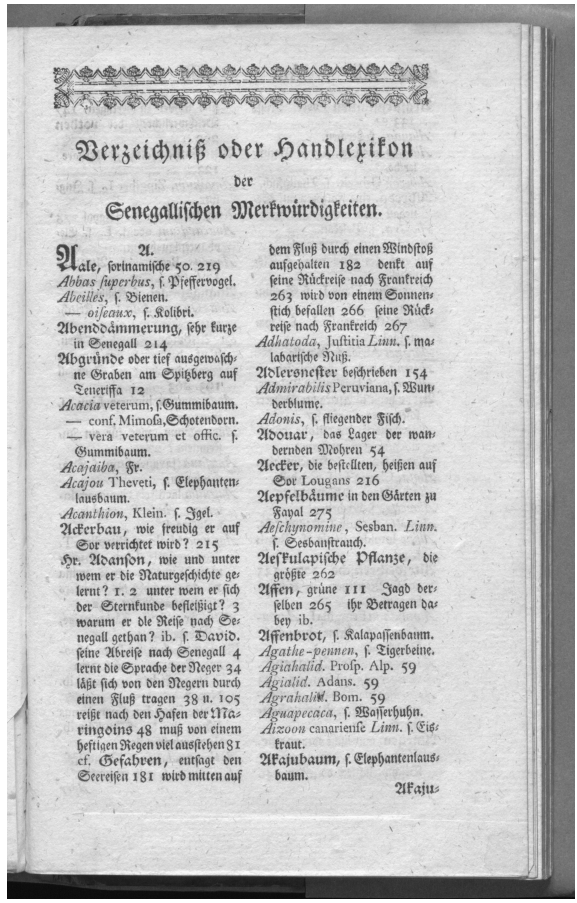
Ligament. Le ligament L qui joint les battans, ſort entierement au dehors, où il paroît convexe. Il eſt deux fois plus court que la largeur de la coquille, & placé au-deſſus du ſommet auquel il vient ſe terminer. Il ſemble qu'il quitte plus faci-

FIGURE 4.2 Vernacular Names Given to the Shell 'La Clonisse' in the *Histoire naturelle du Sénégal: Coquillages*

Source: Universitätsbibliothek der LMU München W 4 H.nat. 1

to simplify the travel account for his readers. He also appended a glossary of specific vocabulary related to Senegalese curiosities with an approximate German equivalent term or a description to his translation (Figure 4.3).

This chapter focuses on the complex process of naming, as it is deeply rooted in the culture where the natural specimens are found and therefore central to wider discussions of translatability and untranslatability (Large, Akashi, Józwikowska, and Rose 2018; Malmkjær 2018). It opens with a brief introduction to European travel accounts incorporating non-European scientific terminology and how the search for a single style of nomenclature led to discrimination against non-European languages considered as 'barbarous'. The multilingual scientific terminology in the *Histoire naturelle du Sénégal* reflects the multilingual character of a country in which, during colonization, even the French had trouble differentiating its various dialects



Verzeichniß oder Handlexikon

der

Senegalischen Merkwürdigkeiten.

A.

Aale, surinamische 50. 219
Abbas superbus, s. Pfeffervogel.
Abeilles, s. Bienen.
— *oiseaux*, s. Kolibri.
Abenddämmerung, sehr kurze in Senegall 214
Abgründe oder tief ausgewaschne Graben am Spitzberg auf Teneriffa 12
Acacia veterum, s. Gummibaum.
— conf. Mimosa, Schotendorn.
— vera veterum et offic. s. Gummibaum.
Acajaiba, Fr.
Acajou Theveti, s. Elephantenlausbaum.
Acanthion, Klein. s. Igel.
Ackerbau, wie freudig er auf Sor verrichtet wird? 215
Hr. Adanson, wie und unter wem er die Naturgeschichte gelernt? 1. 2 unter wem er sich der Sternkunde befleißigt? 3 warum er die Reise nach Senegall gethan? ib. s. David. seine Abreise nach Senegall 4 lernt die Sprache der Neger 34 läßt sich von den Negern durch einen Fluß tragen 38 u. 105 reißt nach den Hafen der Maringoins 48 muß von einem heftigen Regen viel ausstehen 81 cf. Gefahren, entsagt den Seereisen 181 wird mitten auf dem Fluß durch einen Windstoß aufgehalten 182 denkt auf seine Rückreise nach Frankreich 263 wird von einem Sonnenstich befallen 266 seine Rückreise nach Frankreich 267
Adhatoda, Justitia *Linn.* s. malabarische Nuß.
Adlersnester beschrieben 154
Admirabilis Peruviana, s. Wunderblume.
Adonis, s. fliegender Fisch.
Adouar, das Lager der wandernden Mohren 54
Aecker, die bestellten, heißen auf Sor Lougans 216
Aepfelbäume in den Gärten zu Fayal 275
Aesehynomine, Sesban. *Linn.* s. Sesbanstrauch.
Aeskulapische Pflanze, die größte 262
Affen, grüne 111 Jagd derselben 265 ihr Betragen dabey ib.
Affenbrot, s. Kalapassenbaum.
Agathe-pennes, s. Tigerbeine.
Agiahalid. Prosp. Alp. 59
Agialid. Adans. 59
Agrahalid. Bom. 59
Aguapecaca, s. Wasserhuhn.
Aizoon canariense *Linn.* s. Eiskraut.
Akajubaum, s. Elephantenlausbaum.

Akaju-

FIGURE 4.3 First Page of Friedrich Martini's Glossary of Senegalese curiosities in his German Translation of Adanson's *Histoire naturelle du Sénégal*

Source: University Library Johann Christian Senckenberg, Frankfurt am Main

and languages. In his analysis of interlingual communication, Michael Cronin mentions five different strategies to which the travel writer can turn (Cronin 2003: 159). Adanson adopted those which complicated the distinction between Wolof and other African languages. For instance, when employing periphrasis to introduce utterances by the native people in indirect speech, he wrote 'que les oualofes appellant du nom' [as the Wolof call it], or 'il se nomme chez les nègres' [known by the Negroes with the name]. The third section applies Cronin's strategies to Adanson's use of Wolof in the *Histoire naturelle du Sénégal* to gain insights into the strategies Adanson used most frequently to incorporate Wolof into his French account.[2]

Multilingualism and Untranslatability

All languages undergo change over time, especially through contact with other cultures. This produces amalgamations, i.e. words containing roots from several languages blended together in one term. This phenomenon increased with the numerous scientific expeditions to Africa in the second half of the eighteenth century (Vandersmissen 2015). As new specimens were collected, naming them became increasingly difficult. New specimens were not only plentiful. They also presented unknown features, on the basis of which their names would be formulated. European naturalists were then obliged to use the systems developed by one of two prominent figures of the time, Linnaeus or Georges-Louis Leclerc, Comte de Buffon. Treading an alternative path, Adanson decided to retain the native terms to describe Senegalese natural history, because, as he noted in his preface to the *Familles des plantes* [Plant Families]:

> Par là on évitera toute confusion, et chacun aura la liberté de réunir et diviser les genres et les espèces suivant les idées, sans être obligé de forger à chaque instant de nouveaux noms auxquels ne peuvent suppléer les phrases de nomenclateurs, ou de changer les noms réels et primitifs de chaque chose.
>
> *(Adanson 1763: xv)*

> [We will thus avoid any confusion, and everyone will be free to bring together and divide the genera and species according to his ideas, without being constrained to create new names every time which cannot be replaced by nomenclatural phrases, or to change the real or primitive names of every object].

His *Histoire naturelle du Sénégal* therefore embodies the contact zone between Senegalese and French culture, the latter being dominant in this power asymmetry. However, Adanson tried to minimize the power imbalance by giving a voice to the minority languages, enabling them to contribute to the production of scientific discourse and thereby highlighting the capability of every language to designate natural objects.

In her work on linguistic imperialism, Schiebinger (2004) makes a record of scientific texts from the fifteenth to the seventeenth centuries where authors provided names for the same species in multiple languages. For example, Thomas Harriot employed Algonquin names for plants and animals in his *A Briefe and True Report of the New Found Land of Virginia* (1588). He also added the respective equivalents in English, Dutch, and Spanish. To deal with the problem of language diversity and the influx of new specimens, it was necessary to gather all the equivalents in a dictionary. To this end,

Christian Mentzel published his *Index nominum plantarum multilinguis* [Multilingual Index of Plants] in 1682 to provide botanical nomenclature in African, Asian, and American languages as well as European ones. Charles de Rochefort, a French naturalist who travelled to the Caribbean, appended a lexicon of Carib names for plants to his *Histoire naturelle et morale des Iles Antilles de l'Amérique* [Natural and Moral History of the American Antilles] (1658). Following his example, Charles Plumier later employed Taino and Carib names in his *Description des plantes de l'Amérique, avec leurs figures* [Description of American Plants with Illustrations] (1693). Hendrik van Rheede, the Dutch Governor of Malabar and naturalist, gave plant names in Malayalam, 'Brahmanese', Arabic, and Konkani in his *Hortus Malabaricus* [Malabar Garden] (1678–93).

Some Europeans, like van Rheede, worked in collaboration with natives in a sort of scientific committee for the publication of scientific work; others, like Harrison and Adanson, could only count on the information they gathered to write their travel accounts. Nevertheless, they learnt the language in the field and then had to improvise to convey what they heard in written form. This is what Lydia Liu has called 'imagined *adequatio* of meanings' which results in 'makeshift inventions' that become fixed through repeated use or replaced by latter generations (Liu 2004: 110, quoted in Hermans 2018: 34). The anthropologist Bronisław Malinowski (1948: 231) is an interesting example of this. During his research in East Guinea, he consulted the dictionaries of Oceanic languages written by missionaries but realized that they were useless because most of the native words did not correspond to an existing concept for English speakers. Scientific terms are developed according to the environment in which the speaker using them operates. Native people, therefore, had an eye for differences and could recognize and differentiate special features indistinguishable to a foreigner.

Brent Berlin's 1992 work on ethnobiological classification in traditional societies gives copious examples of the numerous categories and names that indigenous people around the globe give natural objects. For instance, during his ethnobotanical research on the Achuar in Ecuador, Philippe Descola (1988: 144, quoted in Berlin 1992: 6) was astonished to see that his informants could name every tree within a radius of several kilometres. Jared Diamond (1972: 91, quoted in Berlin 1992: 6) noted during his time with the Fore people of Guinea that his informants could name and describe 30 separate birds which were small, uncommon and, to European eyes, not easily distinguishable.

By inviting the contribution of native languages, we recognize their equal status and their capacity to generate new terminology in European languages through strategies such as loanwords, neologisms, or circumlocutions. Furthermore, languages are not static but dynamic bodies. For instance, words like 'atom' and 'neutron' were introduced to Tibetan

through Buddhist scientific terminology (Mundt 2018: 74). This malleability of language is highlighted by Roman Jakobson:

> All cognitive experience and its classification is conveyable in any existing language. Whenever there is deficiency, terminology may be qualified and amplified by loan-words or loan-translations, neologisms, or semantic shifts, and finally, by circumlocutions. […] No lack of grammatical device in the language translated into makes impossible a literal translation of the entire conceptual information contained in the original.
>
> *(Jakobson 1992: 147)*

The incorporation of multilingual voices, especially of non-European languages, into Western scientific texts demonstrates how the richness of scientific terminology related to particular scientific fields can contribute enormously to improving Western science. The improvised version of the native language, that is one based on their own understanding through communication in a language largely self-taught, as shown in some of the above examples, could increase the creative potential of translation. At the same time, it highlights the malleability of every language when naming new natural objects.

Scientific Language in the Eighteenth Century: Adanson Battling Linnaean Hegemony

If multilingualism was first celebrated in scientific texts, how did the eighteenth century see the return to monolingualism and hence the linguicide of indigenous languages? Latin, as used in Linnaean nomenclature, had been instrumentalized to extend the reach of Christianity in the medieval period. Linnaeus likewise adopted a strategy that turned on the use of Latin, here to extend a scientific Western hegemony worldwide (Schiebinger 2004: 198). The search for a standardized language of science to deal with the new specimens which had multiplied enormously went hand in hand with the necessity of bringing order to the natural world. This task was, however, an implicitly artificial undertaking. The natural order of things could only be provided by God, and it was humankind's duty to label every object and hence prove its existence in the natural world and as an object of knowledge. In the eighteenth century, naming a new species implied placing it within a knowledge system that would represent 'une véritable cartographie de l'organisation naturelle' [a real cartography of the natural order] (Vuillemin 2009: 39).

Both concerns were reflected in the Linnaean conception of botany. In the eighteenth century, Linnaeus was one of the first naturalists to provide a system to classify plants, based on their sexual organs: pistils and stamens. He thought that all new specimens, including those native to tropical regions,

could be adapted and introduced into his system. However, he overlooked the problem presented by new plants whose sexual organs were not visible at first sight. That is the main reason why Adanson realized that Linnaeus and Joseph Pitton de Tournefort's main works, which he had brought with him to Senegal, were useless for classifying Senegalese plants. Instead, he invented a natural method which considered the relations between all parts of the plants instead of just one.

In his work on the history of binomial nomenclature, John L. Heller refers to a pre-Linnaean phase, with the first traces of a binomial nomenclature appearing in the Swiss natural philosopher Caspar Bauhin's 1632 *Pinax* (Heller 1970: 33). Every plant was given a generic and a specific name. However, in many cases, both the generic and the specific name consisted of more than one word. What Linnaeus did in his *Species Plantarum* [The Species of Plants] (1753) and the first volume of the *Systema naturae* [Natural System] (1758) was to improve on Bauhin's attempt, so that the binomial nomenclature comprised only two elements, without exception. The victory of Linnaean nomenclature over other systems was therefore due to the use of trivial names instead of polynomial specific ones. The single words were easier to memorize, say, and write. Naturalists could save precious time by rapidly devising a simple epithet to classify a specimen related to a large genus. Most importantly, such epithets 'were stable and hence a new name was no longer necessary when a new species was found' (Heller 1970: 55).

At a time when patronage and relationships with powerful people were still necessary to build a reputation in the scientific community, Linnaeus's system and nomenclature gained global influence. Linnaeus' disciples saw it as their mission to collect plants in every corner of the world and provide as much information as possible about them. By extracting the specimens from their natural environment, positioning them within the European knowledge system (such as in a book, a collection, or a botanic garden), and giving them a new name, naturalists disregarded the complexity of their organic and ecological relations and the subsequent impact on people's daily lives (Pratt 1992: 31).

As pointed out by Schiebinger, 'it was precisely this type of information – medicinal usages, biogeographical distribution, and cultural valence – that was to be stripped from plants in Linnaean binomial nomenclature as it has come down to us' (Schiebinger 2004: 197). One example is the Linnaean name *Cinchona officinalis*, given to the Quechua plant *quina*, deeply rooted in Incan culture. Linnaeus decided to name the plant after the Countess of Chinchón, the wife of Peru's viceroy, who was cured thanks to the plant's antipyretic properties. His name for the plant thus celebrated European colonial rule (for further examples see Schiebinger 2004: 204, 216, 218). According to the rules of Linnaean nomenclature, which involved a two-word name, the first element required a descriptor based on the essential character of the

plant or its external appearance. For example, the sunflower was given the Latin term *Helianthus* as its genus, which described a plant 'whose great golden blossoms send out rays in every direction from the circular disk' (Schiebinger 2004: 201). Another way to come by the first descriptor was the time-honoured practice of naming plants after prominent men, thus immortalizing Europeans whose research contributed to the progress of science. Linnaeus highlighted the advantage of easily memorizing plants thus named and the economic reasons behind the link between the botanist and the plant name (Schiebinger 2004: 203). Adanson, by contrast, condemned the vanity of botanists and considered this a major obstacle to progress in science. That is why 'he rejected the name *Adansonia digitata* which Linnaeus gave to the Baobab' (Schiebinger 2004: 221). Despite his fierce criticism of 'barbarous' names that derived from the languages indigenous to the place where the plant in question grew, Linnaeus did accept some, but only under certain conditions. Firstly, the name should be short and 'attractive' in its Latinized form. Secondly, it should be easy for a European speaker to pronounce, such as *Berberis,* from an Arabic term related to 'barbariyya' [Berber language], or *Yucca*, an ornamental plant, derived from the Taino 'yuca'.

Following the example of seventeenth-century botanists, Adanson employed Wolof names for new specimens found during his stay in Senegal. His nomenclature rules are found in his 1763 *Familles des plantes*, published in two volumes, and in his major work *Histoire naturelle du Sénégal*. The first volume of *Familles des plantes* specifies the three different ways a plant could be presented in a scientific text: by name, definition, and description. For Adanson, the name could be simple or compound and should not express the plant's essential character (Adanson 1763: cxxiij–cxxv). According to him, names were meaningless and independent of any kind of rule because they could never represent the real identity of the plant. For this reason, the language in the description should be the inspiration for the name, because without it no access to the name will be granted. The definition includes the common name and expresses another part or quality in addition. Finally, the description is an essential part of the scientific text, as it is a detailed summary of all the parts and qualities of the natural object.

In the third part of the first volume, Adanson considers seventeen points with regard to nomenclature (Adanson 1763: clxxi–clxxxiij). They include the preservation of the names given by ancient Greek thinkers such as Aristotle and Theophrastus. If changed, they could lead to a misunderstanding between the herbalists who gather plants and the doctors who prescribe them. His openness to contributions from native languages contrasts with the narrow Linnaean perspective regarding plant names. To deal with new plant names from different languages, Adanson proposed shortening foreign names if they were too long while preserving the content. Between two

synonyms, the botanist always had to choose the one that was shorter and easier to pronounce (Adanson 1763: clxxv).

One of the main features of Adanson's creativity is his unique writing style, which reflects the reform of scientific language taking place at the time. Like naturalists and learned men of the eighteenth century, he understood the need for a universal language. This was reflected in his own conviction that spoken language preceded writing and thus the same letters or characters should be employed to express the same sound. Adanson then enumerates the following rules:

1) write as you speak
2) eliminate letters in the written text if they are not pronounced
3) reduce letters with the same sound to one
4) introduce new and simple letters to express sounds which refer to double letters (Adanson 1763: clxxix–clxxx).

An example where Adanson applies the elimination of double letters and those which are not pronounced is the introduction to his *Familles des plantes*:

> Parmi les Auteurs dont nous avons conservé les Ouvrajes [ouvrages], Téofraste [Théophraste], Dioskorides [Dioscoride] & Pline, sont les seuls qui ayent traité de toutes les Plantes conues [connues] de leur tems [temps].
> *(Adanson 1763: v)*

> [Among the Works of the Authors that we have preserved, Theophrastus, Dioscorides & Pliny, are the ones who have included all the known Plant specimens of their time].

As we have seen, Adanson's defence of the preservation of the native names for new specimens was in the middle of the eighteenth-century debate on the standardization of scientific terminology. If the plants or animals were found in a non-European environment, they should be given names which preserved the valuable cultural information of the native language. By refusing to use Latin names, Adanson recognized the Senegalese knowledge system and the most widely spoken language at the moment of his scientific journey, Wolof, as equally capable of producing a scientific discourse.

The Use of Wolof in Adanson's Scientific Work

While the eighteenth century was characterized by the development of scientific discourse and the urgency shared by the learned community to find a universal language, the reality was still that diverse naming practices existed around the world. Multilingualism could, however, be exploited for the sake

of science. In his article on the use of African terms – 'paroles et mots nègres' – in Adanson's *Histoire naturelle du Sénégal*, Ousmane Seydi argues that Adanson used Wolof to strengthen and highlight his position in the discursive community of naturalists, represented in this case by the *Académie des Sciences* [Academy of Sciences], of which he had aspired to become a member from an early age (Seydi 2011: 215). Constantly struggling over symbolic territory, travel writers' recourse to native languages was an auctorial mark to distinguish themselves from other members and a strategy to reinforce the authenticity and credibility of their scientific discourse, which was also 'sought by association with scientific status' (Withers 2011: 567). In the case of Adanson, we are talking about his status as correspondent of the *Académie*.

Apart from being a scientific tool, learning the native language of the territory was a mandatory step towards surviving and having access to valuable knowledge. This is especially reflected in the dictionaries and grammar books written by missionaries and governors of Senegal. General Louis Faidherbe, who was governor of Senegal in 1863–65, realized how important it was to have recourse to interpreters as a last resort. For this reason, he highlighted the practical role of his works on Senegalese languages, especially aimed to deal with real-life situations such as commercial transactions. One of his main works was '*Langues sénégalaises: Wolof, Arabe-Hassania, Poule* [sic]*, Sérère, Soninké*' [Senegalese Languages: Wolof, Hassani Arabic, Fula, Serer, Soninke] (1887). Here he gives a detailed description of his other compatriots who published works focused on Wolof, such as Jean Dard, a French teacher who taught in Saint-Louis, who published the first bilingual French-Wolof and Wolof-French dictionary (1825) and Wolof grammar (1826). Baron Jacques-François Roger, governor of Senegal from 1822 to 1827, published *Recherches philosophiques sur la langue ouolofe suivies d'un vocabulaire abrégé français-ouolof* [Philosophical research on the Wolof language, followed by an abridged vocabulary French-Wolof] in 1829.

Père Kobès, a French missionary, published *Principes de la langue wolof* [Wolof language principles] in 1855, *Dictionnaire français-wolof et wolof-français avec un essai de grammaire* [French-Wolof and Wolof-French Dictionary with a grammar essay] in 1869, and many other works related to the translation of religious texts such as prayers and catechisms into Wolof.

The utility of learning Wolof was also pointed out by Adanson, who did not want to depend on an interpreter:

> J'employai les premiers mois de mon arrivée non seulement à étudier les mœurs et les caractères des habitants, mais encore à apprendre la langue *oualofe* qui est la plus répandue par le pays car je n'ignorais pas qu'elle me serait d'une grande utilité.
>
> *(Adanson 1757: 23)*

> [During the first months of my arrival, I studied not only the character and manners of the inhabitants, but also the Wolof language, the most widespread in the country, because I knew it would be extremely useful].

It is worth drawing attention here to the word *oualof,* used by Adanson to refer to all the Africans under his authority who came from the Waalo Kingdom (now Senegal and Mauritania) and spoke Wolof. He concluded that 'le wolof était la langue du Oualo et devait être orthographié oualof' [Wolof was the language of the Oualo kingdom and that it should therefore be spelled oualof] (Seydi 2011: 207).[3] Senegal's multilingualism led to multiple improvized attempts to provide detailed learning materials on Wolof by Adanson's contemporaries. They were the result of the phonetic perception of Europeans, as it was an oral language without a written form.

Translation Strategies in the *Histoire naturelle du Sénégal*

Arriving in a foreign country to collect and study different specimens, naturalists had to deal with the problem of representing natural objects in their travel accounts. Cronin proposes five strategies:

- *Mimesis*: when the author reproduces the speech in the foreign language without any changes.
- *Defamiliarization*: the use of foreign words or phrases throughout the text.
- *Periphrasis*: as a form of indirect translation, the writer uses indirect speech or a paraphrase of the context to express what is said in the foreign language.
- *Exclusion*: the writer ignores the foreign language reality which surrounds him or her.
- *Translation*: the foreign speech is translated into the language of the narrative. (Cronin 2003: 159, emphasis in the original)

Although Cronin asserts that most travel writers choose the 'translation' strategy, many also opt for periphrasis, rendering foreign reality 'visible' (2003: 159).

Why did Adanson refuse to follow the commonest strategy, and how did it shape his account in terms of the visibility it accorded the indigenous people whose natural world he was surveying? The following examples draw together some Wolof terms extracted from the *Histoire naturelle du Sénégal*, without focusing on the neologisms presented mostly in the *Histoire de Coquillages*. In all cases, the Wolof term was emphasized by Adanson himself.

> et une grande espèce de sensitive épineuse, que les nègres appellent *guérackiao,* c'est-à-dire bonjour, parce que, disent-ils, lorsqu'on la touche ou

> qu'on lui parle de près, elle incline aussitôt les feuilles pour souhaiter un bonjour, et témoigner qu'elle est sensible à la politesse qu'on lui fait.
>
> *(Adanson 1757: 43)*

> [and a large species of a sensitive plant which the negroes call *guérackiao*, that is 'Good day', because, they say, when you touch it and talk to it, the plant immediately bends its leaves to greet you, and expresses its sensitivity to your politeness].

In this example, Adanson introduces the term *guérackiao* through indirect speech 'which the negroes call', thus drawing our attention to the word used in Wolof (captured here in Adanson's approximation). He then describes the reason behind the term and elaborates on how the indigenous people personify the plant, understanding its movement as a response to touch and a form of greeting to the passing traveller.

On occasion, Adanson couples periphrasis with additional paratextual information, as in the following example:

> C'était un calebassier appellé [sic] pain-de-singe (1) que les oualofes nomment *goui* dans leur langue.
>
> *(Adanson 1757: 54)*

> (1) *Bahobab, P., Alp. vol. 2. pag. 37*
> [It was a calabash tree called monkey bread (1) which the Wolof call *goui* in their language].

Adanson firstly introduces the term 'pain-de-singe' and then indicates through periphrasis that *goui* is the term employed by the Wolof, not as in the previous example where he refers to the Senegalese native people as 'negroes'. He then employs the strategy of defamiliarization in a footnote, introducing the Arabic name *Bahobab*, borrowed from the Egyptians by the Italian botanist Prospero Alpini, the first European to discover the tree in Egypt, who named it after the main feature of its fruit: the term comes from the Arabic *bū ḥibab*, 'fruit of many seeds'. Furthermore, by quoting Alpini, Adanson reinforces the authenticity of his scientific discourse and highlights the valuable information contained in the native name of the plant. If we consider that most of the prospective readers were European, and hence non-Arabic speakers, the consultation of Prosper Alpini's work would have been the only way to have access to this information.

In other cases, Adanson introduced indigenous terms to French to differentiate between the various languages spoken in Senegal. This emphasis on linguistic diversity can be seen here, for example:

> Le dattier de ce pays est sauvage, & vient sans culture. Les nègres Sérères du royaume du Kaïor, qui comprend le cap Verd, l'appellent *kiokkomm*; et ceux du pays d'Oualo vers l'isle du Sénégal, lui donnent le nom de *sor-sor*.[4]
>
> *(Adanson 1757: 106)*

> [The date palm in this country is wild and grows without being cultivated. The Serer negroes from the Cayor Kingdom, which includes Cape Verde, call it *kiokkomm*; and those from the Wolof country toward Senegal Island call it *sor-sor*].

Here Adanson introduces the paragraph by referring to the date palm, so that readers are aware that the African terms subsequently encountered are different denominations for the same plant. By indicating the geographic location where the terms are employed, Adanson not only highlights differences between the other languages spoken in Senegal; he also implicitly invites the reader to make a link between the textual and the visual elements of his account, creating a kind of geographical map through language.

The following examples demonstrate how Adanson exploited the *métissage* of different languages. The selection of vernacular names in European languages such as Portuguese and French reflects his preference, like the earliest botanists, for simple or common names. According to him, 'c'est en général au peuple et non aux Botanistes que nous devons les premiers noms des Plantes' [In general, it is to the people and not to botanists that we owe the first plant names] (Adanson 1763: cxxvij). Here, Adanson introduces the Wolof name with periphrasis followed by the vernacular French.

> Le faucon-pêcheur, que les oualofes appellent du nom de *nguiarkol*, et les françois de celui de *nanette*.
>
> *(Adanson 1757: 125)*

> [The fishing falcon which the Wolof call *nguiarkol*, and the French call *nanette*].

Regarding the specific ornithological term, the fish-eating bird of prey which Adanson refers to as a fishing falcon is the African fish eagle (*Haliaeetus vocifer*), in modern French, *pygargue*.[5] It seems that Adanson chose the name *faucon-pêcheur* because of the bird's behaviour when it was hunting its prey.

Continuing with the ornithological terminology, Adanson presents three different languages in the following paragraph. He introduces the vernacular name in Portuguese with the strategy of defamiliarization. Then he employs periphrasis and italicizes only the Wolof term to distinguish it from the European vernacular terms. The Portuguese name might be Adanson's phonetic transcription of *galinha* with an augmentative suffix such as *-ão*.

The French name which Adanson refers to seems to be native to the French Caribbean islands, of which Saint-Domingue (Haiti) was the most important for the *Compagnie des Indes*.

> Cet oiseau pourroit bien être la gallinache des portugais, ou celui que les françois des isles de l'Amérique appellent marchan; il se nomme *guinar* chez les nègres.
>
> *(Adanson 1757: 173)*

> [This bird could be the Portuguese gallinache, or the marchan of the French of the American Islands; the negroes call it *guinar*].

Both vernacular names in French and Portuguese were quoted by Georges Buffon in his *Histoire naturelle des oiseaux* [Natural History of Birds] (1770: 167) as one of the names for the *vautour brun* [brown vulture] in the category 'Oiseaux étrangers qui ont un rapport aux Vautours' [Foreign birds related to vultures]. Adanson's description of its black feathers and its consideration as a marabou stork by the native inhabitants coincide with Buffon's physical description of the *guinar*. Other than the hooked beak, other physical features make it more akin to a kind of turkey, 'ce qui lui a fait donner par les Espagnols & les Portugais le nom de *gallinaça* ou *gallinaço*' [which led to the Portuguese and Spanish name it *gallinaça* or *gallinaço*] (Buffon 1770: 176).

Adanson's descriptions of Senegalese fauna also extended to reptiles. In the example below, Adanson introduces the term 'diasik':

> Toutes les fois que les nègres approchent de cet endroit, ils sont sûrs d'y trouver ces animaux; et c'est de-là qu'ils ont donné à ce ruisseau le nom de marigot de *Diasiks*, qui en leur langue signifie marigot de Crocodiles.
>
> *(Adanson 1757: 143)*

> [Whenever the Negroes approach that place, they are sure to find those animals; that is why they gave this stream the name of swamp of the *Diasiks*, which in their language means Crocodile swamp].

Adanson expands on the meaning of the term 'diasik' by means of periphrasis. The unusually large number of crocodiles found in this stream determined the name the Wolof gave the landscape feature. The term *marigot*, specific to tropical regions, indicates how specialized the French itself is in Adanson's account, capturing the complexities of regional topography. The term *marigot* was originally coined during expeditions to the West Indies in 1654 and was used from 1688 to refer to a small branch of a river, for example, in the description of the African landscape of Michel de La

Courbe's *Voyages de La Courbe, en Afrique et en Amérique* (1696–1699) [La Courbe's Travels in Africa and America].

The following example illustrates the combination of botany and anthropology in scientific travel writing. Adanson gives an insight into Wolof cultural practices, such as personal hygiene related to mouth cleaning. Following his arrival in Senegal, Adanson spent a lot of time among the Wolof learning their language and their customs. This direct observation allowed him to give a detailed description of their daily rituals. For instance, he talks about social rituals such as funerals, describing a burial where two pots were placed on each side of the dead person, one filled with water and the other filled with couscous for the deceased's journey to the afterlife (Adanson 1757: 60–1). Regarding the native use of natural objects to treat diseases, Adanson mentions applying a toad to the sufferer's head to cure migraine (1757: 163).

After this brief description of Adanson's closer observation of the Wolof culture, reflected in different parts of his travel account, we will see how the botanical term *sokiou* is represented from an anthropological perspective during his journey in a difficult plain.

> Je fis route d'abord dans une plaine sablonneuse & difficile, où entr'autres arbres épineux & qui se plaisent dans les terres les plus arides, je rencontrai celui que les oualofes appellent *niottout*: il porte beaucoup de cette gomme résine connue sous le nom de *bdellium*, & ses branches servent de *sokiou*, c'est-à-dire de cure-dent aux femmes du pays.
>
> *(Adanson 1757: 162)*

> [Firstly, I made my way across a sandy and difficult plain, where among other thorny trees which grow abundantly in the most arid of lands, I found the one that the oualofes call *niottout*. It has a lot of the resin gum known as *bdellium*, & its branches serve as *sokiou*, that is toothpicks for the women of the country].

Adanson starts by describing the environment where he found different thorny trees, including the *niottout*. In his *Mémoires d'Adanson sur le Sénégal et l'île de Gorée* (Martin & Becker 1980), the same Wolof term is further described as African myrrh, which produces bdellium, an aromatic gum. After the use of periphrasis, Adanson applies defamiliarization in *sokiou*, a term previously mentioned on page 75 of his travel account, which means toothpick.

As these examples demonstrate, Adanson typically employed defamiliarization and periphrasis. The use of Wolof words and the recourse to paraphrases reveal the specificity of the Senegalese natural world and the expertise in Wolof that Adanson acquired over time. In some cases, Adanson added a footnote and explained either the source of the term or its meaning. Of a total of eighteen Wolof terms, fourteen are botanical: *guiarnatt*,

soumpe, *guérackiao*, *khoff*, *goui*, *sob*, *benten*, *ronn*, *sokiou*, *sor-sor*, *dougoup-nioul*, *niouttout*, *foudenn* and *sanar*. There are three zoological terms: *nguiarkol* and *guinar* birds, and *diasik*, a crocodile. The last two terms in the list are *yet*, a type of shell, and *sakem*, a mollusc.

Seydi concluded that the last term, *sakem*, appeared to be Wolof because of its location on the island of Gorée and the care Adanson took over its pronunciation: the term *Sakeum* resembles the Wolof verb *sakeumi* or *sakami,* which means 'to eat something by crunching and savouring at the same time'.[6]

The list of these scientific terms reveals how proficient Adanson was in Wolof, as recognized by his biographers Claude-François Le Joyand (1806), Georges Cuvier (1861), Auguste Chevalier (1934), and Alfred Lacroix (1938). Adanson applied the same phonetic writing rules he proposed in his *Familles des plantes* to Wolof. The high proportion of Wolof botanical terms aligns with the fact that this was the branch of study on which he wrote most, such as *Familles des plantes*, where he developed a natural method to classify the exotic plants he found in Senegal. His first acquaintances were also botanists, such as Antoine and Bernard de Jussieu, who brought Adanson to the *Jardin du Roi* [Royal Garden], Louis Guillame Lemonnier, one of his first botany professors, and Joseph Pitton de Tournefort, who proposed a plant classification based on their fruits and flower shape as an alternative to the Linnaean classification based on sexual organs. He also planned, but did not complete, a second volume of his *Histoire naturelle du Sénégal*, to include treatises on rural botany and plant physiology and the description of the medicinal properties of Senegalese plants, with their respective names in Wolof, Mandingue, and Portuguese (Chevalier 1934: 95–9).

Conclusions

Adanson regarded multilingualism as a positive resource to exploit in his work and considered the diversity of languages not as a threat, but as evidence of the collective network where Western and native African languages could collaborate and enrich each other through loanwords and the transmission of knowledge. His travel account served to inform Western naturalists of a necessary step in the knowledge network, extending the intellectual commons worldwide, including Africa. To be part of the Western knowledge system, new specimens had to be given a name. The fear of the unknown and strange names for Europeans led to massive uptake of Linnaean nomenclature. Yet some traveller scholars, like Adanson, decided to explore the unknown and highlight its foreignness by preserving the indigenous names for the specimens found. This allowed

him to present Wolof and other African languages, seen as peripheral by Western naturalists, as equally capable of producing a valuable and rich scientific vocabulary. Binomial nomenclature and the standardization of scientific language meant the preference for translation as opposed to the other strategies outlined by Cronin (2003: 159), implying the exclusion of indigenous languages. Taking Adanson's path meant turning to mimesis, defamiliarization, and periphrasis, and embracing the collaboration of the foreign in scientific discourse.

Much more research remains to be done on the native names of natural history objects, building on the pioneering efforts of Berlin (1972; 1992) and Seydi (2011), and looking beyond botany, as this chapter has largely done, to other fields such as zoology, marine biology, microbiology, ecology, and anatomy, and to other non-European languages. It is also worth mentioning the emphasis on English in modern science publishing, which has sidelined research in other languages. As a result, non-native English-speaking authors must write in a universal language to be accepted by the scientific community. More scientific publications in non-European languages could help not only prevent the extinction of endangered languages but also give non-European languages the place they deserve.

Notes

1 All translations are by the author unless otherwise indicated. Research for this chapter was supported by the German Research Foundation (DFG) as part of its Priority Programme 2130 'Early Modern Translation Cultures (1450–1800)' under the Project Number 461560091.
2 I would like to thank Professor Ousmane Seydi of the University of Basel, who helped me validate Wolof terms in the *Histoire naturelle du Sénégal* [Natural History of Senegal] (1757).
3 In 1608, the French word to refer to the Wolof people was *Jalof* (Jarric 1608: 25), in 1825 'Wolof' was used by Jean Dard in his French-Wolof and Wolof-French dictionary, in 1832 the missionary Raymond employed the name Yolof which was then repeated in the Larousse dictionary in 1876. In 1903, the Larousse dictionary offered an additional alternative: Ouolof, like Adanson's term. (https://www.cnrtl.fr/definition/wolof, accessed 12 October 2023).
4 Adanson observed this plant in the Isle du Sénégal, where the Director of the *Compagnie des Indes* had his main residence. It was on the northern border of the Cayor kingdom, just at the mouth of the Niger river, as indicated in Philippe Buache's map of Senegal annexed to Adanson's travel account. However, the accurate geographic coordinates are similar to those of the current city of Kayar, located at 14.917277 latitude north and -17.122192 longitude east.
5 For a definition and description of the term, see https://www.cnrtl.fr/definition/pygargue, accessed 8 August 2023.
6 This explanation of the term *sakem* was clarified in an academic exchange by mail with Professor Seydi.

References

Adanson, Michel. 1757. *Histoire naturelle du Sénégal. Coquillages*. Paris: C-J-B. Bauche.
Adanson, Michel. 1759. *A Voyage to Senegal, the Isle of Goree, and the River Gambia*, trans. anonymous. London: J. Nourse & W. Johnston.
Adanson, Michel. 1763. *Familles des plantes*. Paris: Vincent, 2 vols.
Adanson, Michel. 1773. *Nachricht von seiner Reise nach Senegal*, trans. Johann Christian Daniel Schreber. Leipzig: Crusius.
Adanson, Michel. 1773. *Reise nach Senegall*, trans. Friedrich Heinrich Wilhelm Martini. Brandenburg: J. W. and J. C. Halle.
Berlin, Brent. 1972. 'Speculations on the Growth of Ethnobotanical Nomenclature', *Language in Society* 1(1): 51–86. http://www.jstor.org/stable/4166669 (accessed 7 April 2023).
Berlin, Brent. 1992. *Ethnobiological Classification. Principals of Categorization of Plants and Animals in Traditional Societies*. Princeton and New Jersey: Princeton University Press.
Buffon, Georges-Louis Leclerc, Comte de. 1770. *Histoire naturelle des oiseaux*, vol. 1. Paris: Imprimerie Royale.
Carteret, Xavier. 2012. 'Michel Adanson au Sénégal (1749–1754): Un grand voyage naturaliste et anthropologique du Siècle des lumières', *Revue d'histoire des sciences* 65(1): 5–25. https://doi.org/10.3917/rhs.651.0005 (accessed 21 January 2023).
Carteret, Xavier. 2014. *Michel Adanson (1727–1806) et la méthode naturelle de classification botanique*. Paris: Honoré Champion.
Chevalier, Auguste. 1934. *Michel Adanson: voyageur, naturaliste et philosophe*. Paris: Imprimerie du Droit.
Cronin, Michael. 2003. *Translation and Globalization*, first edition. London and New York: Routledge.
Cuvier, Georges. 1861. 'Éloge historique de Michel Adanson', in Georges Cuvier (ed.), *Récueil des éloges historiques*, pp. 175–204. Paris: Firmin Didot Frères.
Descola, Philippe. 1988. *La selva culta: Simbolismo y praxis en la ecología de los Achuar*. Quito: Abya-Yala, Instituto Francés de Estudios Andinos.
Diamond, Jared. 1972. *Avifauna of the Eastern New Guinea Highlands*. Cambridge, MA: Nuttal Ornithological Club.
Harriot, Thomas. 1588. A *Briefe and True Report of New Found Land of Virginia*. London: n. publ.
Heller, John L. 1970. 'Linnaeus's Bibliotheca Botanica', *Taxon* 19(3): 363–411. https://doi.org/10.2307/1219065 (accessed 26 February 2023).
Hermans, Theo. 2018. 'Untranslatability, Entanglement and Understanding', in Duncan Large, Motoko Akashi, Wanda Józwikowska, and Emily Rose (eds), *Untranslatability: Interdisciplinary Perspectives*, pp. 27–40. London: Routledge.
Jakobson, Roman. 1992. 'On Linguistic Aspects of Translation', in Rainer Schulte and John Biguenet (eds), *Theories of Translation*, pp. 144–51. London/Chicago: The University of Chicago Press.
Jarric, Pierre du. 1608. *Histoire des choses plus memorables advenues tant ez Indes Orientales, que autres pais de la descouverte des Portugais, en l'establissement et progrez de la foy Chréstienne et Catholique*, vol. 1. Bordeaux: S. Millanges.
Lacroix, Alfred. 1938. 'Michel Adanson (1727–1806)', in Alfred Lacroix (ed.), *Figures des Savants*, vol. 4, pp. 187–207. Paris: Gauthier-Villars.
Le Joyand, Claude-François. 1806. *Notices sur la vie, les travaux, les découvertes, la vie et la mort de Michel Adanson*. Paris: Arthus Bertrand.

Liu, Lydia. 2004. *The Clash of Empires: The Invention of China in Modern World Making*. Cambridge, MA and London: Harvard University Press.
Malinowski, Bronisław. 1948. *Magic, Science and Religion and Other Essays*. Glencoe and Illinois: The Free Press.
Malmkjær, Kirsten. 2018. 'On the (Im)possibility of Untranslatability', in Duncan Large, Motoko Akashi, Wanda Józwikowska, and Emily Rose (eds), *Untranslatability: Interdisciplinary Perspectives*, pp. 41–9. London: Routledge.
Martin, Victor, and Charles Becker. 1980. 'Mémoires d'Adanson sur le Sénégal et l'île de Gorée'. *Bulletin de l'IFAN*, B, 42(4): 722–79.
Mentzel, Christian. 1682. *Index Nominum Plantarum Multilinguis*. Berlin: Reichel.
Mundt, Klaus. 2018. 'Against the "Un-" in Untranslatability: On the Obsession with Problems, Negativity and Uncertainty', in Duncan Large, Motoko Akashi, Wanda Józwikowska, and Emily Rose (eds), *Untranslatability: Interdisciplinary Perspectives*, pp. 64–79. London: Routledge.
Plumier, Charles. 1693. *Description des plantes de l'Amérique, avec leurs figures*. Paris: Imprimerie Royale.
Pratt, Mary-Louise. 1992. *Imperial Eyes: Travel Writing and Transculturation*. London and New York: Routledge.
Rochefort, Charles de. 1658. *Histoire naturelle et morale des iles Antilles de l'Amérique*. Rotterdam: Arnould Leers.
Schiebinger, Londa. 2004. *Plants and Empire: Colonial Bioprospecting in the Atlantic World*. Cambridge, MA: Harvard University Press.
Seydi, Ousmane. 2011. 'Paroles et mots nègres dans les écrits scientifiques du naturaliste Adanson: de l'autonymie à la mise en scène de soi', in Marie-Françoise Marein, Bérengère Moricheau-Airaud, Christine Copy, and David Diop (eds), *Les illusions de l'autonymie: La parole rapportée de l'Autre dans la littérature*, pp. 205–21. Paris: Hermann.
Vandersmissen, Jan. 2015. 'Les traductions de récits de voyage et leurs arrière-plans politiques', in Michèle Coltelloni-Trannoy (ed.), *La traduction: sa nécessité, ses ambiguïtés et ses pièges*, pp. 68–77. Paris: Éditions du Comité des travaux historiques et scientifiques.
Van Rheede, Hendrik. 1678–93. *Hortus Malabaricus*. Amsterdam: Van Someren and Van Dyck.
Vuillemin, Nathalie. 2009. *Les beautés de la nature à l'épreuve de l'analyse*. Paris: Presses Sorbonne Nouvelle.
Withers, Charles W. J., and Innes M. Keighren. 2011. 'Travels into Print: Authoring, Editing and Narratives of Travel and Exploration, c.1815-c.1857', *Transactions of the Institute of British Geographers* 36(4): 560–73. http://www.jstor.org/stable/23020829 (accessed 16 May 2022).

5

BIOLOGICAL NOMENCLATURE AND TRANSLATION

The Case of Charles Darwin's *Origin of Species* and its Portuguese Translations

Pedro Navarro

Introduction

The practice of naming living beings is extremely complex. It spans from the philosophical debate between nominalism and realism to clashes between different folk nomenclatures in space and time. The same name can designate different organisms; conversely, several names can apply to one. Language shifts over time add further complexity. Moreover, there is a reflexive relation between nature and language, whereby language shapes the image of nature as much as nature shapes language. Carl Linnaeus's system of nomenclature, with its universal Latinized names, seems to be a neat answer to such conundrums. A translator could guarantee total equivalence simply by using the scientific name attributed to the organism in question. Unfortunately, as this chapter will demonstrate, it is not as simple as that.

The following section presents the basic historical coordinates of vernacular and scientific nomenclature and the challenges it has presented to translators in various contexts and ages. These historical examples lay the groundwork for the subsequent case study. To understand how translators handle scientific and vernacular biological names, this chapter presents a study of three Portuguese translations of Charles Darwin's *Origin of Species*, originally published in 1859 and followed by five further editions, in 1860, 1861, 1866, 1869, and 1872, the sixth reprinted with minor additions in 1876 standing as Darwin's final version of the text. This sixth edition was the source for all three translations. This chapter describes the history and reception of each translation, then presents a comparative analysis of the first six sections of the book, covering the Historical Sketch, Introduction, and Chapters I to IV. The chapter concludes with a discussion connecting the

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various behaviours exhibited by the translators, from the errors they made to their use of footnotes, with definitions of expertise recently developed in Science Studies. By bringing together the history of science, sociology of science, and translation studies, the chapter aims to demonstrate that, in some contexts, vernacular species names should be regarded as specialized terminology, in line with scientific names. As a result, translators who intend to work with such texts would benefit from becoming interactional experts by acquiring tacit knowledge through immersion in biological nomenclature.

Biological Nomenclature and Translation

Inter- or intralingual translation problems regarding plants and animals have been ubiquitous across history: Aristotle's discussions of animals and their translation into various languages in the Middle Ages and Renaissance have been the topic of excellent research (Steel, Guldentops, and Beullens 1999). The rock hyrax (*Procavia capensis*), a small mammal native to the Middle East and Africa, is mentioned in the Bible as an unclean animal. As the text moved across regions and millennia, translations rendered the rock hyrax as a pig, a hare, a hedgehog, and a porcupine. Not even Saint Jerome could come to a single interpretation for the Latin term for the animal, 'chyrogrillius' (Dines 2008). Georges Cuvier (2012), one of the most renowned naturalists of his time, lamented that Pliny's *Naturalis Historia* had never been published in an annotated translation which brought together the expertise of multiple experts until Ajasson de Grandsagne's French version, which includes copious notes attempting to identify what animal or plant Pliny is referring to (Ajasson de Grandsagne 1829–32).[1] Conrad Gessner's and Gaspard Bauhin's sixteenth-century understandings of the term 'Pinax' (a botanical genre at the time) differed greatly, the former understanding it within a pragmatic and medical tradition, while the latter was inspired by botany as a science of its own (Selosse 2005). In his preface to João Vieira de Almeida's translation of Joseph of Anchieta's *Cartas Inéditas* [New Letters], Augusto César de Miranda Azevedo complained about the mistakes in a previous translation, where many animal names in Latin were incorrectly turned into Portuguese, rendering entire sentences unintelligible (Anchieta 1900: vii-viii). In fact, confusion regarding the identification of ancient terms for species is so great that entire compendia have been produced trying to address the question: see Desfayes (1999) and Arnott (2007) for birds alone.

Such conflicts became intolerable for eighteenth-century naturalists. How could they be sure they were talking about the same plant or animal if potentially dozens of extant or extinct vernacular names were available? How could they tell if a given specimen was a local variety with a proper name or a contiguous species that should be addressed by one label? How could they find words for the astonishing biodiversity found in the New World? More

importantly, how could they name new things, confident in the knowledge they were not inadvertently reusing extant nomenclature and ensuring they would be duly acknowledged as the discoverer of a given species? A universal form of referencing was needed to quiet the chaotic multivocality of early Enlightenment descriptive science. It was within this context that scientific nomenclature was invented.

Linnaeus's nomenclature was even more popular than his classification system. In this new system, every organism would have its proper and unique Latinized binomial name consisting of one generic and one specific epithet. The name *Homo sapiens* would tell readers that this was a particular species of the genus *Homo*, separate from but closely related to *Homo neanderthalensis*, for example. Genera were grouped into families (Hominidae, in this case), families into orders (Primata), and so on. All living beings, including ones yet to be identified, would fit neatly into this nested system of properly named categories. In its infancy, the system was still cacophonic, but as time passed, it became increasingly refined and accurate, with the formalization and addition of principles, rules, and suggestions giving rise to our present codes of nomenclature (Ritvo 1997; Knapp et al. 2004).[2]

With such a universal system for naming organisms, translation problems might be thought less of an issue. All the vernacular names for a given species could be listed side by side with its scientific name, which a translator could consult for his or her work.[3] However, translation challenges remained. J. L. Molina's 1782 *Saggio sulla Storia Naturale del Chili* [Essay on the Natural History of Chile] was the first work to describe Chilean species according to the Linnaean system of nomenclature; it was translated into Spanish by Domingo Joseph de Arquellada Mendoza in 1788. According to José Stuardo, besides omissions and typos, 'La mala traducción de algunos nombres comunes para los naturalistas, tampoco ayudó a la proyección del valor educativo de esta obra; es más, creó confusión, aunque Molina usó tales nombres en su sentido zoológico preciso' [the mistranslation of some names common to naturalists likewise undermined the work's educational value; furthermore, it created confusion, though Molina used such names only in their strict zoological sense] (Stuardo 2007: 88).[4] Studies of Brazilian translations of nineteenth-century natural history books also reveal that even in a scientific setting, translating the names of organisms is not simply a matter of determining their referent but a translation choice like any other, where translators have to choose if they will domesticate or foreignize the text (Carneiro Rodrigues 2011, 2012, 2014; Venuti 1998).

Such issues are not restricted to scientific works. Umberto Eco (2003) provides a thoughtful discussion about how the plants in *Il Nome della Rosa* [The Name of the Rose] should be translated, considering both the actual species found in the novel's setting as well as the history of their vernacular terms. Terms like 'mouse' and 'rat' could be regarded by an

inattentive translator as synonymous and translated as if equivalent, thus compromizing the original sense of the sentence. While translating his own book into English, Brazilian writer João Ubaldo Ribeiro asked: 'is it fair to call a *Scomberomus regalis* a mackerel, when in your heart you know that for your reader a real mackerel is probably a *Scomber scombrus*?' (Ribeiro 1989/2018: 149–50)

Translating species names thus remains problematic (Remsen 2016). The aim of the following case study is to understand how translators without specialist training in the biological sciences deal with these names in their translations. Based on the results of this research, I argue that not only terms like '*Scomber scombrus*', '*Homo sapiens*', and 'mammals' should be viewed as technical terms, but that in certain contexts, seemingly innocuous words like 'rose', 'mackerel', and 'fish' should also fall into this category.

Darwin's *Origin of Species* in Portuguese

This chapter focuses on three Portuguese translations of the *Origin of Species*, by Joaquim Marques Dá Mesquita Montenegro Paúl (Darwin 1961), Ana Afonso (Darwin 2009), and Carlos and Anna Duarte (Darwin 2014). The translators will from now on be referred to as JMP, AAF, and CAD, respectively. All are significant for the translation history of Darwin's magnum opus in the Lusophone world and are widely available to readers. Their contexts of production, spanning just over a century, and the diverse backgrounds of their translators and editorial projects offer rich material for a comparative analysis of plant and animal name translations.

JMP's translation had a significant impact on the Lusophone history of the *Origin* that is still ongoing. Besides its pioneering role as the first complete Portuguese translation of the *Origin*, it was the only one available for decades, reprinted numerous times and republished in 2009. It was unknowingly read by many people in a plagiarized edition brought out in 1973 by the Brazilian publisher Hemus, which attributed the translation to the fictitious 'Eduardo Fonseca'. Until as recently as 2010, the misattributed translation was frequently reprinted by publishers including Madras, Martin Claret, and Ediouro, sometimes with new translatorial attributions. It is now easily found online (Darwin 2003), extending its reach across the Lusophone world, ironically making it easier for subsequent translators to consult, as CAD's references indicate (Darwin 2014: 571–2). However, it lacks translatorial paratexts and it has not proved possible to locate other sources about Paúl's translation method. Nor is there any overt acknowledgement that the book was actually a relay translation using Edmond Barbier's French version as the source text, though this can be easily ascertained through textual comparison. No contemporary reviews have been located, but modern ones are not flattering:

> O tradutor português, sem poder ou sem querer consultar a sexta edição original (1872), teria usado como fonte uma versão francesa correspondente. Isso ajudaria a explicar a presença de tantos erros, mal-entendidos e escolhas ruins, a ponto de transformar a sua versão em uma caricatura da edição inglesa.
>
> *(Costa 2014)*[5]

> [The Portuguese translator, not willing or not wanting to consult the sixth original edition (1872), used the corresponding French translation as his source. This goes some way to explaining so many errors, misunderstandings, and bad choices, to the point of turning his version into a caricature of the English edition.]

AAF's 2009 retranslation was intended as the first volume of a large collection including all of Darwin's works (Gomes 2009: vii) which never came to fruition. The translation was published as a part of *Origin*'s 150th anniversary celebrations, in the context of which tight deadlines affected the process of translation, as confirmed by the translator herself (Machado 2017). Nevertheless, unlike the JMP translation, AAF benefited from considerable editorial attention, including an introduction by the editor and proofreader Nuno Gomes, himself a biologist, a preface by the evolutionary biologist Jorge Vieira, and numerous footnotes by the translator and by the editor-proofreader.

The introduction briefly outlines the *Origin*'s importance for society and details the translation process, giving interesting rationales for some translation choices of relevance to this chapter:

> Uma tradução é uma adaptação e uma visão particular de quem traduz e revê. Por isso, para facilitar a leitura e a compreensão, alguns dos termos originais de Darwin não foram literalmente traduzidos, porque não tinham correspondência em português, porque cairam em desuso, ou ainda porque criariam "ruído" na leitura. Por exemplo, Darwin aplica recorrentemente o termo organic beings, cuja tradução directa seria seres orgânicos. Embora correcto, este termo é pouco usual na língua portuguesa contemporânea e é substituído pelo termo comum seres vivos, que tem também correspondência directa no francês, língua estrangeira privilegiada pelos naturalistas portugueses até meados do séc. XX. Outro termo frequente é organisation, que Darwin aplica indiscriminadamente à organização do indivíduo, ou seja, a sua estrutura ou organismo, e à organização taxonómica dos seres vivos, pelo que nem sempre se respeitou a tradução literal. Outro ainda, refere-se ao termo shell, aplicado genericamente a bivalves e gasterópodes, que são duas classes de moluscos. O termo concha não tem correspondência directa a estes grupos, pois

> em português refere-se apenas ao invólucro desses animais, que até serve de referência para a classificação das espécies, mas não pode ser aplicado como sinónimo de caracóis, amêijoas, ostras ou outros moluscos. E os exemplos poderiam continuar. Caso o leitor assinale alguma incorrecção ou melhor forma de expressão de alguns termos, agradecemos a sua contribuição para uma futura revisão.
>
> *(Gomes 2009: ix)*

> [A translation is an adaptation and a particular vision of the translator and proofreader. That is why, to make it easier to read, some of Darwin's original terms have been translated literally because they have no equivalent in Portuguese, have fallen out of favour, or would create 'noise' for the reader. For instance, Darwin correctly uses the term *organic beings*, which translates directly as *seres orgânicos*. Though correct, this term is little used in contemporary Portuguese and has been replaced by the more common *seres vivos* [living beings], which also has a direct correspondent in French, a language favoured by Portuguese naturalists until the mid-twentieth century. Another frequent term is *organization*, which Darwin applies indiscriminately to an individual's organization, that is, his structure or organism, and to the taxonomical organization of living beings, so that it has not always been translated literally. By way of another example, he refers to the term *shell*, generally applied to shellfish and gastropods, which are two distinct classes of molluscs. The Portuguese term *concha* has no direct correspondence with these groups since it is used to refer only to the outer layer of such animals, which has its use in species classification, but cannot be used as a synonym for snails, clams, oysters or other molluscs. And the examples could go on.]

The collaboration between the editor Nuno Gomes and the website *Darwin Online* made AAF available in full for free in the world's largest online database of Darwin-related works and documents, the first (and hitherto only) Portuguese translation of the *Origin* available on the site.

The third text in our comparison is the Duartes translation.[6] According to Carlos Duarte, their process of translation ran as follows:

> Como o [sic] meus conhecimentos de inglês são maiores que os dela [Anna Duarte], faço primeiro um trabalho digamos mais "bruto" e em seguida ela entra "polishing" o texto, como dizem os americanos. Depois o texto dela volta para mim que faço então uma revisão final. Depois dessas etapas o trabalho fica pronto para ser mandado de volta para a Editora.
>
> *(Duarte 2008)*

> [As my English is better than hers [Anna Duarte], I start with a 'rougher' work and then she 'polishes' it, as the Americans say. Then, her text comes back to me, and I do the final proofreading. After these stages, the work is ready to be sent to the publishers.]

The translation was published in 2014 by Martin Claret as a cheap paperback and a luxury illustrated edition, probably as a retraction of his previous plagiarism of JMP misattributed to the fictitious 'John Green' (Bottman 2009–13). Adriana Deslandes is credited as a scientific consultant and Sérgio Roberto Campos as an illustration consultant. The book is prefaced by Nélio Bizzo, a distinguished Brazilian authority on Darwin. There is no information about which of the sixth edition printings (1872 or 1876) was the source text, but we have been able to identify the 1876 edition as the source through textual comparison. Alongside the authors' footnotes, there is a list of references consulted for the translation.

The luxury edition seems to have sold well, certainly helped by its exquisite finish: it has been reprinted at least three times since 2014. Although buyers generally talk about the book's physical look, some have also commented on the translation. One says it is well translated (Júnior 2016), while another says it is poorly revised (Matias 2018). A third touches on our point of interest:

> de repente me deparei com uma passagem extremamente confusa, já no conteúdo principal do livro. Uma frase simplesmente afirmava o contrário do que tinha sido dito logo na frase anterior. Fiquei em dúvida se o problema era minha interpretação, mas aconteceram outras situações parecidas. Resolvi cotejar com o original em inglês e constatei que o problema era a traduação mesmo!Além disso vários nomes científicos estão com erros, em vários casos sem obedecer à regra estabalecida no código de nomenclatura zoológica (isso não importa muito para o leitor casual, mas como obra científica...) e ora escritos de uma forma ora de outra (isso é pior, pois o leitor pode querer procurar pela espécie em questão e não saber o nome certo)
>
> *(Neto 2017)*

> [suddenly I was struck by a very confusing excerpt in the main text. One sentence simply stated the opposite of the one that came before. I wondered if the problem was my interpretation, but similar situations followed. I decided to compare with the original and determined that the problem was, in fact, the translation! Besides that, many scientific names are wrong, in many cases do not abide by the rules of zoological nomenclature (this may not matter to the casual reader but as a scientific work...) and are written sometimes one way and sometimes another (which is

worse, since the reader might want to look for the species in question without knowing the right name)]

We can therefore see that reviewers and translators regularly voiced concerns about the translation of biological nomenclature. The next section delves more deeply into the translators' choices to understand better the strategies they used to translate these names and their effects on the target text.

Comparative Analysis of Findings

The most immediately identifiable features of the comparison are translation errors. Errors have been the focus of much research in Translation Studies (Hensen 2010). For the purposes of this chapter, errors are defined as noise between the source and target text, from typos to glaring problems of equivalence.

There are a few typos in the three texts. The first occurs in CAD (Darwin 2014: 20; 1876a: xv), which instead of '*Amaryllidaceae*' reads '*Amaryllisaceae*'. Here, Darwin is referring to the title of a book by William Herbert, which is why all translators italicize it.[7] JMP writes the scientific name of the rock pigeon as '*Columbia livia*', while the correct spelling is *Columba livia* (Darwin 1961: 24; 1876a: 20); the nonce word 'Delargonium' stands in for the correct form *Pelargonium*, the genus of geraniums (Darwin 1961: 32; 1876a: 27); while the genus name of the species *Lobelia fulgens* is spelt as '*Lubelia*' (Darwin 1961: 68; 1876a: 57). These typos do not affect the reading experience too much since they are easily recognized and corrected if looked for in a quick web search.

Other translation errors are more serious because they completely change the meaning of the sentence in which they occur. For example, in AAF the 'spot pigeon' (a race of *Columba livia*) is translated as 'pomba-do-orvalho' (Darwin 1961: 49; 1876a: 18–19), the common name of another bird, *Patagioenas maculosa*, probably due to the similarity with its English common name 'spot-winged pigeon' (Avibase 2023) together with the lack of a Portuguese term for this race of pigeon. Similarly, the 'Ribston-Pippin' apple was mistakenly translated as 'maçã-fuji' [fuji apple] (Darwin 2009: 47; 1876a: 21), although they are different varieties (National Fruit Collection 2019). To take another example, 'certain Brazilian crustaceans: thus, the male of a Tanais is translated as 'certos crustáceos do Brasil: no rio Tanais' [certain Brazilian crustaceans: in the Tanais river] (Darwin 2009: 59; 1876a: 36), mistaking the genus *Tanais* for the name of a (non-existent) river. In CAD, 'a minute drop of poison by a gall-producing insect' becomes 'uma gota mínima de veneno pela galha produzida por inseto' [a minute drop of poison from the gall produced by an insect] (Darwin 2009: 38; 1876a: 6) changing the meaning of the sentence. The term 'lancelet', which is commonly

translated as 'anfioxo', became 'peixe-espada' [sword-fish] (Darwin 2014: 153–4; 1876a: 97), which completely changes the zoological context for the sentence. On another occasion, 'clover' [trevo] is mistaken for 'clove' [cravo], though it is correctly translated in all other instances (Darwin 2014: 125; 1876a: 75), once again disrupting the original context.

Other hidden errors stem from conceptual misunderstandings that may go unnoticed by non-specialist readers. For example, 'corn' is translated as 'trigo' [wheat] in JMP, 'milho' [maize] in CAD, and both in AAF (Darwin 1961: vii, 65; 2009: 21, 77; 2014: 17, 100; 1876a: xviii, 55). Nineteenth-century English dictionaries define 'corn' as cereals in general (Anon 1867: 64; Murray 1874: 46), so the best Portuguese translation would probably be 'cereais'. Another example is the translation of 'alligator' as 'crocodilo' [crocodile] in AAF and CAD (Darwin 2009: 91; 2014: 118; 1876a: 69), which is misleading because alligators and crocodiles belong to different families, Crocodylidae and Alligatoridae.

Another point of interest is the importance of adjectives combined with common nouns. Darwin, for example, uses 'common camel', which is translated to 'camelo' [camel] in all texts (Darwin 1961: 16; 2009: 40; 2014: 47, 100; 1876a: 13). This first case offers little problem, but in other situations, the adjective is vital for identifying the organism: what distinguishes the red deer [veado-vermelho], *Cervus elaphus*, from the generic 'deer' [veado], a term suitable for all the members in the Cervidae family, is the adjective. JMP and AAF simply omit the adjective 'red', leading to a potentially much wider interpretation of Darwin's original sentence. 'Red Deer in Scotland' becomes '*veado* na Córsega'[8] in JMP and 'veado na Escócia' in AAF (Darwin 1961, 120; 2009: 121; 1876a: 97) rendering the Lusophone reader unable to tell which of the four species of Scottish deer (Scottish Natural Heritage 2020) is being referred to.

Maybe the most dangerous errors are the ones in the footnotes or explanations inserted into the main text, presented as facts that expand, update, or even correct the original text. Most readers, especially non-specialists, are liable to head to the notes in search of an explanation for a difficult passage or the meaning of an unknown term, trusting in the expertise of whoever wrote the footnote. Errors in the notes, therefore, have a greater chance of going unnoticed and misleading readers, as the following examples demonstrate.

In CAD, there is a major error in the footnote to the sentence 'Sir J. Lubbock has shown a degree of variability in these main nerves in Coccus'. The footnote states that Coccus is a 'bactéria de forma esferoidal' [spheroid bacteria] (Darwin 2014: 74). Spheroid bacteria are indeed known as 'coccus' in English ('cocos' in Portuguese), but readers do not need to be expert biologists to know that bacteria do not have nerves. Furthermore, the context is entomological, suggesting that Darwin was referencing beetles of the

Coccus genus.[9] Again in CAD, footnote 27 (Darwin 2014: 58) states that the term 'ancon' is used to designate wild sheep but, according to Gidney, it actually means 'a specific recessive dwarf mutation [in sheep], frequently exhibiting crippled feet'(2007: 318).

Most of JMP's idiosyncrasies derive from its French source text, from errors that pass unnoticed to Gallicisms that catch the eye in a comparison with other texts in Portuguese. Generally, for the sections under analysis, JMP follows Barbier's choices closely and only diverges subtly from the source text on a few occasions. His work, therefore, incorporates typical linguistic 'Frenchisms' of his time (Pereira 2010: 649; Fonseca 2015: 110) that can be unfamiliar to the modern Lusophone reader, besides compounding Barbier's errors with his own. The term 'Amaryllidaceae', for example, becomes 'Amaryllidacées', a clear inheritance from Barbier (Darwin 1876b: xii; 1876a: xv; 1961: x). Another term that comes directly from French is 'cão *Tournebroche*', Barbier's translation of the original 'turnspit dog' (Darwin 1876b: 30; 1961: 27; 1876a: 22). AAF and CAD maintain it in English (Darwin 2009: 48; Darwin 2014: 58) probably because the breed is extinct and there is no term for it in Portuguese.[10]

The case of the 'pato' [duck] which became a 'canário' [canary] has already been widely discussed (Bottman 2009–13; Furtado 2011). It is the result of a 'false friend' between the French word for duck, 'canard', which resembles the Portuguese word for canary, 'canário' (Darwin 1876b, 12; 1961, 11; 1876a, 8). That is not the end of the story, however. Further on in the same chapter, the term is correctly translated (Darwin 1876b: 29; 1961: 26; 1876a: 21), although the French word for goose ('oie'; 'ganso' in Portuguese) is consistently translated as 'pato' (Darwin 1876b: 18, 39, 42; 1961: 16, 34, 37; 1876a: 13, 28, 30). Other examples of false friends are the terms 'champignon' and 'coléoptère', translated by JMP as 'cogumelo' [mushroom] and 'coleóptero' [coleoptera], for which the closest translations would be 'fungo' and 'besouro' according to the terms employed by Darwin ('fungus' and 'beetle') and the context (Darwin 1876b: 59, 83; 1961: 51, 71; 1876a: 43, 60).

Barbier's 'biset' [rock-pigeon] translated as 'torcaz' (*Columba palumbus*) instead of 'pombo-da-rocha' (*Columba livia*) is another example. The term is widely used throughout the original, especially in the first chapter since Darwin took pigeons as a model for his theory of natural selection. However, he never mentioned *Columba palumbus* (known as 'common wood-pigeon' in English and 'pigeon ramier' in French) (Avibase 2023; Littré 1873–4, v. 3: 1117; Larousse 1866–77, v. 12: 1001).

All three translations fail to follow the rules and conventions of scientific and common nomenclature at times. These include italicizing terms above species and genus ranks, as seen in CAD's '*Lepidoptera*' (Darwin 2014: 77); not hyphenating common names, a Lusophone convention (Embrapa 2018)

which only AAF follows; failing to capitalize genus names, as in JMP's and CAD's '*lachnantes*' (Darwin 1961: 12; 2014: 42).

A different pattern that emerged from the analysis was that just as Barbier Gallicised and Darwin Anglicized some words, some translators did use a strategy of Lusophonisation. For example, the Latin term 'Canidae' is translated as 'canídeos' (Darwin 1961: 17; 2009: 40; 2014: 47; 1876a: 14) and the term anglicized by Darwin, 'coleopterous', is given a Lusophonised equivalent, 'coleópteros' (Darwin 1961: 53; 2009: 67; 2014: 86; 1876a: 44). The advantage of such a strategy is that it makes technical terms more accessible, without undermining the scientific aspect of the author's writing. The phenomenon seems to be more common in JMP and AAF when compared to CAD.

We expected to find many cases of 'scientificism', where translators deliberately replace common names in the original with scientific ones. However, this strategy was rare in all texts. Examples are AAF's translation of 'fowl' (a generic term for domestic birds) as 'galiformes', a Lusophonisation of Galliformes (the bird order that includes chickens), and the translation of 'canine animals' as 'canídeos' for Canidae, the dog family (Darwin 2009: 41, 50, 73; 1876a: 14, 25, 50). Most instances of what could be regarded as scientificism are in CAD's footnotes. For example, note 50 informs readers that the scientific name of the mistle thrush is *Turdus viacivirus*, with a typo in the species epithet, which should be '*viscivurus*' (Darwin 2014: 105).

AAF and CAD approach footnotes differently. The former provides extra information in the main text, while the latter follows the traditional function of footnotes. By way of an example, AAF translates 'humped cattle' as 'boi-de-bossa indiano, ou zebu', while CAD chooses to inform readers about the alternative 'zebu' in a footnote (Darwin 2009: 41; 2014: 48; 1876a: 14). In another example, AAF translates 'Ganoid fishes' as 'peixes ganóides (esturjões, por exemplo)', adding an example of a ganoid fish, the sturgeon, in parentheses (Darwin 2009: 104; 1876a: 83). These work like glosses that may help readers by presenting them with more familiar terms. Adding it to the main text may look too aggressive to a reader that expects complete fidelity to the original but it makes the extra term more likely to be seen.

The analysis anticipated few or no omissions of terms of interest, though many were found. Many such omissions are explained by the use of anaphoric references, though some appear unmotivated. For example, 'fossil sloths' ('preguiças fósseis', in Portuguese) is translated simply as 'fósseis' (Darwin 1961: xiv; 1876a: xx) in JMP while the term 'Leicester sheep' became 'rebanhos' [flocks] in AAF (Darwin 2009: 51; 1876a: 26). Omissions can be welcome if the translator is aiming for a fluent text by avoiding repetitions. However, omission of terms like those mentioned above impoverishes the text and can lead to errors (as in the case of omission of an adjective, as seen above with common and red deer).

Another very common phenomenon revealed by comparative textual analysis was polysemy in the target texts, that is when the same original term is translated differently in the same text or between texts. As a result, a single meaning in English can map onto multiple meanings in Portuguese. The best example found is the translation of 'cattle'. Though the term has a direct Lusophone equivalent, 'gado', the analysis found nine different translations, varying from the overly generic 'animais' [animals] to the overly specific 'bois' [oxen]. Similarly, 'sheep' was translated as 'carneiro' [ram] by JMP and CAD but as 'ovelha' [ewe] on most occasions by AAF. Polysemy was present in two ways:

1. intertextual, with varying translations for the same term between two or all texts, as in the term 'carices', translated as 'espanadas', 'junça', and 'ciperáceas' in JMP, AAF, and CAD, respectively (Darwin 1961: 66; 2009: 78; 2014: 101; 1876a: 56)
2. intratextual, with translation divergences within the same text, like the varying translations for 'bloodhound' in JMP, 'sabujo', 'rafeiro', and 'perdigueiro' (Darwin 1961: 16, 18–19, 27).

Intertextual polysemy is less liable to affect readers because they usually read only one translation, but it can influence discussions since different readers may have read different translations. Intratextual polysemy may be more harmful because it may lead the reader to think different organisms are under discussion, as well as evidencing a general lack of terminological coherence.

Other equivalence problems can be found in the translations of the *Origin*, as Bizzo points out in his 'Technical Note' on Daniel Miranda's translation (Darwin 2018): 'Houve considerável dificuldade em encontrar nomes populares em português para as espécies nomeadas na obra que não ocorrem no Brasil, a começar pela imprecisão que, por vezes, existe no próprio original' [It was very difficult to find common names in Portuguese for the species that do not occur in Brazil, starting with the imprecision that sometimes exists even in the original]. The analysis revealed that these difficulties are largely dependent on the temporal, geographical, and social contexts of each text, the biogeography of each organism, and the natural process of language drift. The contexts are related to Darwin himself as well as translators: different people are unable to produce the same text at different times. The second factor is related to Darwin's theory, since geographic and biological barriers restrict the presence of species in certain regions of the world: languages from one part of the world will not have the vocabulary to describe species from another part. In its turn, the natural drift of language generates problems of equivalence because terms that once designated a certain species become associated with another or may even fall

into disuse. These obstacles, however, must not be seen negatively. In fact, as shown by Selosse (2005), Stuardo (2007), Dines (2008), and many more, studying these issues across different historical contexts has proven a fruitful avenue both for the history of translation and the history of science. After all, science translators have always borrowed, adapted, and coined words (Montgomery 2000; Gordin 2015).

The Portuguese translations of Darwin's 'red grouse' ('lagopode-escocês') are a case in point. At the beginning of the *Historical Sketch*, Darwin discusses Richard Owen's ideas on the 'red grouse', a pheasant endemic to the British Isles, which JMP and CAD translate as *tetras urogallus L*. This translation is problematic in many ways. First, the species name (*tetras*) is not capitalized and is spelt incorrectly in another instance of JMP's repeated Gallicism, probably influenced by the French 'grand tétras'. The correct form is *Tetrao*. Secondly, citing the scientific name's author is not mandatory outside of scientific papers but, if present, should be written as 'Linnaeus' and not italicized: botanical nomenclature requires the abbreviation 'L.', while zoological nomenclature does not mention the possibility (ICZN 1999; Turland et al. 2017). Thirdly both JMP and CAD replicate Barbier's erroneous translation of 'red grouse' as 'coq de bruyère rouge'. 'Coq de bruyère' is indeed a term that refers to *Tetrao urogallus* when not used in conjunction with the adjective 'rouge', probably the source of JMP's confusion, but the term is synonymous with 'grand tétras' in French ('tetraz' in Portuguese, among other common names) and thus refers to the western capercaillie, not the English 'red grouse'. A correct translation would be 'lagopéde d'Écosse' in French or 'lagópode-escocês' in Portuguese. The same term is translated subsequently as 'galo de *bruyère* vermelho' (following Barbier's text) and 'galo montês' by JMP or 'galo inglês silvestre vermelho' and 'galo montês' in CAD (Owen 1859: lxxxiii; Darwin 1876b: xiv–xv, 52, 91; 1961: xii, 45, 79; 2014: 23, 68, 114; 1876a: xvii-xviii, 38, 66; Bizzo 2018; Avibase 2023).

The bird's scientific nomenclature is itself confusing. It is identified as a species in its own right, *Lagopus scotica*, or as a subspecies of the willow ptarmigan (*Lagopus lagopus*, 'lagópode-cinzento' in Portuguese), called *Lagopus lagopus scotica*, so that, technically, the term 'lagópode-cinzento' also applies to 'red grouse' (Avibase 2023). Bizzo (2018) prefers 'faisão' instead of 'lagópode', stating that the first is 'mais familiar ao leitor brasileiro, em vez de "lagópode", "tetraz" ou "galo-lira", que seriam mais precisos, e conhecidos em Portugal, mas não no Brasil' [more familiar for the Brazilian reader since the terms 'lagopode', 'tetraz' or 'galo-lira', which are more accurate, are known in Portugal but not in Brazil]. His comment emphasizes the cultural difficulties of translating species names. This raises the question: should translators use a pre-existing translation even if it is obscure to the target audience? Should they choose 'lagópode' and alienate

some readers, or should they borrow, adapt, or coin a new term? The next section offers a brief reflection on this issue.

Conclusions

The *Origin* has a twofold nature: it is such a classic of scientific thought that it has become of interest to non-specialist readers. To answer the previous question, we must first understand the context in which the source and translated texts are produced, including matters relating to the translation and the translator, as well as the editorial scope and socialcultural features that influence translation choices. In other words, we must know if the translator set out to preserve the Victorian, technical, and foreign aspects of the texts or if he or she intends to make it more approachable to today's non-specialist reader. Should translators adapt their translations according to the expected readership or keep the idiosyncrasies of the source text to preserve its original context? This is a long-standing issue in Translation Studies, much debated to this day (Munday 2016: 47–9, 225–9).

It is important to keep in mind that errors are inevitable, and translators should not be demonized because of the occasional slip. After all, even Darwin was wrong when he mistakenly identified the 'galo-da-serra-do-pará' [Guianan cock-of-the-rock] (*Rupicola rupicola*) as the 'rock-thrush of Guiana' (Darwin 1876a, 70; Bizzo 2018). Thrushes belong to the genus *Turdus*, as noted by the naturalist Julius Victor Carus (1867), the *Origin*'s second German translator, who asked Darwin directly: '[...] is it a *Turdus* or a *Rupicola*?' However, the seriousness and frequency of mistakes are an excellent assessment tool to gauge the quality of the translation and the expertise of its translators, proofreaders, and editors. After all, in scientific discourse, translation errors may turn an originally sound claim about nature into misinformation.

The role of expertise in the translation of biological nomenclature, therefore, deserves attention. Igor Silva (2019) borrows the concepts of contributory and interactional expertise from Harry Collins and Robert Evans (2007) to explore whether translators should be experts on the subject of their translations. Contributory expertise is needed to execute a given activity properly in a field of knowledge, while interactional expertise stands for the capacity to understand a field so deeply that its practitioners are unable to identify if the interactional expert is a contributory member of the field or not. In other words, in a scientific context, the contributory expert in biotechnology goes to the lab, conducts experiments, develops products, and writes papers which add to the field, while the bureaucrat who authorizes the funding or the journalist who writes about the work for the general public are interactional experts. Both kinds of experts have what is called 'specialist tacit knowledge', not verbally expressed or written in manuals, but common to

the expert's practice and acquired through immersion in their culture. After comparing translations of the same text by experts and non-experts, Silva concludes that 'the core translation problem is related to both understanding the source text and producing an adequate target text, which requires specialized tacit knowledge [...] interactional expertise seems to be a potential avenue in the (continued) training of specialized translators.' (2019: 94)

As seen above, while JMP comes the closest as a medical sciences graduate, none of the translators in the corpus is an expert on Darwin or natural history. The examples explored above show the problems caused by a lack of specialized tacit knowledge in translating *The Origin of Species*. The sections analysed call for some degree of knowledge in the fields of scientific nomenclature, systematics, botany, zoology, dog breeding, pigeon breeding, etc., besides the historical knowledge of how such terminology was applied in the nineteenth century.

Therefore, following Silva (2019), it appears that translators of texts like the *Origin* would benefit from interactional expertise in biology and its history to produce better translations of the technical terminology, especially regarding our focus here – vernacular and scientific names for plants and animals. The ideal Darwin translator, therefore, already is or has the potential to become an interactional expert by applying their research skills to acquire the requisite level of subject-specific competence. This concurs with the views of Kastberg (2007) and Stolze (2009) on translating technical texts: science does not occur in a vacuum, since even its terminology is steeped in the culture of its practitioners and the translator should be trained to perceive these contexts.

The linguist Anna Wierzbicka (2004) and the biologists John Wilkins and Malte Ebach (2014: 79) agree that terms like 'bird' may be used in a popular sense (usually associated with small flying and singing feathered animals) or in a technical sense (as a synonym of the taxonomical class Aves). Philippe Selosse (2008) analyses dozens of translation problems relating to the *épistémè* of a seventeenth-century technical term for a botanical species. Any translator unaware of such conflicts between the worldviews of Renaissance and early modern science would be at risk of misrepresenting the history of science. Translators who acquire tacit knowledge of scientific and vernacular nomenclature are better suited to distinguishing when a term is used in its everyday sense or otherwise, and how they should therefore translate it. Better-equipped professionals will typically work better than their peers with fewer tools. The same is true of translators.[11]

Notes

1 This is a problem faced by every translator of such technical classical texts. To give an example, a zoological consultant, John T. Saunders, was employed on Rackham's translation of *Naturalis Historia* (1938–62).

2 During the nineteenth century, the rules of nomenclature worked more like suggestions of best practice: many authors and organizations published codes, but they were not as institutionalised as today. The International Commission on Zoological Nomenclature was founded in 1895, and the International Botanical Congress, which today defines the botanical codes of nomenclature, began in 1900. However, there are still separate codes of nomenclature for cultivated plants, plant associations, bacteria and archaea, and viruses.

3 See, for example, Robert Waring Darwin's *Principia Botanica* (1787), which contains a long list of British plant names side by side with their Linnaean names.

4 All translations are by the author unless otherwise indicated.

5 Two further reviews have similarly negative views:
A tradução de Mesquita Paúl é por interpolação do francês, o que não é crime nenhum, mas explica as torções da linguagem e mostra que o francês de nosso amigo eram bem fraquinho [Mesquita Paúl's translation is interpolated with French, which is not a crime, but explains linguistic distortions and shows our friend's very weak French]. (Bottman 2009–13)
Imagine quantos outros absurdos não devem existir ao longo dessa tradução medonha! [...] Se você tem uma tradução das origens, procure, no capítulo I ("Variação das espécies no estado doméstico"), pelo primeiro parágrafo da seção "Efeito dos hábitos e do uso ou não-uso das partes", parágrafo esse que começa com "A mudança dos hábitos produz efeitos…". Muito bem: se lá estiver escrito "canário doméstico" e "canário selvagem", você é o infeliz proprietário de uma tradução não apenas tosca como nem mesmo feita a partir do original
[Imagine how much nonsense must exist in this dreadful translation! [...] If you own a translation of the *Origin,* look for the first paragraph of the section 'Efeito dos hábitos e do uso ou não-uso das partes', in Chapter I ('Variação das espécies no estado doméstico') which starts with '*A mudança dos hábitos produz efeitos* […]'. Alright: if it is written "domestic" and "wild canary," you are the unfortunate owner of a translation that is not only crude but not even based on the original text] (Furtado 2011)

6 The information about the couple was collected from personal blogs and professional websites, as well as personal communication.

7 *Amaryllidaceae: Preceded by an Attempt to Arrange the Monocotyledonous Orders, and Followed by a Treatise on Cross-Bred Vegetables, and Supplement*, published in 1837.

8 Emphasis in the original. There is no way to know why JMP italicised the term, but the exchange of 'Escócia' [Scotland] for 'Córsega' [Corsica] derives from the French intermediary translation: 'du cerf en Corse' (Darwin 1876b: 139).

9 Darwin's source here is John Lubbock's 1859 paper *On the Digestive and Nervous Systems of* Coccus hesperidum.

10 Turnspit dogs were bred specifically to turn roasting spits. The breed became increasingly rare over the nineteenth century, which may explain why there is not an equivalent term in Portuguese. CAD's footnote is incorrect, mistaking the breed for a kind of gun dog.

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References

Ajasson de Grandsagne, Stéphane (ed.). 1829–32. *Histoire Naturelle de Pline*. Paris: C. L. F. Panckoucke, 20 vols. URL: https://www.biodiversitylibrary.org/bibliography/16747 (accessed 16 March 2023)

Anchieta, Joseph de. 1900. *Cartas Inéditas*, trans. João Vieira de Almeida. São Paulo: Typographia da Casa Ecletica. URL: https://digital.bbm.usp.br/handle/bbm/4683 (accessed 16 March 16 2023)

Anon. 1867. *The Grammar-School Dictionary: A Dictionary of the English Language*. 1867. London: William Allan; Edinburgh: John Menzies. URL: https://archive.org/details/grammarschooldic00lond/page/n7/mode/2up (accessed 16 March 2023)

Arnott, W. Geoffrey. 2007. *Birds in the Ancient World from A to Z*. London: Routledge.

Avibase. 2023. URL: https://avibase.bsc-eoc.org (accessed 16 March 2023)

Bizzo, Nélio. 2018. 'Nota Técnica: A Revisão da Tradução do *Origin*', *Blog Professor Nélio Bizzo*. URL: http://neliobizzo.pro.br/blog/nota-tecnica-a-revisao-da-traducao-do-origin/ (accessed 16 March 2023)

Bottman, Denise. 2009–13. *Blog Não Gosto de Plágio*. URL: https://naogostodeplagio.blogspot.com/search/label/Darwin (accessed 16 March 2023)

Carus, Julius Victor. 1867. 'Letter 5370' [to Charles R. Darwin]. *Darwin Correspondence Project*. URL: https://www.darwinproject.ac.uk/letter/DCP-LETT-5370.xml (accessed 16 March 2023)

Collins, Harry, and Robert Evans. 2007. *Rethinking Expertise*. Chicago: University of Chicago Press.

Costa, Felipe A. P. L. 2014. 'Lendo Darwin em Português', *Observatório da Imprensa* 802. URL: https://www.observatoriodaimprensa.com.br/armazem-literario/_ed802_lendo_darwin_em_portugues/ (accessed 16 March 2023)

Cuvier, Georges. 2012 [1831]. *Cuvier's History of the Natural Sciences*: *Twenty-four Lessons from Antiquity to the Renaissance*, trans. Abby J. Simpson. Paris: Publications scientifiques du Muséum. URL: https://books.openedition.org/mnhn/3643. (accessed 16 March 2023)

Darwin, Robert W. 1787. *Principia Botanica*. Newark: Allin and Co. URL: https://www.google.com.br/books/edition/Principia_Botanica_Or_A_Concise_and_Easy/LPpeAAAAcAAJ?hl=en&gbpv=1&printsec=frontcover (accessed 16 March 2023)

Darwin, Charles R. 1876a. *The Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*, sixth edition. London: John Murray. URL: http://darwin-online.org.uk/content/frameset?viewtype=image&itemID=F401&pageseq=1 (accessed 16 March 2023)

Darwin, Charles R. 1876b. *L'origine des espèces au moyen de la sélection naturelle ou la lutte pour l'existence dans la nature*, trans. Edmond Barbier. Paris: C. Reinwald. URL: http://darwin-online.org.uk/converted/pdf/1876_OriginFrench_F661.pdf (accessed 16 March 2023)

Darwin, Charles R. 1961 [1913]. *A origem das espécies*, trans. Joaquim Dá Mesquita Paúl. Porto: Lello & Irmão.

Darwin, Charles R. 2003. *Origem das Espécies*, trans. Joaquim Dá Mesquita Paúl [São Paulo: Departamento de Ecologia IB-USP]. URL: http://ecologia.ib.usp.br/ffa/arquivos/abril/darwin1.pdf (accessed 16 March 2023)

Darwin, Charles R. 2009. *A Origem das Espécies Através da Selecção Natural ou a Preservação das Raças Favorecidas na Luta Pela Sobrevivência*, trans. Ana Afonso. Leça de Palmeira: Planeta Vivo. URL: http://darwin-online.org.uk/converted/pdf/2009_OriginPortuguese_F2062.7.pdf (accessed 16 March 2023)

Darwin, Charles R. 2014. *A Origem das Espécies*, trans. Carlos Duarte and Anna Duarte. São Paulo: Martin Claret.
Darwin, Charles R. 2018. *Sobre a Origem das Espécies por Meio da Seleção Natural ou a Preservação de Raças Favorecidas na Luta Pela Vida*, trans. Daniel Miranda. Technical revision by Nélio Bizzo. São Paulo: Edipro.
Desfayes, Michel. 1999. *A Thesaurus of Bird Names: Etymology of European Lexis through Paradigms*. Sion: Musée Cantonal d'Histoire Naturelle. URL: https://ewatlas.net/desfayes/intro/anglais/page2.php (accessed 16 March 2023)
Dines, Ilya. 2008. 'The Textual and Pictorial Metamorphoses of the Animal called Chyrogrillius', in Michèle Gambier, Pieter de Leemans and An Smets (eds), *Science Translated: Latin and Vernacular Translations of Scientific Treatises in Medieval Europe*, pp. 73–89. Leuven: Leuven University Press.
Duarte, Carlos. 2008. 'A 4 mãos', *Blog Coisas Que Eu Vou Pensando*. URL: http://coisasqueeuvoupensando.blogspot.com/2008/02/parceria-bem-sucedida.html (accessed 16 March 2023)
Eco, Umberto. 2003. *Mouse or Rat? Translation as Negotiation*. London: Phoenix.
Embrapa. 2018. 'Hífen'. URL: https://www.embrapa.br/manual-de-editoracao/gramatica-e-ortografia/normas-ortograficas/hifen (accessed 16 March 2023)
Fonseca, Pedro R. G. 2015. *Darwin em Portugal (1910–1974): O Darwinismo e a Evolução na Produção Científica de Botânicos Portugueses*. PhD thesis, Coimbra: Universidade de Coimbra, 3 vols. URL: https://estudogeral.sib.uc.pt/handle/10316/28562 (accessed 16 March 2023)
Furtado, Gerardo. 2011. 'O teste do canário', *Blog Biologia Evolutiva*. URL: https://biologiaevolutiva.wordpress.com/2011/10/08/o-teste-do-canario/ (accessed 16 March 2023)
Gidney, L. 2007. 'Earliest Archaeological Evidence of the Ancon Mutation in Sheep from Leicester, UK', *International Journal of Osteoarchaeology* 17(3): 318–21. https://doi.org/10.1002/oa.872 (accessed 16 March 2023)
Gomes, Nuno. 2009. 'Introdução à Colecção Planeta Darwin', in Charles Darwin, *A Origem das Espécies Através da Selecção Natural ou a Preservação das Raças Favorecidas na Luta pela Sobrevivência*, trans. Ana Afonso, pp. vii-x. Leça de Palmeira: Planeta Vivo. URL: http://darwin-online.org.uk/converted/pdf/2009_OriginPortuguese_F2062.7.pdf (accessed 16 March 2023)
Gordin, Michael D. 2015. *Scientific Babel: How Science was Done before and after Global English*. Chicago: University of Chicago Press.
Hensen, Gyde. 2010. 'Translation Errors', in Yves Gambier and Luc van Doorslaer (eds), *Handbook of Translation Studies*, vol. 1, pp. 385–88. Amsterdam: John Benjamins.
ICZN. 1999. *International Code of Zoological Nomenclature*. London: ICZN. URL: https://www.iczn.org/the-code/the-international-code-of-zoological-nomenclature/the-code-online/ (accessed 16 March 2023)
Júnior, Marcus Sander. 2016. 'Charles Darwin ficaria feliz com esta edição pocket', *Amazon Customer Reviews*. URL: https://www.amazon.com.br/gp/customer-reviews/R3L348TQRJNFJ9/ref=cm_cr_srp_d_rvw_ttl?ie=UTF8&ASIN=8544000258 (accessed 16 March 2023)
Katsberg, Peter. 2007. 'Cultural Issues Facing the Technical Translator', *The Journal of Specialised Translation* 8: 104–9. URL: https://www.jostrans.org/issue08/art_kastberg.pdf (accessed 16 March 2023)
Knapp, Sandra, Gerardo Lamas, Eimear Nic Lughadha, and Gianfranco Novarino. 2004. 'Stability or Stasis in the Names of Organisms: The Evolving Codes of Nomenclature', *Philosophical Transactions of the Royal Society of London B* 359: 611–22. https://doi.org/10.1098/rstb.2003.1445 (accessed 16 March 2023)

Larousse, Pierre (ed.). 1866–77. *Grand Dictionnaire Universel du XIXe Siècle: Français, Historique, Géographique, Mythologique, Bibliographique, Littéraire, Artistique, Scientifique, etc., etc*. Paris: Administration du Grand Dictionnaire Universel, 17 vols. URL: https://gallica.bnf.fr/services/engine/search/sru?operation=searchRetrieve&version=1.2&collapsing=disabled&rk=21459;2&query=dc.relation%20all%20%22cb33995829b%22# (accessed 16 March 2023)

Littré, Émile (ed.). 1873–74. *Dictionnaire de la Langue Française*, first edition. Paris: Librairie Hachette, 4 vols. URL: https://gallica.bnf.fr/services/engine/search/sru?operation=searchRetrieve&version=1.2&startRecord=0&maximumRecords=15&page=1&collapsing=disabled&query=dc.relation%20all%20%22cb30824717s%22%20sortby%20dc.title%2Fsort.ascending (accessed 16 March 2023)

Machado, Cristina de A. 2017. 'Papo de tradutor I', *Blog Diário de Bordo da Caravela Cruzeiro do Sul*. URL: https://diariodebordodacaravelacruzeirodosul.blogspot.com/2017/04/171-papo-de-tradutor-1.html (accessed 16 March 2023)

Matias, Rinaldo. 2018. 'Edição poderia ser melhor', *Amazon Customer Reviews*. URL: https://www.amazon.com.br/gp/customer-reviews/R320VZQAFZV7AE/ref=cm_cr_srp_d_rvw_ttl?ie=UTF8&ASIN=8572329854 (accessed 16 March 2023)

Montgomery, Scott L. 2000. *Science in Translation: Movements of Knowledge through Cultures and Time*. Chicago: University of Chicago Press.

Munday, Jeremy. 2016. *Introducing Translation Studies*: *Theories and Applications*, fourth edition. New York: Routledge.

Murray, James H (ed.) 1874. *Johnson's Dictionary: With Numerous Additions from the Most Eminent Authorities*. London: Routledge. URL: https://archive.org/details/johnsonsdiction00murrgoog/page/n5/mode/2up (accessed 16 March 2023)

National Fruit Collection. 2019. URL: http://www.nationalfruitcollection.org.uk/index.php (accessed 16 March 2023)

Neto, Antonio. 2017. 'Edição para enfeite', *Amazon Customer Reviews*. URL: https://www.amazon.com.br/gp/customer-reviews/R1DEHHF159COFC/ref=cm_cr_arp_d_viewpnt?ie=UTF8&ASIN=8572329854#R1DEHHF159COFC (accessed 16 March 2023)

OWEN, Richard. 1859. 'Address of the President'. Report of the 28th meeting of the British Association for the Advancement of Science, held at Leeds, xlix-cx. URL: https://www.biodiversitylibrary.org/item/96162#page/53/mode/1up (accessed January 12, 2025).

Pereira, Ana Leonor. 2010. 'The Reception of Darwin in Portugal (1865–1914)', *Revista Portuguesa de Filosofia* 66(3): 643–60. URL: https://www.jstor.org/stable/41354908?seq=1 (accessed 16 March 2023)

Rackham, H. (ed.). 1938–62. *Pliny: Natural History*. Cambridge, MA: Harvard University Press, 10 vols.

Remsen, David. 2016. 'The Use and Limits of Scientific Names in Biological Informatics', *Zookeys* 550: 207–23. https://doi.org/10.3897%2Fzookeys.550.9546 (accessed 16 March 2023)

Ribeiro, João Ubaldo. 2018. 'Suffering in Translation', in Marcia A. P. Martins and Andréia Guerini (eds), *The Translator's Word*: *Reflections on Translation by Brazilian Translators*, pp. 147–50. Santa Catarina: Editora UFSC.

Ritvo, Harriet. 1997. *The Platypus and the Mermaid and Other Figments of the Classifying Imagination*. Cambridge, MA: Harvard University Press.

Rodrigues, Cristina Carneiro. 2011. 'As Traduções de Bates: Dois Naturalistas no Rio Amazonas', *Trabalhos de Linguística Aplicada* 50(2): 281–300. DOI: http://dx.doi.org/10.1590/S0103-18132011000200004 (accessed 16 March 2023)

Rodrigues, Cristina Carneiro. 2012. 'Brasiliana e Reconquista do Brasi: Projetos Editoriais de Traduções', *Revista de Letras* (85): 219–30. DOI: http://dx.doi.org/10.5380/rel.v85i1.27070 (accessed 16 March 2023)

Rodrigues, Cristina Carneiro. 2014. 'As muitas vozes de *Viagem ao Brasil* em traduções indiretas', in Lenita Esteves and Viviane Veras (eds), *Vozes da Tradução: Éticas do Traduzir*, pp. 117–47. São Paulo: Humanitas.

Scottish Natural Heritage. 2020. URL: https://www.nature.scot/plants-animals-and-fungi/ (accessed 16 March 2023)

Selosse, Philippe. 2005. 'The Underlying Pattern of the Renaissance Botanical Genre Pinax', in Janne Skaffari, Matti Peikola, Ruth Carroll, Risto Hiltunen, and Brita Wårvik (eds), *Opening Windows on Texts and Discourses of the Past*, pp. 161–78. Amsterdam: John Benjamins.

Selosse, Philippe. 2008. 'Traduire la Nomenclature Botanique Néo-latine de la Renaissance: la Linguistique au Secours de l'Histoire des Sciences' in Pierre Duris (ed.), *Traduire la Science: Hier et Aujourd'hui*, pp. 25–43. Pessac: Maison des Sciences de l'Homme de l'Aquitaine. https://doi.org/10.4000/books.msha.8751 (accessed 16 March 2023)

Silva, Igor Antônio Lourenço. 2019. 'An Interactional Expertise-based Approach to Specialised Inverse Translation', *Tradução em Revista* 26: 86–98. https://doi.org/10.17771/PUCRio.TradRev.40528 (accessed 16 March 2023)

Steel, Carlos G., Guy Guldentops, and Pieter Beullens (eds). 1999. *Aristotle's Animals in the Middle Ages and Renaissance*. Leuven: Leuven University Press.

Stolze, Radegundis. 2009. 'Dealing with Cultural Elements in Technical Texts for Translation', *The Journal of Specialised Translation* 11: 124–42. URL: https://jostrans.org/issue11/art_stolze.pdf (accessed 16 March 2023).

Stuardo, José R. 2007. 'Trascendencia del Primer *Saggio Sulla Storia Naturale del Chili* de J. I. Molina, su Traducción, el *Compendio* Anónimo y el Bicentenário', *Atenea* 495: 83–107. http://dx.doi.org/10.4067/S0718-04622007000100006 (accessed 16 March 2023)

Turland, Nicholas J; John H. Wiersema, Fred R. Barrie, Werner Greuter, David L. Hawksworth, Patrick S. Herendeen, Sandra Knapp, Wolf-Henning Kusber, De-Zhu Li, Karol Marhold, Tom W. May, John McNeill, Anna M. Monro, Jefferson Prado, Michelle J. Price, and Gideon F. Smith. 2017. *International Code of Nomenclature for Algae, Fungi, and Plants (Shenzen Code)*. Glashütten: Koeltz Botanical Books. URL: https://iapt-taxon.org/nomen/main.php (accessed 16 March 2023)

Venuti, Lawrence. 1998. *Scandals of Translation: Towards an Ethics of Difference*. London: Routledge.

Wierzbicka, Anna. 2004. 'Semantics of Natural Kinds', in Anna Wierzbicka. *Semantics: Primes and Universals*, pp. 335–50. Oxford: Oxford University Press.

Wilkins, John S., and Malte C. Ebach. 2014. *The Nature of Classification: Relationships and Kinds in the Natural Sciences*. New York: Palgrave Macmillan.

6

THE TRANSLATION OF NINETEENTH-CENTURY MEDICAL DICTIONARIES PUBLISHED IN SPAIN AND ITS EFFECTS ON THE DISSEMINATION OF SCIENCE

Bertha M. Gutiérrez Rodilla and Carmen Quijada Diez

Introduction

Fortunately, at this point in the twenty-first century, there is no need to insist that reconstructing the history of scientific vocabulary is necessary to our understanding of the history of scientific concepts and the lexicon of a language. The vocabulary that shapes a language cannot be solely based on common and literary texts; it must also take scientific texts into account. Treatises, handbooks, manuals, monographs, and various types of lexicographical repertoires, including dictionaries, glossaries, and vocabularies, provide us with valuable information on scientific vocabulary in the past. This chapter highlights the significance of specialized lexicographical compendia, rarely used as a basis for research.[1]

This is certainly regrettable, as they provide a wealth of valuable information. As McConchie puts it, 'dictionaries themselves and those who compiled them remain largely in the outer darkness. (…) [T]he whole area remains a goldmine of rich research pickings' (2014). They are indeed an excellent source of knowledge about various historical periods, offering a route to refining generalized ideas regarding intellectual or scientific pursuits, and helping trace the evolution and dissemination of various medical doctrines. For instance, they enable us to measure the success or failure of a term or group of terms associated with a particular theory, among many other aspects.

These compendia essentially served to collect words over time. But they also had a decisive role in shaping technical vocabulary, especially at times when the translation of scientific texts was a widespread activity that occupied renowned scientists. In these cases, in addition to a *notarial* function,

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i.e. recording word use and established meaning, these dictionaries also promoted certain usages, and such works contain the first traceable written record of numerous terms. Analysing this type of work from both a translatological and historical perspective can therefore yield valuable information for the study of the history of science and the evolution of medical terminology.

The following pages offer a comprehensive overview of the lexicographic context in the medical field in nineteenth-century Spain. We examine the challenges faced by translators of French and German works into Spanish and discuss the role of translation in the Spanish context and its impact on the history of Spanish medicine. The last section presents the *Tesoro Lexicográfico Médico* [Spanish Medical Lexicographic Thesaurus] computer tool, a valuable resource for scholars of all disciplines interested in exploring the evolution of scientific language – including through translation. The vast *TeLeMe* lexicographic database offers a unique opportunity to investigate the intricacies of scientific language and its development over time, shedding new light on the cultural and historical context of scientific discourse.

Types of Medical Dictionary in Nineteenth-Century Spain

The technical repertoires focused on in this chapter are those produced and published in the medical field in Spain. During the nineteenth century, there was an extraordinary boom in the development of technical lexicographical repertoires in Europe, particularly in France and Germany, spreading to other countries, including Spain. These repertoires were heterogeneous in form and content, as their purposes and recipients did not always coincide.

This type of work allows for various classification criteria (Figure 6.1).

Lexicographic works can be divided into terminological and encyclopaedic dictionaries (Dechambre 1864; Gutiérrez Rodilla 1999: 34). The former have been called 'word dictionaries', 'lexicons', and 'vocabularies'. This type of lexicographic work did not enjoy much success in France but flourished in Spain, meeting a clear need to name the new concepts and theories being developed north of the Pyrenees. No repertoire of this type was translated into Spanish, while several original ones were published: Manuel Hurtado de Mendoza's terminological dictionary of medicine stands out as the first such published in Spain, as early as 1840 (Hurtado de Mendoza 1840; on this dictionary, see Gutiérrez Rodilla 2012a and 2017). Encyclopaedic dictionaries, also called 'dictionaries of things' or 'realias', were the most widespread format in France and Germany (Gutiérrez Rodilla 1999: 34). In Spain, original medical dictionaries of this kind were not unknown: examples include Antonio de Ballano's *Diccionario de Medicina y Cirugía* [Dictionary of Medicine and Surgery] (1805–7) and Manuel Hurtado de

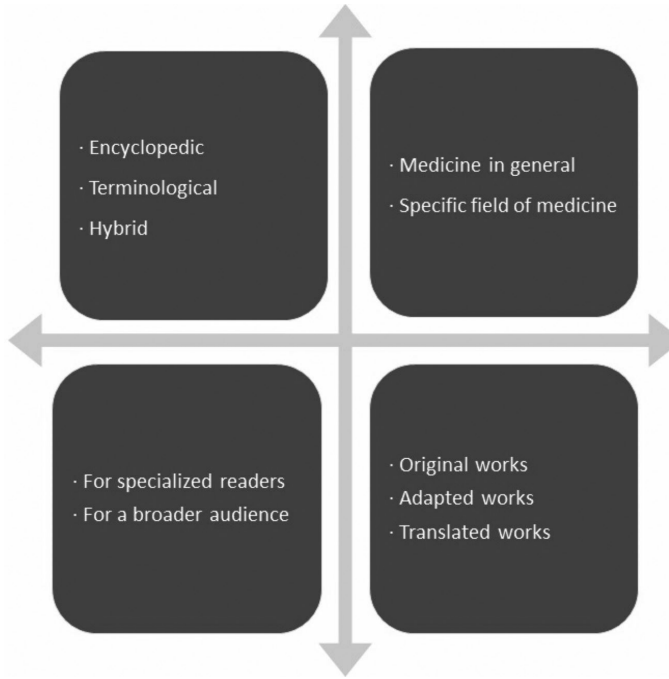

FIGURE 6.1 Types of Dictionaries Depending on the Classification Criteria Applied.

Source: The authors

Mendoza and Celedonio Martínez Caballero's *Diccionario de Medicina y Cirugía* [Dictionary of Medicine and Surgery] (1820–23) (on this particular dictionary, see Gutiérrez Rodilla 2012b). However, the majority of medical dictionaries available in Spain were translations from French and German. There was also a rare third type combining the first two approaches, in which concise definitions characteristic of terminological vocabularies were included alongside typical encyclopaedic definitions. One such is Ángel de Larra y Cerezo's *Diccionario de bolsillo de Medicina y Cirugía y Farmacia* [Pocket Dictionary of Medicine, Surgery, and Pharmacy] (1894), in which purely terminological definitions are found alongside encyclopaedic ones.

A second criterion for the classification of lexicographic works from this period is the specialized subject matter they covered. Medical reference works can be divided into general dictionaries of medicine, such as the aforementioned works by Ballano (1805–07) and Larra y Cerezo (1894), and dictionaries pertaining to a very specific medical field, such as Manuel Hurtado de Mendoza's *Enciclopedia de terapéutica* [Encyclopaedia of Therapeutics] (1847) and Javier Pongiolioni's *Vocabulario de Sintomatología* [Vocabulary

of Symptomatology] (1895). In fact, the commonest specific medical dictionaries of the century published in Spain were on the topic of therapeutics (see Gutiérrez Rodilla 2022: 159–60).

One further aspect to be considered is that of the intended audience: some dictionaries addressed specialists, while others addressed the general public. Even within those aimed at a specialized audience, a distinction can be made between those specifically targeted at medical professionals and ones targeted at other types of professionals, such as legal specialists or public health authorities. This is evident if we compare, for example, the *Diccionario manual antropológico para inteligencia de los reconocimientos facultativos en lesiones corporales* [Anthropological Dictionary for Understanding Medical Assessments of Bodily Injuries] (1853) by José Vázquez de Quevedo and the *Diccionario de las sustancias alimenticias, con sus alteraciones y sofisticaciones* [Dictionary of Food Substances, their Alterations and Adulterations] (1877) by Francisco Javier Ágreda (on this type of dictionary, see Gutiérrez Rodilla 2018a and 2018b). One last criterion is the one that interests us most in this chapter – whether the dictionary was originally written in Spanish or translated and/or adapted from another language.

Translating Medical Dictionaries in Nineteenth-Century Spain

Of all these types of repertoires, the ones that were translated the most – at least in Spain – were encyclopaedic in nature, for an audience of medical specialists. Alongside a handful of dictionaries of this type originally written in Spanish, such as the works by Ballano (1805–7) and Hurtado de Mendoza and Martínez Caballero (1820–23), around 15 repertoires were imported in translation from France and, to a lesser extent, Germany. Examples include the *Dictionnaire des sciences médicales* [Dictionary of Medical Sciences], compiled by several authors and published in Paris between 1812 and 1822, published in Spanish as *Diccionario de Ciencias Médicas* [Dictionary of the Medical Sciences] (1821–27), and the *Diccionario enciclopédico de medicina y cirugía prácticas* [Encyclopaedic Dictionary of Practical Medicine and Surgery] (1885–91), based on Albert Eulenburg's *Real-Encyclopädie der gesamten Heilkunde: Medizinisch-chirurgisches Handwörterbuch für praktische Ärzte* [*Complete Encyclopaedia of Medicine: Medical-Surgical Dictionary for General Practitioners*] (1880–83).

Understanding how these works were used means exploring what led their authors to plan and publish them and the impact they had in nineteenth-century Spain. These encyclopaedic repertoires were an attempt to compile medical knowledge from various areas of medicine, drawn from extant manuals. They were up-to-date medical handbooks, arranged in alphabetical order, providing professionals with the most up-to-date review of medical texts. This is evident in the great length of the articles and in

the terms they included, which do not aim for full terminological coverage but rather focus on terms whose content had undergone significant change in recent times. The French and German originals ran to multiple volumes in an attempt to cover the entire field: Albert Eulenburg's German encyclopaedic dictionary (1880–83) grew from 15 volumes in its first edition (Eulenburg 1880–83) to 22 in the second and 27 in the third.

The number of volumes could also increase when such dictionaries were translated into Spanish: one example is Ambroise-Auguste Tardieu's *Dictionnaire d'hygiène publique et de salubrité* [Dictionary of Public Hygiene and Sanitation] (1852–54), which went from three volumes in its original French version to five in the Spanish edition, titled *Diccionario de Higiene pública y salubridad* [Dictionary of Public Hygiene and Sanitation] (1882–85). However, the opposite was also true, as the translation could shrink: the *Dictionnaire des sciences médicales* [Dictionary of Medical Sciences] (1821–27) went from 60 volumes in French to 39 in Spanish. These were not the only formal changes resulting from the translation process, which also on occasion included new figures and engravings not present in the original. José Sáenz Criado's Spanish translation of Tardieu's dictionary added 65 new engravings for didactic purposes (Gutiérrez Rodilla 2022: 158). The dictionaries were translated by renowned physicians, who adapted the content to the target culture. This is evident from the title page of the translated works: in the Spanish translation of Eulenburg's dictionary (Figure 6.2), the name of the translator is more prominently displayed than that of the original author.

The process of adaptation is also announced on the title page: 'Traducido directamente y arreglado para uso de los médicos españoles' ['Directly translated and arranged for the use of Spanish physicians']. It was not uncommon for translators to add, modify, or suppress information from the original works, in part due to the fact that some content had become obsolete by the time the translations were published.

Four major types of adaptation can be identified (Gutiérrez Rodilla and Quijada Diez 2015: 202–6). These involve: 1) synthesizing the content to reduce the number of volumes in the target edition; 2) updating the content in an attempt to mitigate the time gap between the original and the translation; 3) expanding or substituting the content in order to adapt it to the interests of the Spanish-speaking audience; and 4) correcting original information deemed incorrect or anti-Spanish.

As discussed, the *Dictionnaire des sciences médicales* (1812–22; translated into Spanish as *Diccionario de ciencias médicas*, 1821–27) is a particularly noteworthy example of textual shortening, going from 60 volumes in French to just 39 in Spanish. Equally noteworthy is the fact that the Spanish publishers had initially announced just 12 volumes. In the preface to the Spanish edition, the translators discussed the difficulties they faced:


DICCIONARIO ENCICLOPÉDICO

DE

MEDICINA Y CIRUGÍA

PRÁCTICAS

ESCRITO EN ALEMAN BAJO LA DIRECCION

DE

Dr. J. Eulenburg

TRADUCIDO DIRECTAMENTE Y ARREGLADO PARA USO DE LOS MÉDICOS ESPAÑOLES

POR EL

Dr. D. Isidoro de Miguel y Viguri

PRECEDIDO DE UN PRÓLOGO

POR EL

Dr. D. Cirilo María Cortejo

ILUSTRADO CON NUMEROSOS GRABADOS

TOMO I

A.—BALANITIS.

MADRID

AGUSTIN JUBERA, EDITOR

1884

FIGURE 6.2 Cover Page of the Spanish Translation of Albert Eulenburg's Dictionary.

Source: Biblioteca Nacional de España

> [N]o se trataba solamente de traducir: las mas veces era necesario antes examinar cada artículo cotejándole con otros publicados posteriormente, y ver si estos contenían verdaderos progresos, si se podían reducir o simplemente suprimir.
>
> *(1821–27: 1)*

> [It was not just about translating – most of the time it was necessary to first examine each article by comparing it with others published later, and see if these contained true advances, if they could be reduced, or simply eliminated.][2]

Another interesting example is the French *Dictionnaire de médecine et répertoire général des sciences médicales* [Dictionary of Medicine and General Repertoire of Medical Sciences] (1832–44), translated into Spanish by various authors as the *Diccionario de Medicina y Cirugía* (1851–55), which saw a reduction from 29 volumes to just eight in the translated edition (Gutiérrez

Rodilla 1999: 49–50). These reductions in size were not arbitrary, but rather economic in origin. The works were purchased by subscription, making it difficult for interested readers to commit financially to a high number of volumes, especially considering the likelihood that the later volumes would already be obsolete by the time of publication.

The second type of adaptation, involving the updating of content, is closely related to the first. Considerable time could elapse between the publication of the first and last volumes of the original – 12 years in the case above – to which must be added the time it took to translate and publish the work in Spanish. Medicine continued to advance in the meantime, quickly rendering these works obsolete. Translators would therefore update the original text by adding information from later works. An example can be found in the lemma 'choléra' [cholera] in Tardieu's *Dictionnaire d'hygiène publique* [Dictionary of Public Hygiene] (1852–54) and its Spanish translation *cólera*: the lemma took up 51 pages in the French edition, increasing nearly fourfold in the Spanish version to 220 (*Diccionario de Higiene pública y salubridad*, 1882–85). The translator decided to add a significant amount of new information about the disease, published after the original dictionary came out. An equally illustrative example can be found in the Spanish translation of the German dictionary *Handbuch der speciellen Pathologie und Therapie* [Handbook of Special Pathology and Therapy] (Ziemssen 1874–85). The Spanish translator and physician Francisco Vallina frequently incorporated his own notes into the body of the text, making them difficult to distinguish from the original text as they are not indicated as footnotes (Quijada Diez 2018). Vallina was well versed in the latest medical advances and deemed it crucial to incorporate updated information into the translation. For instance, he added information published in 1885, nine years after the source text, as seen in the following translator's note:

> Möbius (Vortrag in der Leipziger med. Gesellschaft, Marzo, 1885. – Deutsche Medicinal-Zeitung, 1885) rechaza la opinión, por casi todos aceptada, de que la hemicránea deba atribuirse á una afección del simpático.
>
> *(Ziemssen 1887–98, 8th volume of the Spanish edition, 1888: 30)*

> [Möbius (Vortrag in der Leipziger med. Gesellschaft, March, 1885. - Deutsche Medicinal-Zeitung, 1885) rejects the opinion, accepted by almost everyone, that hemicrania should be attributed to a sympathetic affection.]

Similarly, it was common practice for Spanish translators to expand or replace original content to adapt it to the interests of the target audience,

a process now known as localization. The aforementioned translator Sáenz Criado explained the reasons for such adaptations in his version of Tardieu's dictionary:

> La sola traducción de este libro no hubiera satisfecho enteramente las necesidades y aspiraciones de nuestros colegas: primero, por carecer de muchos conocimientos posteriores á su publicacion; segundo, por prescindir en absoluto de España, falta de que, por lo comun, adolecen las publicaciones extranjeras.
>
> *(Sáenz Criado 1882, in his 'Advertencia' [foreword] to the Spanish translation, vol. I: 771)*

> [Merely translating this book would not have fully satisfied the needs and aspirations of our colleagues: first, due to the lack of considerable knowledge acquired after its publication; second, by completely ignoring Spain, a deficiency that foreign publications usually suffer from.]

This localization was often seen in sections of dictionaries that referred to legislation or public health issues specific to the country of origin. Geographic locations where the best medicinal waters could be found to treat a particular condition were often included. The translators of Ziemssen's German dictionary even announced the inclusion of a table detailing the locations of medicinal mineral waters in Spain, as requested by subscribers to the Spanish edition:

> Accediendo al deseo manifestado por varios suscritores, ponemos á continuación un cuadro de las aguas minero-medicinales extranjeras citadas en las enfermedades del aparato respiratorio de esta obra y las equivalentes de España.
>
> *(Ziemssen 1887–98, vol. 3 of the Spanish edition: 914–15)*

> [In response to the request expressed by several subscribers, we provide below a table of foreign medicinal mineral waters mentioned in this work for respiratory diseases, along with their equivalents in Spain.]

The fourth category of adaptation involves corrections to content in the original works deemed incorrect or even anti-Spanish. One case in point is Manuel Jiménez's translation of the *Dictionnaire des dictionnaires de médecine français et étrangers* [Dictionary of French and Foreign Medical Dictionaries] (1839–41), directed by F. Fabre, published in Spanish under the title *Diccionario de los diccionarios de Medicina* [Dictionary of Medical Dictionaries] (Fabre 1842–46). The translator found it expedient to correct

some errors or inaccuracies in the original text regarding Spanish medicine. The original work stated in its lemma on the childhood ailment croup that 'aucun médecin espagnol ne l'a décrit' [no Spanish physician has described it] (Fabre, vol. 3, s.v. *croup*: 167). In his Spanish translation, Jiménez added:

> No podrá menos de llamar la atención de los lectores la candidez con que el autor de este Diccionario manifiesta ignorar los autores españoles que han escrito sobre el crup, aunque con distinto nombre; por lo que nosotros [...] no podemos menos de poner a continuación la lista de algunos autores españoles antiguos que han escrito sobre esta materia, para dar una prueba al doctor Fabre y colaboradores del Diccionario de los pocos conocimientos que poseen respecto á autores españoles antiguos que han escrito de medicina [...].
>
> *(Jiménez, 1842–46, III, s. v.* crup*: 137)*

> [Readers will undoubtedly be struck by the author of this dictionary's naiveté in admitting his ignorance of Spanish authors who have written about croup, albeit under a different term. Therefore, we cannot help but provide a list of some Spanish authors of old who have written on this subject, to demonstrate to Dr Fabre and the collaborators on the dictionary the limited knowledge they possess regarding Spanish authors of old who have written on medicine.]

This represents another singular adaptation made by Spanish translators: for instance, in the Spanish translation of two German works – the aforementioned dictionaries by Ziemssen (1887–98) and Eulenburg (1885–91) – the translators deemed it appropriate to supplement the bibliographical information by adding references to Spanish works and authors not found in the original texts. There were even some other, more surprising cases of adaptation, such as the complete elimination of paragraphs, entries, and even entire volumes. Was the aim perhaps to conceal from the Spanish public information that was not entirely in line with the morals of the time (Gutiérrez Rodilla and Quijada Diez 2017: 195)? This may be why the Spanish edition of Ziemssen's dictionary left out the entire volume on the female reproductive organs, *Krankheiten der weiblichen Geschlechtsorgane* [Diseases of Female Sex Organs].

Undoubtedly, encyclopaedic dictionaries of medicine, regardless of their origin and size, aimed to help readers keep up to date with the latest medical advancements, without the need to purchase and read all the works in which new discoveries or theories were constantly being published (Gutiérrez Rodilla 2012b: 470). Something similar had happened in the previous century, due to the expansion of knowledge linked to the Age of Enlightenment and its 'dictionaries of arts and sciences' (Yeo 2001: 60). The emergence of

medical encyclopaedism in France during the mid-eighteenth century and its continuation into the first decades of the nineteenth century – the golden age of French medicine – was no coincidence. It also flourished during the last decades of the nineteenth century in Germany, by then the most important centre for the development of medicine, remaining so until at least the 1930s. In this regard, it is not surprising that this type of encyclopaedic work achieved the greatest growth during the nineteenth century, and one of its functions was to introduce and disseminate new scientific ideas throughout Europe.

However, as previously discussed, the very large lapses of time between the publication of the original work and the task of translating put an end to more than one encyclopaedic work in Spain (Gutiérrez Rodilla and Quijada Diez 2021). This occurred at a time when the phenomenon of encyclopaedism was already starting to give way to specialized journals, which became a much more effective (and cheaper) way to allow physicians to stay up to date with the latest news and discoveries in their fields of expertise.

Using Translated Medical Dictionaries to Assess the Dissemination of Medical Terms and Concepts

Lexicographical works can be of considerable use in assessing the dissemination of medical ideas and terminology and in reconstructing the history of medicine. They should be considered reliable sources with the same status as archival documents, newspapers, monographs, journal articles, and the like. A detailed analysis can provide valuable information that cannot be gathered elsewhere.

Let us take, for instance, some specific medical fields. The nineteenth century was not just the great century of specialized lexicography. It was also the century that saw the emergence of specific fields of medical expertise, such as public hygiene and legal medicine, together with the creation of their own university professorships, medical manuals, monographs, and so on (Albarracín Teulón 1973, Carrillo Martos 1996, López Piñero 1992). The new specialisms were, of course, reflected in lexicography (Gutiérrez Rodilla 2018a and 2018b). For one thing, it encouraged the composition of independent texts focusing specifically on these disciplines. For another, it left its mark on general medical dictionaries produced throughout the period, which already included various entries devoted to concepts and approaches specific to these subjects, sometimes even with the specific field labelling such as *Med. leg.* for legal medicine or *Hig.* for words related to hygiene. To cite just one example, the *Diccionario de Medicina y Cirugia prácticas* [Dictionary of Practical Medicine and Surgery] (1838–44), was translated into Spanish from the *Dictionnaire de médecine et de chirurgie pratiques* (1829–36). This Spanish translation devotes 42 pages to the term *asfixia*

[asphyxia], which indicates an interest in providing data to help medical professionals to make legal decisions which would later guide judges and those responsible for administering justice.

These and other dictionaries contain a whole arsenal of overlooked information, as, inexplicably, very few medical-historical works have used them as sources. Yet, nineteenth-century medical dictionaries contain information that sometimes cannot be found anywhere else. For instance, much of what the French professor of legal medicine Alphonse Chevallier wrote in his *Dictionnaire des altérations et falsifications des substances alimentaires, médicamenteuses et commerciales avec l'indication des moyens de les reconnaitre* [Dictionary of Alterations and Falsifications of Food, Medicinal, and Commercial Substances with the Indication of Means to Recognise them] (1850–52) was printed nowhere else, so that historians tracing the history of food fraud must use this dictionary if they do not want to overlook some of the most important information on the subject. This dictionary was translated into Spanish by Ramón Ruíz Gómez as *Diccionario de las alteraciones y falsificaciones de las sustancias* [Dictionary of Alterations and Falsifications of Substances] (1854–55).

The disregard for this type of works by linguists and historians is also perplexing given that certain dictionaries contain the earliest references to particular concepts or theories. Not until 1884 did the Royal Spanish Academy language dictionary include terms such as *acupuntura* [acupuncture] or *erotomania* [erotomania], both included in several previous Spanish medical dictionaries such as the aforementioned *Dictionnaire des sciences médicales*, as shown by the *TeLeM*e tool.

On other occasions, what these translated dictionaries reveal is the failure of their translators to identify the concepts they were attempting to translate. Sometimes translators were incapable not only of recognizing specific terms, but even the concepts to which they pertained (Gutiérrez Rodilla 1998). This phenomenon is not limited to the past. It remains a challenge today for all of us working with terms that originated in English. When faced with such terms, we may not recognize the concept they are referring to, rendering us unable to realize that these terms already have equivalents in the target language. As a result, English terms are introduced into other languages, which end up competing with vernacular ones. However, this is not the most concerning aspect of the problem. The most significant issue is that a non-expert reader might be led to believe that the concept itself is new, leading to further complications.

This is what happened, for instance, in the nineteenth century with various terms that were mainly translated from French dictionaries. A good example would be the word *croup*, in which Spanish-speaking translator-physicians were unable to recognize *garrotillo*, a well-known disease in the Spanish-speaking world, first accurately described by a Spanish doctor in

the seventeenth century. The same happened with another childhood ailment, *coqueluche* [whooping cough], and its adjectival form *coqueluchoïde*. Both words frequently cropped up in nineteenth-century Spanish dictionaries, though the Spanish physician Antonio Ballano's dictionary had stated as early as 1805 that the disease the French named *coqueluche* was known in Spanish as *tos ferina*, *tos compulsiva* or *catarro maligno*.

In the last decades of the nineteenth century, the same began to happen for German and English terms as well as French. This is illustrative of the change that was taking place in these last years of the century in the struggle for scientific and linguistic hegemony between German and French, as well as English, which was starting to join the race.

The *Spanish Lexicographical Medical Thesaurus* (*TeLeMe*)

As has been shown in previous sections, there are several types of medical dictionaries, and researchers might struggle to determine which ones are most suitable for their work. In this regard, to use the different types of available medical dictionaries effectively, it is crucial for researchers to understand how many dictionaries there are and which ones are most relevant to their research. This is one of the reasons that has led our research group to build *TeLeMe*, a Spanish-language medical lexicographical thesaurus which includes the medical dictionaries published in Spain during the eighteenth and nineteenth centuries and the first decades of the twentieth century. *TeLeMe* gives scholars access to all the works in a single tool, enabling them to perform comprehensive term searches with ease. We believe this is a great help for researchers studying the history of various medical (or medicine-related) terms in the past, as well as the ideas and concepts that accompanied them.

Shaping this thesaurus first required compiling a list of all medical lexicographic works published in Spain during the period of study. All the works were then classified according to the typological criteria discussed above. Once all the works to be studied had been located and organized, the next step was prioritizing the order of inclusion into the *TeLeMe* tool. The team then started the lengthy process of extracting words from each repertoire to include them in the *TeLeMe* research tool to create the lemmary.[3]

Although the tool aims to include all the types of dictionaries discussed in this chapter, it was nevertheless necessary to start with just one type of lexicographic work. Given our previous experience and knowledge of the subject, we chose to start with terminological (but not encyclopaedic) works on medicine in general, rather than focusing on specific medical fields. We also decided to start adding dictionaries originally written in Spanish rather than translations, although these will follow shortly. So far, 14 volumes have been added, including works by Suárez de Ribera (1730–31), Hurtado de

Mendoza (1840), Vázquez de Quevedo (1853), Cuesta Ckerner (first [1878] and second [1883–92] editions), and Caballero Villar (1886).

At the time of writing, the tool is in the process of being built, but it can already be used to answer questions such as whether there are total or partial coincidences in the lemmary of each dictionary and in the meaning of the terms. It also allows scholars to trace the history of the words it contains, from first appearance to last, as well as possible variations in meaning. We can see when certain terms entered Spanish and when they dropped out of use, or even if a certain word enters and leaves several times. The results may even show that a particular word appears chronologically in the first three dictionaries included, but then disappears in the fourth and reappears in the fifth, with the same or a different meaning. Combining the answers to these and other questions yields highly interesting results (Gutiérrez Rodilla and Pascual 2022). Further studies could involve conducting searches to find total or partial synonymy of terms, among other lexicographical, linguistic, and historical analyses.

Conclusions

This chapter has presented a panoramic view of the translation of medical dictionaries in nineteenth-century Spain. The choice of these works for the present study was not accidental: the eighteenth and nineteenth centuries were the golden age of lexicography, and dictionaries were one of the most useful and used tools in the dissemination of specialized knowledge. Being able to observe and analyse these works is essential to understanding the development of medicine in an era when medical advances were happening at a dizzying speed. Moreover, the Spanish translation of these lexicographical works tells us much about Spanish society in general and the Spanish scientific community in particular, as well as the development of scientific vocabulary, as confirmed by the various examples discussed above. For instance, the omission of certain paragraphs – or indeed volumes – dealing with topics that translators found morally or culturally sensitive, reflects the convictions and beliefs of Spanish society. The fact that a majority of physicians were unable to realize that the French *croup* was the same as the Spanish *garrotillo* (or, if they did, they preferred to use the borrowed French term) clearly demonstrates how practitioners of science in Spain developed (and continue to develop today) a particular blindness to their own practices and heritage when foreign ones overshadow them, and when they wish to show their colleagues that they are aware of innovations coming from abroad. The inclusion of terms like *acupuntura* or *erotomanía* in medical dictionaries translated from French to Spanish in the first half of the nineteenth century, long before they were picked up by the Royal Language Academy Dictionary in 1884, points to some (but by no means all) of the

ways in which the Spanish medical vocabulary has been shaped from the nineteenth century onwards.

The *Spanish Lexicographical Medical Thesaurus* (*TeLeMe*) presented here is the first of its kind to exist for a scientific field in Spanish. In fact, to our knowledge, it is the first one for a specific scientific field in our language environment (which includes French, English, Italian, and Portuguese). This thesaurus brings together an extensive number of works that retain their autonomy and identity, yet, can be consulted together with little effort. It provides researchers with a clearer understanding of specialized words and their history, stimulating our knowledge of the scientific lexicon and individual terms. By employing a philological methodology based on comparison, hypotheses can be formulated to understand a word's trajectory, accounting for its lifespan – ephemeral or extensive – and helping to answer the questions raised in the previous section. In short, the *TeLeMe* thesaurus provides a range of possibilities that can be used to complement various research approaches to the history of science, language, and, of course, translation.

Notes

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2 All translations are by the authors unless otherwise stated.
3 The tool can be accessed through http://teleme.usal.es/ (accessed 31 April 2023).

References

Ágreda, Francisco Javier. 1877. *Falsificaciones de los alimentos y bebidas, ó Diccionario de las sustancias alimenticias, con sus alteraciones y sofisticaciones*. Barcelona: Espasa Hermanos y Salvat.

Albarracín Teulón, Agustín. 1973. 'La titulación médica en España durante el siglo XIX', *Cuadernos de Historia de la Medicina española* XII: 15–77.

Ballano, Antonio de. 1805–07. *Diccionario de Medicina y Cirugía, o Biblioteca manual médico-quirúrgica*. Madrid: Imp. Real, 7 vols.

Caballero Villar, José María. 1886. *Diccionario tecnológico de ciencias médicas,* Vitoria: Viuda e hijos de Iturbe, 2 vols.

Carrillo Martos, Juan Luis. 1996. 'Los orígenes de la Medicina Legal como especialidad en España', *Cuadernos de Medicina Forense* 6(13): 13–17.

Chevallier, Jean Baptiste Alphonse. 1850–52. *Dictionnaire des altérations et falsifications des substances alimentaires, médicamenteuses et commerciales avec l'indication des moyens de les reconnaître,* Paris: Bézet Jeune, 2 vols.

Chevallier, Jean Baptiste Alphonse. 1854–55. *Diccionario de las alteraciones y falsificaciones de las sustancias alimenticias, medicamentosas y comerciales, con indicación de los medios de reconocerlas,* trans. Ramón Ruiz Gómez. Madrid: M. Alvarez, 2 vols.

Cuesta Ckerner, Juan. 1878. *Vocabulario tecnológico de Medicina, Cirujía y Ciencias auxiliares*. Madrid: Gregorio Juste.

Cuesta Ckerner, Juan. 1883–92. *Vocabulario tecnológico de Medicina, Cirujía, Farmacia y Ciencias auxiliares, 2ª ed. corregida, aumentada y enriquecida con más de 21000 voces por D. Eduardo Aragón Obejero y D. Favila Cuesta Armiño,* Madrid: Gregorio Juste, 4 vols.

Dechambre, Amédée. 1864. 'Introduction', in Amédée Dechambre and Léon Lereboullet (eds), *Dictionnaire encyclopédique des sciences médicales*, vol. 1, pp. I-XVIII. Paris: Masson, 100 vols.

Diccionario de Ciencias Médicas, por una sociedad de los más célebres profesores de Europa, traducido al castellano por varios facultativos de esta Corte. 1821–27. Madrid: Impr. Calle de la Greda y Mateo Repullés, 39 vols.

Diccionario de Medicina y Cirugía, ó Repertorio general de Ciencias médicas consideradas bajo sus aspectos teórico-prácticos ... traducida al castellano por D. Manuel Alvarez Chamorro, D. José María Velasco y D. Juan Sierra y Gato. 1851–55. Madrid: D. S. Compagni.

Diccionario de Medicina y de Cirugía prácticas ..., por Andral, Bégin... Trad. al español por D. Felipe Losada Somoza. 1838–44. Madrid: Imp. de I. Boix/Impr. del colegio de sordo-mudos.

Dictionnaire de Médecine et de Chirurgie pratiques, 1829–36. Paris: Gabon, Méquignon-Marvis, J.-B. Baillière, Crochard, 15 vols.

Dictionnaire de Médecine et Répertoire géneral des Sciences Médicales considérées sous le rapport théorique et pratique par Adelon.... 1832–44. Second edition. Paris: Bechet, 29 vols.

Dictionnaire des Sciences Médicales, par une société de Médecins et de Chirurgiens. 1812–22. Paris: Panckouke, 60 vols.

Eulenburg, Albert. 1880–83. *Real-Encyclopädie der gesamten Heilkunde: Medizinisch-chirurgisches Handwörterbuch für praktische Ärzte*. Vienna and Leipzig: Urban & Schwarzenberg.

Eulenburg, Albert. 1885–91. *Diccionario enciclopédico de medicina y cirugía prácticas, escrito en alemán bajo la dirección del Dr. A. Eulenburg; traducido directamente y arreglado para uso de los médicos españoles por el Dr. D. Isidoro de Miguel y Viguri*. Madrid: Agustín Jubera.

Fabre, François (ed). 1839–41. *Le dictionnaire des dictionnaires de médecine français et étrangers ou traité complet de médecine et chirurgie pratiques […], rédigé par une société de médecins sous la direction du Dr. Fabre*, Paris: Germer-Baillière, 8 vols.

Fabre, François. 1842–46. *Diccionario de los diccionarios de Medicina publicados en Europa... por una Sociedad de Médicos dirigidos por el Dr. Fabre; traducida y aumentada... bajo la dirección de D. Manuel Jiménez,* Madrid: Imp. Médica/ Imp. de Sanchiz, 10 vols in 9.

Gutiérrez Rodilla, Bertha M. 1998. 'Problemas conceptuales y sus repercusiones terminológicas: el caso del *croup* en la historia de la difteria', in Joaquín Fernández García and Antonio Castillo Ojugas (eds), *La Medicina Popular Española. Trabajos dedicados al Dr. D. Antonio Castillo de Lucas*, pp. 303–10. Oviedo: ASEMEYA.

Gutiérrez Rodilla, Bertha M. 1999. *La constitución de la lexicografía médica moderna en España*. La Coruña: Toxo-Soutos.

Gutiérrez Rodilla, Bertha M. 2012a. 'El Vocabulario terminológico de medicina de Manuel Hurtado de Mendoza', *Revista de Filología Española* 92(2): 249–72.

Gutiérrez Rodilla, Bertha M. 2012b. 'La obra lexicográfica de Manuel Hurtado de Mendoza: sus diccionarios enciclopédicos de medicina', *Asclepio. Revista de Historia de Medicina y de la Ciencia*, 64(2): 467–90.

Gutiérrez Rodilla, Bertha M. 2017. 'La preocupación por la lengua y su reflejo en la lexicografía: el caso de los vocabularios españoles de medicina en el siglo XIX y principios del XX', *Moenia* 23: 583–602.

Gutiérrez Rodilla, Bertha M. 2018a. 'La Medicina Legal en la lexicografía médica española del siglo XIX', *Revista de Filología (RFULL)* 36(1): 229–49.

Gutiérrez Rodilla, Bertha M. 2018b. 'Fuentes lexicográficas para la historia de la alimentación y del fraude alimentario en la España del siglo XIX', *Dynamis*, 38 (1): 87–110.

Gutiérrez Rodilla, Bertha M. 2022. 'Escasez, variedad e indefinición: la lexicografía médica "específica" en la España decimonónica', in Bertha M. Gutiérrez Rodilla and José A. Pascual (eds), *Tesoros lexicográficos y terminología médica. La explotación del recurso TeLeMe, Anejos de la Revista de Filología Española* 110, pp. 147–73. Madrid: Consejo Superior de Investigaciones Científicas.

Gutiérrez Rodilla, Bertha M., and Carmen Quijada Diez. 2015. 'La adaptación del contenido en los diccionarios médicos traducidos y publicados en España en el siglo XIX', in Pedro Aullón de Haro and Alfonso Silván (eds), *Translatio y cultura*, pp. 201–8. Madrid: Editorial Dykinson.

Gutiérrez Rodilla, Bertha M., and Carmen Quijada Diez. 2021. 'Stranded Encyclopaedic Medical Dictionaries in Eighteenth and Nineteenth-century Spain', in Linn Holmberg and Maria Simonsen (eds), *Stranded Encyclopedias, 1700–2000. Exploring Unfinished, Unpublished, Unsuccessful Encyclopedic Projects*, pp. 169–200. Cham: Palgrave MacMillan.

Gutiérrez Rodilla, Bertha M., and José A. Pascual (eds). 2022. 'Tesoros lexicográficos y terminología médica. La explotación del recurso TeLeMe', *Anejos de la Revista de Filología Española* 110. Madrid: Consejo Superior de Investigaciones Científicas.

Hurtado de Mendoza, Manuel. 1840. *Vocabulario médico-quirúrgico, o Diccionario de Medicina y Cirugia, que comprende la etimologia y definicion de todos los terminos usados en estas dos ciencias por los autores antiguos y modernos*. Madrid: Boix.

Hurtado de Mendoza, Manuel. 1847. *Enciclopedia de terapéutica ó tratado de terapéutica especial, médica y quirúrgica, en el cual se esponen por el orden alfabetico de la patologia todos los adelantamientos que ha hecho hasta el dia esta parte, la mas importante de la ciencia de curar […]*. Madrid: Severiano Omaña, 3 vols.

Hurtado de Mendoza, Manuel, and Celedonio Martínez Caballero. 1820–23: *Diccionario de Medicina y Cirugia o Suplemento al Diccionario de Antonio de Ballano*. Madrid: Viuda de Barco López/Brugada, 3 volumes in 4.

Larra y Cerezo, Ángel de. 1894. *Diccionario de bolsillo de Medicina y Cirugía y Farmacia prácticas*. Madrid: Imp. Vda. de los Ríos.

López Piñero, José María. 1992. *Las ciencias médicas en la España del siglo XIX*. Madrid: Espasa Calpe.

McConchie, Roderick. 2014. 'The Lost History of Medical Lexicography'. Helsinki Society for Historical Lexicography. URL: https://blogs.helsinki.fi/hellex-society/the-lost-history-of-medical-lexicography/ (accessed 30 March 2023)

Pongilioni Varela, Francisco Javier. 1895. *Vocabulario de Sintomatología*. Jerez: Imp. de 'El Guadalete'.

Quijada Diez, Carmen. 2018. 'La recepción de la ciencia en la España decimonónica a través de la traducción', in José María Castellano Martínez and Aurora Ruiz Mezcua (eds), *La traducción y la interpretación en contextos especializados (II): un enfoque multidisciplinar para la transmisión del conocimiento científico*, pp. 129–36. Granada: Comares.

Quijada Diez, Carmen, and Bertha M. Gutiérrez Rodilla. 2017. 'La traducción al español de diccionarios médicos alemanes en el siglo XIX', *Revista de Lexicografía* XXIII: 185–99.

Sáenz Criado, José. 1882. 'Advertencia', in Ambroise-Auguste Tardieu. 1882–85. *Diccionario de Higiene pública y salubridad,* trans. D. J. Sáenz y Criado. vol. I, pp. 771–3. Madrid: Maroto e Hijos, 5 vols.

Suárez de Ribera, Francisco. 1730–31. *Clave médico-chirurgica universal, y diccionario médico, chyrurgico, anathomico, mineralogico, botanico, zoologico, farmaceutico, chymico, historico-phisico*. Madrid: Viuda de Francisco del Hierro, 3 vols.

Tardieu, Ambroise-Auguste. 1852–54. *Dictionnaire d'hygiène publique et de salubrité*. Paris: Bailly-Baillière, 3 vols.

Tardieu, Ambroise-Auguste. 1882–85. *Diccionario de Higiene pública y salubridad*, trans. D. J. Sáenz y Criado. Madrid: Maroto e Hijos, 5 vols.

Vázquez de Quevedo, José. 1853. *Diccionario manual antropológico para inteligencia de los reconocimientos facultativos en lesiones corporals*. Granada: Lib. J. M. Zamora.

Yeo, Richard. 2001. *Encyclopedic Visions: Scientific Dictionaries and Enlightenment Culture*. Cambridge: Cambridge University Press.

Ziemssen, Hugo von. 1874–85. *Handbuch der speciellen Pathologie und Therapie*. Leipzig: Verlag von F. C. W. Vogel.

Ziemssen, Hugo von. 1887–98. *Tratado enciclopédico de patología médica y terapéutica traducido al español por el Dr. Francisco Vallina*. Madrid: Sucesores de Rivadeneyra.

PART III

Translation, Dissemination, and Nation

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7

‘LES OPINIONS LES PLUS ACCRÉDITÉES PARMI LES GÉOLOGUES ANGLAIS’

Translating Henry De la Beche’s *Geological Manual* for the Continental Market

Susan Pickford

Introduction

In 1896, the Belgian politician Ernest Mahaim, writing in the *Revue d’économie politique* [Journal of Political Economy], issued a stark warning. In times past, he argued, using Latin as a lingua franca offered huge advantages: anyone who could read Latin could keep abreast of scientific discoveries from abroad. Nowadays, he complained, keeping up with science meant learning half a dozen languages, or agreeing to submit to the ‘danger des traductions’ [danger of translations].[1] After a detailed critique of one wholly inadequate translation of a German work of political economy, he concluded that ‘la traduction scientifique doit devenir une carrière, une spécialité, exigeant des études et toute une préparation appropriées’ [scientific translation must become a career, a specialism, requiring appropriate studies and much preparation] (Mahaim 1896: 497).

While an interest in the pedagogy of science translation did indeed lie far in the future (Pinchuk 1977; Olohan 2007), Mahaim failed to recognize that at the time of writing, the practice was already a specialism to some extent, particularly compared to the situation a century previously. Scientific practice, writing, and publishing all became increasingly professionalized in the late eighteenth and early nineteenth centuries, leading to a rise in specialist scientific discourse and jargon (Bret and Moerman 2014: 603). As Latin gave way to European vernaculars as the languages of scientific dissemination, it was increasingly recognized that science translation required a triad of skills, with source and target language competency being joined by subject area expertise. As early as 1781, the French chemist Louis-Bernard Guyton de Morveau (1737–1816) wrote ‘il faut être versé dans la langue

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particulière d'une science […] pour transporter d'une nation à l'autre les richesses qu'elle a nouvellement acquises' [it takes knowledge of the particular language of a science […] to transport its newly acquired riches from one nation to another] (quoted in Bret and Moerman 2014: 605). Science translation was increasingly (albeit with many exceptions, as in the case critiqued by Mahaim) carried out within specialist knowledge networks: books on mathematics, for instance, were translated by and for the students who used them under the supervision of their professors (Chatzis, Morel, Preveraud and Verdier 2017). While this triad of skills did not straightforwardly map on to professionalization, which requires the full set of translation competences including service provision (DGT 2022), it did foreground the importance of the 'adjacent discipline' (Xu and Chu 2015) in translation practice. This chapter studies the French and German translations of Henry De la Beche's 1831 *Geological Manual* and the significance of the habitus acquired within the 'adjacent discipline' of geology by the respective translators, who were both geology professionals and educators.

Henry De la Beche's Contribution to Geology

Henry De la Beche's (1796–1855) contribution to the history of geology is now largely overshadowed by his contemporary Charles Lyell (1797–1875), who published his groundbreaking *Principles of Geology,* popularizing James Hutton's uniformitarian theory, contemporaneously with the *Manual*. De la Beche developed an interest in geology as a young man growing up in Lyme Regis, where he went fossil hunting with Mary Anning (McCartney 1977: 6). He was elected to the Geological Society in 1817 at the age of 21 (McCartney 1977: 8), and published his first paper, on the temperature and depth of Lake Geneva, two years later. He saw the science as an international, multilingual endeavour driven by cross-border knowledge transfer from the outset, publishing his inaugural paper in a French translation in a Geneva journal while honeymooning in the city in 1819 (De la Beche 1819).[2] Two years later, he published his own translation of *A selection of the geological memoirs contained in the Annales des Mines* (De la Beche 1824), helping stabilize the emergent international language of geology in a synoptical table of equivalent rock formations in English, French, and German, taking on the role of an active co-constructor of knowledge (Olohan 2018: 510): he settled, for instance, on the 'new red conglomerate' observed around Exeter as an equivalent of the 'rothe-todte-liegende' [sic] described by William Buckland as occurring between magnesian limestone and new red porphyry in Germany (Anon 1824: 372).[3] De la Beche corresponded with many of the leading geologists he met on two geological tours of Europe in the late 1820s – including his French and German translators – and as such, it was only natural that his manual should draw on the latest

geological findings from across the continent, quoting some research, such as that of Léonce Elie de Beaumont, from unpublished manuscripts. In the early 1830s, he lost his private income derived from slavery on the family sugar plantations in Jamaica, where he also conducted fieldwork. Forced to earn a living, he negotiated a government salary to work on an Ordnance Survey geological map. He became an adept administrator, establishing the Museum of Economic Geography, the Mining Records Office, and the Royal School of Mines, among other worthy projects, before falling into ill health in the early 1850s and dying in 1855.

Henry De la Beche's *Geological Manual*

The period from 1788–1840 has been called the 'golden age' of geology, a period in which the practice gained widespread popularity (Sollas 1905, quoted in Clary 2003: 11). As a field-based practice, it appealed widely across the social scale (Pickford 2015); as an emergent arena of scientific enquiry, it was progressively institutionalized through structures such as journals – beginning with the *Journal für die Liebhaber des Steinreichs und der Konchyliologie* [Journal for Amateurs of Geology and Conchology], first published in Weimar in 1773 (Meadows 1980: 2) – alongside scholarly bodies like the Geological Society, founded in 1807, and university chairs. A Chair in Geology was established at the Natural History Museum in Paris in 1793 as a revolutionary priority (Gohau 1990: 3);[4] by the early 1830s, Britain had two professors of geology, in Oxford and Cambridge.

De la Beche's geology manual, explicitly tailored for students (De la Beche 1831: vi), was thus an attempt to winnow some 40 years of research for a non-expert readership. In keeping with De la Beche's own approach to science, based on the cautious compilation of a body of data rather than grand theorizing,[5] the manual sought not to advance hypotheses, but to 'sketch the actual state of a particular science' (De la Beche 1831: v). It was warmly received on publication in 1831, being hailed by the *Spectator* (and widely cross-advertised in contemporary publications) as 'the first and best work of the kind […] So much geological science was never before comprised in so small a space' (Prout 1834: 314).[6] Robert Jameson wrote in April 1831 that he recommended it to his class at the University of Edinburgh and was 'daily pressed for information about it' (McCartney and Sharpe 1998: 63). A second edition came out in 1832 and a third a year later; there was also an 1832 American edition printed in Philadelphia by Carey, Lea and Blanchard. The first edition was heavily illustrated with 104 woodcuts – a low-cost technology that kept the book affordable (Clary 2003: 171). Its publisher, Treuttel and Würtz, was a French company, based in Paris and Strasbourg since the 1770s, with a London branch since 1817 (Barber 1968). The book's title page gave all three as places of publication: it was therefore conceived

of as a multinational product from the outset, echoing the contents that drew abundantly on recent French, German, Swedish and Italian geological writings, quoting the French and German titles in the original in its footnotes. This points to a well-established multilingual social network of geologists across Europe akin to the network of botanists studied by Sigrist and Widmer (2011). Given the breadth of its cutting-edge coverage, it is perhaps unsurprising that the manual was immediately translated for the continental market. It came out in German in 1832 as the *Handbuch der Geognosie;* the French version, *Manuel géologique,* was published in 1833, with a second edition in 1837.

De la Beche actively sought to keep the work at the cutting edge of research, adding material received too late to include in the body of the text in appendices. He also updated the subsequent editions based on feedback from his correspondents, both in England and elsewhere. As Sir Roderick Murchison pointed out in his presidential address to the Geological Society of London in 1832, 'Few indeed are the memoirs which have been completed without the aid of other distinguished Fellows of the Society, who, each in the branch of natural knowledge for which he stands pre-eminent, comes to the assistance of his wandering associate' (Murchison 1832: 385–6). Murchison matched his words with deeds, writing to De la Beche in December 1833 offering 'for the correction of my grauwacke[7] views in your French edition of the Manual a correct view of the whole matter. I wish to illustrate the whole mass of strata from the mountain limestone downwards. I must help you rewrite all the appropriate article in your fourth edition' (which in fact never appeared) (McCartney and Sharpe 1998: 76).

Subsequent editions incorporated De la Beche's own retranslations of up-to-date material from the continental translations. The third edition, announced as 'considerably enlarged' on the title page, expanded from 535 to 629 pages: as the preface points out, it contains so many additions 'that it would be tedious, and indeed, somewhat difficult to enumerate them' (De la Beche 1833a: iii). Some sense of the labile nature of the editions can be gleaned from comparing the appendices in the first and third editions (see Table 7.1).

The third edition was also printed in a larger format and type at the behest of friends, while lists of organic remains were moved to the end of the volume for ease of access and calculations relating to the chemical composition of rocks were included. The preface also explicitly states that the author makes abundant use of additions to von Dechen's translation, particularly in the sections on German geology. The French edition was due out too late for him to incorporate its new insights, but he had learned from correspondents that it was to include Elie de Beaumont's most recent work on the elevation of mountain chains (De la Beche 1833a: iv). Like some of the rock formations it studied, the various editions and translations of the

TABLE 7.1 Comparison of the Appendices in the First and Third Editions of De la Beche's *Geological Manual*, 1831 and 1833

Contents of the Appendix, First Edition	*Contents of the Appendix, Third Edition*
On some of the Terms employed in Geology	On some of the Terms employed in Geology
Osseous Breccia of Australia	On Geological Maps and Sections, and on the Geological Examination of a Country
Fossil Shells from Bordeaux and Dax	Dr Daubeny's Views respecting Thermal Springs
Cretaceous Rocks of Stevensklint	On the Upper Portion of the Grauwacke Group in Shropshire, Herefordshire, and Wales
On Geological Maps and Sections	On Magnetic Intensity in Mines
Tables for Calculating Heights by the Barometer	Tables for Calculating Heights by the Barometer
Comparison of English and French Measures	Comparison of French and English Measures

Manual accumulated new sedimentary strata of knowledge subjected to the metamorphic recrystallization of language transfer.

Translating the *Manual* into French and German

Given the magmatic state of geological knowledge at the time, the French and German translations of the *Manual* were bound to engage in dialogue with the state of the field it presented. The French translation, based on the second edition of the *Manual*, was by André Brochant de Villiers (1772–1840), then professor of geology at the *École des Mines* in Paris, assisted by four students (De la Beche 1833b: e).[8] By 1833, De la Beche and Brochant de Villiers had known each other for a decade, and De la Beche read and commented on the draft translation. The skopos of Brochant de Villiers's translation was dictated by his belief that what French geologists wanted to read were 'les opinions les plus accréditées parmi les géologues anglais' [the most accredited opinions among English geologists] (De la Beche 1833b: f). Brochant de Villiers therefore claimed strict faithfulness to the original, writing in the preface that 'Je me suis donc fait une loi de conserver strictement le texte de l'auteur, et je me suis efforcé de rendre fidèlement ses idées' [I therefore made it a rule to maintain the author's text strictly, and I made every effort to reproduce his ideas faithfully] (De la Beche 1833b: f). The

appendix, for instance, opens with De la Beche's glossary, retaining the English terms and explaining

> Cet article ne contient qu'un petit nombre de termes de géologie, qui ont paru à l'auteur anglais avoir besoin d'être définis. J'ai conservé son texte, sans y ajouter. Ainsi, cet article est plutôt une suite d'explications de quelques expressions *anglaises* usitées en géologie […] qu'un tableau général des termes français employés par nos géologues.
>
> *(De la Beche 1833b: 673, emphasis in the original)*

> [This article only contains a handful of geological terms that the English author thought needed defining. I have kept his text without additions. As a result, this article is rather a series of explanations of some *English* expressions used in geology […] than a general table of French terms used by our geologists.]

He also chose not to convert English measurement units (see Table 7.2).

Within this overtly acknowledged framework of strict linguistic fidelity, he nonetheless also demonstrated fidelity to De la Beche's educational skopos by adapting the work in a number of ways. He moved or simply left out four of the seven appendices, for instance (De la Beche 1833b: xix). He also added a number of footnotes and updated the list of fossils based on von Dechen's translation and correspondence with other geologists, indicating changes with asterisks. Many of the additions were provided by the Strasbourg geologist Philippe-Louis Voltz (1785–1840), whose fluency in German made him a key figure in intellectual exchanges between French and German geologists. The new fossils listed were therefore largely located in France and western Germany (De la Beche 1833b: 412). Brochant de Villiers also occasionally added a footnote on his own geological practice, such as his discovery of 'calciphyre felspathique' in Savoy (De la Beche 1833b: 575). Despite Brochant de Villiers's avowed intention to remain faithful to the original text, then, the nature of the original project summarizing the

TABLE 7.2 Translation of Units of Measurement in French and German

Dr Turner found that the thermal springs of Pinnarkoon and Loorgootha […] which produced 24 grains of solid matter in a gallon, contained 21.5 per cent of silica (1832: 143)	*Le docteur Turner a trouvé que les sources thermales de Pinnarkoon et de Loorgootha […] donnent, par gallon, 24 grains d'un résidu fixe contenant, sur 100 parties, 21,5 de silice (1833a: 178)*	*[…] die zu Pinnarkoon und Loorgootha enthalten unter ihren festen Bestandtheilen 21,5 pro Cent Kieselerde […] (1832: 148)*

latest in geological research required him to carry out a localizing function (Olohan 2014). Most notably, as pointed out in the third English edition, he expanded on De la Beche's brief notes on Elie de Beaumont's recent theory on the origin of mountain ranges by including the entire paper on the subject.

Two further changes to the French publication are worthy of comment in their impact on its horizon of reception. First, the work changed format from a relatively portable duodecimo size to a larger, more unwieldy octavo format, potentially heralding a shift in use from field to classroom.[9] The second was the inclusion of three new woodcuts. In contrast to the numerous diagrams, cross-sections, and illustrations of fossils in the original, the three new images were vivid imaginary depictions of deep time, again perhaps signalling a shift towards a more popular or younger readership (Rudwick 1976). The images, inspired perhaps by De la Beche's own innovative artistic depictions of deep time in works such as *Duria Antiquior* [A More Ancient Dorset] (Clary 2003), were then included in the third English edition. The changes to the French edition are in line with Patrice Bret and Ellen Moerman's comments on the specificities of scientific translation, which include adding value by means of updates and bringing the work into debate in a wider linguistic sphere than the original (Bret and Moerman 2014: 606).

Across the Rhine, Von Dechen's *Handbuch* took the opposite tack to Brochant de Villiers in terms of translatorial discourse. A translation would be of clear value to the German geology community, as one specialist journal made clear:

> Das *Geological Manual*, welches Henry De la Beche im vorigen Jahr zu London herausgegeben hat, zeichnet sich unter allen in der neuesten Zeit im Auslande erschienenen geognostischen Handbüchern aus, dass es den Anfänger auf eine gründliche Weise in die Wissenschaft einführt […] Deshalb würde schon eine gute Übersetzung dieses brauchbaren Buches eine dankbare Anerkennung in Deutschland gefunden haben.
>
> *(Karsten 1832: 567)*

> [The *Geological Manual* that Henry De la Beche published in London last year stands out from all the recent geognostic handbooks published abroad for its thorough introduction to the science for beginners […] A good translation of this useful book would therefore certainly have received grateful recognition in Germany].

However, the journal then pointed out, a straightforward translation would not be of as much use as a *localized* version:

> Aber jenes Handbuch der Geognosie soll nun in einem vorteilhafteren Gewande als es durch eine blosse Übersetzung hätte geschehen können,

> ein Eigenthum der deutschen Geognosten werden. Hr. von Dechen, der selbst zur Vervollkommnung der Wissenschaft durch seine gründlichen Beobachtungen so wesentlich beigetragen hat, wird nämlich nicht eine Übersetzung, sondern eine wirkliche Bearbeitung jenes Handbuches liefern, und den Inhalt des Originals vielfach berichtigen und ergänzen.
>
> *(Karsten 1832: 567)*

> [But the geognostic manual is now to belong to German geognosts in a more advantageous garb than a mere translation could achieve. Mr. von Dechen, who has himself done so much to perfect the science with his own thorough observations, will produce not a translation, but a proper adaptation of the manual, correcting and completing the content of the original in many ways.]

Accordingly, where Brochant de Villiers downplayed the impact of his updates on his translatorial fidelity, von Dechen's translatorial paratext made a point of foregrounding his changes. Von Dechen set out his own intellectual stall in a paragraph preceding the opening lines of the translation proper that defined 'Geognosie' as the branch of 'Oryktognosie'[10] that studies the large masses forming the earth's crust (De la Beche 1832b: 1). His preface argued that, though the work's practicality made it a useful addition to German geological literature, De la Beche's primary focus on British rock formations was inappropriate for a German readership:

> Unter allen Englischen und Französischen Werken, welche in der letzten Zeit über Geognosie im Allgemeinen erschienen sind, zeichnet sich das vorliegende Geological Manual von De la Beche durch seine praktische Brauchbarkeit, besonders rücksichtlich der geschichteten versteinerungsführenden Gebirgsarten, sehr vortheilhaft aus. Es schien daher eine Uebersetzung desselben für das Deutsche Publicum wünschenswerth zu sein. Da indessen De la Beche in vielen Fällen die Verhältnisse von Grossbritannien vorzugsweise berücksichtigt, die des Continentes dagegen mehr vernachlässigt hat, so schien es zweckmässiger, eine Bearbeitung des Originals zu versuchen, als sich demselben strenge anzuschliessen und die nothwendigen Zusätze auf Noten zu verweisen, wodurch der Zusammenhang immer unterbrochen wird.
>
> *(De la Beche 1832b: iii)* [11]

> [Of all the English and French works to have recently appeared on geognosy in general, De la Beche's Geological Manual stands out for its practicality, particularly in terms of the stratification of fossiliferous mountains. A translation for German readers therefore seemed desirable. Since De la Beche in many cases foregrounds rock formations in Great Britain, sidelining those

on the continent, it seemed more pertinent to attempt an adaptation of the original rather than following it strictly and using notes to indicate the necessary additions, which would constantly interrupt the flow.]

Von Dechen thus extensively, and silently, rewrote much of the content. The localization process began from the very opening lines. The very first footnote in English and French, on the flattening of the poles, quotes a 1/305 figure from d'Aubuisson's *Traité de géognosie* [Treatise on Geognosy]; the German quotes the proportion as 1/302.79 from Gauss and 1/297.479 from Schmidt. Von Dechen altered the scientific conventions used in the original as he went: measurements are handled differently, for instance (see Table 7.2).

Like Brochant de Villiers, Von Dechen incorporated scientific material from the appendices into the body of the text; however, he also left out the reference tables since the same information was readily available elsewhere. He also jettisoned almost all the woodcut illustrations on the grounds that they were of too poor quality to be useful, recommending interested readers turn to a German work, H. Bronn's 1824 *System der urweltlichen Conchylien und Pflanzenthiere* [System of primeval conchyliae and zoophytes], instead (De la Beche 1832b: iv). Von Dechen's patterns of referencing also differ significantly from De la Beche's, drawing more heavily on German scholarship (see Table 7.3).

Von Dechen, therefore, set out to localize the German edition more heavily and more explicitly than Brochant de Villiers, drawing openly on the work of Leopold von Buch (1774–1853) and other German peers to anchor his 'Bearbeitung' [adaptation] more firmly in German soil, not only in intellectual terms but also in its multiple new references to German rock formations. Amateur geologists interested in finding a specimen of *Posidonia becheri* were directed in English and French to Herborn and Frankenberg (De la Beche 1832: 463; De la Beche 1833b: 555); in German, they were also sent to Geistlicher Berg and Ründeroth and to a new subspecies (*Posidonia longitudinalis*) not mentioned in English or French, found in Edderbringhausen (De la Beche 1832b: 530).

TABLE 7.3 Number of References to Selected German Geologists in the English (Second Edition), French, and German versions of the *Manual*.

	De la Beche (second edition)	*French Translation*	*German Translation*
Heinrich Georg Bronn	8	13	35
Johann Jakob Nöggerath	0	0	13
Johann Christoph Matthias Reinecke	11	23	33

The change in the title from geology to Geognosie is of particular significance. 'Geognosie' was a coinage of Abraham Gottlob Werner (1749–1817), who taught at the Freiberg mining academy from 1775 to 1817. Both von Dechen and Brochant de Villiers had studied under him. The English mentions Werner only in passing, once in a brief historical overview of theories of rock formation, twice to debunk his theories,[12] and twice in a dismissive footnote (see Table 7.4). The French mentions his work slightly more often, but again dismisses his neptunism – the theory that rocks were created from the slow accretion of sedimentary deposits from water in unvarying layers worldwide – in favour of catastrophism, which held that the earth was shaped by sudden, convulsive upheavals: 'Il est évident qu'une pareille convulsion a dû modifier […] la formation lente et progressive des terrains de sédiment' [It is clear that such a convulsion must have modified […] the slow, progressive formation of sediments] (De la Beche 1833b: 619). While von Dechen acknowledged that Werner's theory of universally distributed rock sequences simply did not hold true (De la Beche 1832b: 549), he did stoutly defend his former teacher, discussing his theoretical contributions in positive terms: 'Werner war der erste, der diese Erscheinung in ihrer Allgemeinheit auffaßte, der sie innig mit dem Ganzen der Geognosie verband, und dadurch das rasche Fortschreiten der Wissenschaft möglich machte' [Werner was the first to grasp the phenomenon [of sedimentary beds] in general, to tie it closely to geognosy as a whole, thereby letting science take giant strides] (De la Beche 1832b: 23). He also left out De la Beche's charge of uncreditable behaviour, in line with his overall strategy of not translating the English footnotes (see Table 7.4).

By the early 1830s, Werner's neptunism was more or less obsolete. As De la Beche himself remarked as early as 1816, on observing alternating layers of schist and granite in Fraserburgh, 'How the latter got there will perhaps puzzle Messrs. Werner & c. to explain' (McCartney 1977: 7). Even in the German context, von Dechen's choice of Wernerian terminology was beginning to look outdated as 'Geologie', the preferred term in French and English since the closing years of the eighteenth century, increasingly came to rival 'Geognosie' in the literature (Klemun 2015). Martin Guntau (2009) points out that Wernerian terminology became increasingly outmoded in the 1820s. A Google Ngram (Figure 7.1) across the century suggests that the point of divergence between the two terms came in the early 1830s: save for a brief rally in 1840, Geognosie was increasingly outpaced by Geologie over the following decades.[13]

Von Dechen's defence of Wernerian geognosy therefore threatened to undermine the manual's status as a compendium of cutting-edge research. Within a handful of years, De la Beche's next German translator, F. Rehbock, had abandoned 'Geognosie' for 'Geologie' – though von Dechen still stuck to his preferred term in his preface (De la Beche 1836: iii–vi).

TABLE 7.4 Critical Footnote References to Abraham Gottlob Werner in English and French

De la Beche's Original English	*Brochant de Villiers's Translation*	*Von Dechen's Translation*
It was observed that in the vicinity of Paris, and for certain distances around, the organic remains detected in the different beds were not all marine, but that freshwater shells and terrestrial animals of genera now unknown were not uncommon; and by prosecuting the discovery, it was found that these remains were deposited in beds, each holding a certain place in a certain series*.	On a observé qu'autour de Paris, et jusqu'à une certaine distance aux environs, les débris organiques, ensevelis dans les différentes couches, n'étaient pas tous marins, mais qu'il n'était pas rare d'y rencontrer des coquilles d'eau douce et des animaux terrestres de genres actuellement inconnus. En poursuivant la découverte, on trouva que ces débris étaient déposés dans des couches dont chacune occupait une place déterminée dans une certaine série.*	In den Gebirgsarten der Umgegend von Paris fanden sich Süsswasser-Muscheln und Reste jetzt untergegangener Landthiere, und zwar in Gesteinschichten, die eine bestimmte Reihenfolge unter sich beobachten (p. 210–11: the entire footnote is missing in German).
* […] [*Fuchsel's] theoretical geology is remarkable, and far superior to that of Werner*, which afterwards became so prevalent […] Altogether, Fuchsel seems to have been a very remarkable man; and, as M. Keferstein observes, *it was little creditable in Werner, that while he adopted his ideas as to strata and formations, he should have followed them so much less logically*. (p. 193–4, my emphasis)	* […] Sa Géologie théorique est de beaucoup supérieure à celle de Werner, qui a tant prévalu dans la suite […] Fuchsel apparaît avoir été un homme vraiment remarquable; et, comme l'observe M. Keferstein, il est peu honorable pour Werner d'avoir adopté ses idées sur les couches et les formations, et de s'être montré moins bon logicien dans l'emploi qu'il en a fait. (p. 244)	

FIGURE 7.1 Google Ngram for the Terms 'Geologie' and 'Geognosie' in the German Books Corpus, 1800–1900

Source: Google

Importing Habitus from an 'Adjacent Discipline' into Translation Practice

Writing at the tail end of the nineteenth century, Karl Alfred von Zittel put forward one reason why von Dechen may have continued to promote Werner into the 1830s: 'So strong was the personal influence of Werner, that the Neptunian doctrines that he inculcated continued to hold their place for several decades – until, in fact, three of his greatest scholars, D'Aubisson de Voisins [sic], Leopold von Buch, and Alexander von Humboldt, stepped into the ranks of the opponents of Neptunism' (von Zittel 1901: 61). This points to the importance of personal and professional networks in shaping translations by practitioners with a firm footing in the scientific field. The final section of this chapter will seek to account for the different framings of the French and German translations with reference to the geological habitus of the translators. It focuses in particular on the emergence of a professional geological habitus, measured in terms of the presence of formal, state-sponsored geological institutions, echoing the observation in Klemun (2015) that the emergent field was embedded in different social contexts across Europe. It therefore explores how habitus acquired in the practice of an 'adjacent' profession (Xu and Chu 2015) shapes translation practice, drawing on the emergent triad of scientific translation skills – source and target language and subject area expertise.

Formal geological institutions were in short supply in the British and French contexts at this time. While the Geological Society dated to 1807, the concentration of geological theorizing among the metropolitan elite hindered the emergence of a professional body of geologists by divorcing

theory from fieldwork (Porter 1978); in 1816, William Smith, who created the first geological map of Britain and was himself a working man, lamented that geological theory was in the hands of one class, practice in another (Clary and Wandersee 2009: 1360). Geology remained largely in the shadow of mineralogy and natural history in British universities, and the mining industry was in private hands. A national mining school was not established until 1851. Henry De la Beche has himself frequently been referred to as the first professional British geologist; the change in his personal circumstances led amateur geologist Gideon Mantell to question his place among the geological elite (Clary and Wandersee 2009: 1361). In France, political upheavals similarly meant that the institutions of professional geology emerged later than in the German context. Several attempts had been made to establish a school of mining along the lines of the Freiberg academy since 1783: the *Journal des Mines* wrote in 1809 of the importance of copying the German model of mine management to tap into mineral wealth estimated at over 100 million francs (Barbian 1990: 554). However, the political context meant that the project was repeatedly abandoned and only came to a stable footing when it moved from Pesey in the French Alps, where Brochant de Villiers had been teaching since 1802, to Paris in 1816. The *Société Géologique* was founded as late as 1830. Brochant de Villiers's 1846 obituary recorded that on his appointment to the newly founded school of mining in Peisey, where he would teach some ten students a year, he was terrified by the extent of the task he was to complete, since geology was still more or less in its infancy (Migneron 1846: 721).

As a result, when De la Beche was writing his manual in the early 1830s, professionalizing geology was an ongoing process in France and Britain. This forms a striking contrast with the German context, where the Freiberg academy, established in 1765, had long drawn budding geologists from all over Europe, attracted largely by Werner's own reputation. Guntau (1978) estimates that he taught some 500 students altogether over the years. Interestingly, Werner himself published very little; the content of his lectures is known largely from notes published by his students Franz Ambros Reuss, D'Aubuisson de Voisins, and Robert Jameson (von Zittel 1901: 57). This suggests a strategy of professional exclusivity in the dissemination of geological knowledge that was at odds with De la Beche's own manual, which clearly targeted a broad, non-specialist readership, and indeed his later championing of open access to knowledge in his museums and lecture series. This strategy of exclusivity of knowledge – one of the defining characteristics of an established profession – is likewise reflected in von Dechen's decision to jettison De la Beche's amateur-friendly iconographic content and general reference material such as tables of comparative measurements. While both the French and German translators updated the work in line with recent

geological thinking, only the latter did so for a well-established, rather than emergent, professional readership. This shift in readership accounts not only for the changes to the text but also for the changes in translatorial discourse. In espousing a topos of translatorial fidelity, Brochant de Villiers was careful to maintain a spirit of scientific cooperation, acknowledging that in the French context, geology was still an emerging science and profession. Von Dechen on the other hand, wrote from a position of established professional authority for an audience of peers; he thus rejected the translatorial habitus of submissiveness (Simeoni 1998), rewriting the text to align it with the Wernerian orthodoxy that shaped his own habitus as a professional geologist.

Conclusions

In 1880, a certain 'L.B.' reviewed Jules Grolous's translation of Sir John Lubbock's recent study on insect metamorphosis. The review stressed the enormous effort required of translators of such specialist content:

> On ne saurait croire à quel soin minutieux, à quelles recherches persévérantes un traducteur soucieux de la dignité de sa mission doit s'astreindre pour faire passer une œuvre scientifique dans une langue étrangère […] la nécessité d'employer le terme propre, de se tenir éloigné de toute périphrase ou circonlocution superflue qui tendrait dans une mesure à affaiblir ou à dénaturer la pensée de l'auteur: tel est le multiple problème que le traducteur est contraint de résoudre […] La traduction scientifique [...] est donc, la plupart du temps, un véritable lit de Procruste.
>
> *('L.B.' 1880: 160)*

> [It is hard to credit how much painstaking care and persevering research a translator persuaded of the dignity of his mission must submit to to translate a work of science into a foreign language […] the requirement of using the correct term and avoiding superfluous periphrases and circumlocutions that risks weakening or misrepresenting the author's thought: that is the multiple problem that the translator must solve […] Science translation […] is therefore, most of the time, a veritable Procrustean bed.]

Accurate translation by subject specialists was crucial to the international circulation of the latest scientific ideas, as De la Beche, Brochant de Villiers, and von Dechen knew well. The importance of languages in science was also a policy issue: France translated considerable amounts of German works on mining administration and technology in the revolutionary period and subsequent decades, recognizing the importance of technology transfer in building the national economy (Barbian 1990). By the late eighteenth century, it

was clear that a triad of skills – source and target language and specialist knowledge – was needed to promote international scientific cooperation, as Guyton de Morveau pointed out. This led to language lessons being incorporated into mining school curricula: the *École des Mines*, founded in 1783 (and subsequently caught up in revolutionary turmoil), taught German and English (Barbian 1990: 553). Yet as the various iterations of the *Geological Manual* demonstrate, science translation was not just a matter of researching the correct terms in an emergent field like geology, where the science and the language used to frame it were still undergoing extensional stress, with terms like geology/géologie/Geognosie becoming fault lines along various schools of thought. Geology translators co-created a stable international lexis of geology. Yet translations by subject specialists also inevitably reflected the scientific habitus of the translators, forming the invisible deep core and mantle of background knowledge and attitude that underlay the tectonic shifts shaping the emergent field.

Notes

1 All translations are by the author unless otherwise stated.
2 While the surname is suggestive of French ancestry, the original family surname was Beach. It was altered by his father in an attempt to claim Norman ancestry: 'De la Beche' is attested in English records as early as the thirteenth century. See https://www.strangescience.net/delabeche.htm and https://www.surnamedb.com/Surname/Beche (accessed 5 June 2023). I spell his surname with a capital D following Clary (2003: 468).
3 Rather mysteriously, he wrote to the geologist William Conybeare the same year, 'I regret having translated Annales des Mines' (quoted in McCartney and Sharpe 1998: 36), though the work was favourably reviewed in the *Annals of Philosophy*, as Conybeare pointed out (McCartney and Sharpe 1998: 33).
4 On changes to the French education system during the Revolution, including a significant new science curriculum, see Savaton (2002).
5 See, for instance, the preface to his 1830 *Sections and Views, Illustrative of Geological Phenomena*: 'The scarcity of the facts known too often gives the theorist a false security, and he hastens to conclusions upon the most meagre data, without reflecting that a small addition to his present very limited stock of knowledge may completely overset his speculations' (1830: iii).
6 A Google Books search locates the advertisement in some thirty publications by 1836, including not only works of scientific interest like Prout but also novels, history books, and travel accounts.
7 Greywacke is a form of hard, dark, coarse-grained sandstone. Murchison still used the German spelling rather than the Anglicised greywacke/grey wacke introduced by Robert Jameson in his 1805 *Mineral Description of the County of Dumfries* and subsequent works. De la Beche had used 'greywacke' throughout his 1824 translation of texts from the *Annales* (De la Beche 1824) and used both spellings, with a clear preference for the German, in the 1831 *Manual*. The 1833 edition kept the German spelling throughout. Lyell used the Anglicised spelling in his 1833 *Principles of Geology:* see the definition in the online Oxford English Dictionary (accessed 5 June 2023). The *Gentleman's Magazine* for February 1832 picked up on the term, writing "if our author intended his work as a manual for the English student (as we presume he did), why not abandon

the crack-jaw German phrase of *Grauwacke*, and substitute either conglomerate-limestone, claystone, or sandstone, or any other more intelligible English term?' ('Sylvanus Urban' 1832: 44).

8 The unusual pagination with letters instead of numbers is due to a printing error, as a statement before the preface makes clear (De la Beche 1833b: unpaginated).

9 The *Société géologique de France* [Geological Society of France] reported on 30 January 1832 that the English edition of De la Beche's manual was 'très portatif et utile' [very portable and useful] (Anon 1832: 184).

10 An antiquated term for mineralogy, derived from the Greek oryktó, mineral. A Google Ngram indicates its usage peaked in 1818 and declined steadily from then on.

11 This criticism was also made of the *Manual* by some French geologists, including his correspondent Ami Boué who also translated at least one of his papers (McCartney and Sharpe 1998: 20): 'M. Boué rend compte à la Société de la 2e édition du Manuel de Géologie de M. De la Beche, et il fait observer que l'auteur s'occupe encore un peu trop exclusivement de l'Angleterre' [M. Boué reviewed the second edition of M. De la Beche's Geology Manual for the Society, and pointed out that the author still focuses rather too exclusively on England] (Anon 1832: 355).

12 'This is precisely the condition of granite veins, which, though much doubted during the reign of the Wernerian theory, are now known to be abundant in nature' (De la Beche 1832: 429; see also 320–1 for a second instance of debunking).

13 Comparable Ngrams for English and French using their respective corpora indicate that geognosy/géognosie only ever had a marginal presence in geological discourse.

References

Anon. 1824. 'Analyses of Books: A Selection of the Geological Memoirs Contained in the *Annales des Mines*', *Annals of Philosophy* 7(23): 371–82.

Anon. 1832. 'Séance du 30 janvier 1832', *Bulletin de la Société Géologique de France* 2: 119–218.

Anon. 1832. 'Séance du 19 mars 1832', *Bulletin de la Société Géologique de France* 2: 349–64.

Barber, Giles. 1968. 'Treuttel & Würtz: Some Aspects of the Importation of Books from France c.1825', *The Library* 23: 118–44.

Barbian, Jan-Pieter. 1990. 'Les relations franco-allemandes dans le domaine minier et métallurgique à l'époque de la Révolution et du Premier Empire: Le modèle de l'École pratique des Mines de la Sarre à Geislautern', in *Scientifiques et Sociétés pendant la Révolution et l'Empire* (collectively edited), pp. 551–68. Paris: CTHS.

Bret, Patrice, and Ellen Moerman. 2014. 'Sciences et arts', in *Histoire des traductions en langue française XVIIe et XVIIIe siècles*, pp. 595–722. Lagrasse: Verdier.

Chatzis, K., T. Morel, T. Preveraud, and N. Verdier. 2017. 'Traduire des mathématiques « pour et par des élèves » dans la première moitié du xixe siècle: acteurs et pratiques de traduction à travers trois cas d'étude en Europe et aux États-Unis', *Mémoires du livre / Studies in Book Culture* 9(1). URL: https://doi.org/10.7202/1043118ar (accessed 7 June 2023).

Clary, Renée. 2003. *Uncovering strata: an investigation into the graphic innovations of geologist Henry T. De la Beche*. Unpublished PhD dissertation, Louisiana State University, Baton Rouge.

Clary, Renée, and James Wandersee. 2009. 'All are Worthy to Know the Earth: Henry De la Beche and the Origin of Geological Literacy', *Science and Education* 18: 1359–75.

De la Beche, Henry. 1819. 'On the depth and temperature etc. Sur la profondeur et la température du lac de Genève. Lettre adressée au prof. Pictet par Mr. H. T. de la Bèche [sic]', *Bibliothèque universelle des sciences, belles-lettres et arts* 12: 118–26.
De la Beche, Henry. 1824. *A Selection of the Geological Memoirs contained in the Annales des Mines, together with a synoptical table of equivalent formations, and M. Brongniart's table of the classification of mixed rocks*. London: William Phillips.
De la Beche, Henry. 1830. *Sections and Views, Illustrative of Geological Phenomena*. Paris, Strasbourg, London: Treuttel & Würtz.
De la Beche, Henry. 1831. *Geological Manual*. Paris, Strasbourg, London: Treuttel & Würtz.
De la Beche, Henry. 1832. *Geological Manual*, second edition. Paris, Strasbourg, London: Treuttel & Würtz.
De la Beche, Henry. 1832b. *Handbuch der Geognosie*, trans. Ernst von Dechen. Berlin: Duncker und Humblot.
De la Beche, Henry. 1833a. *Geological Manual*, third edition. London: Charles Knight.
De la Beche, Henry. 1833b. *Manuel de géologie*, trans. André Brochant de Villiers. Paris: Langlois et Leclerc.
De la Beche, Henry. 1836. *Anleitung zum wissenschaftlichen Beobachten für Gebildete aller Stände 1. Geologie*, trans. F. Rehbock. Berlin: Veit.
Directorate General of Translation. 2022. *Updated Version of the EMT Competence Framework*. URL: https://commission.europa.eu/news/updated-version-emt-competence-framework-now-available-2022-10-21_en (accessed 7 June 2023).
Gohau, Gabriel. 1990. *A History of Geology*, trans. A. M. Carozzi. New Brunswick: Rutgers University Press.
Guntau, Martin. 1978. 'The Emergence of Geology as a Scientific Discipline', *History of Science* 16: 280–90.
Guntau, Martin. 2009. 'The Rise of Geology as a Science in Germany around 1800', *Geological Society, London, Special Publications* 317: 163–77.
Karsten, C.J.B. 1832. 'Nachricht von einem bald zu erwartenden neuen Handbuch der Geognosie', *Archiv für Mineralogie, Geognosie, Bergbau und Hüttenkunde* 4: 567.
Klemun, Marianne. 2015. 'Geognosie versus Geologie: Nationale Denkstile und kulturelle Praktiken bezüglich Raum und Zeit im Widerstreit', *Berichte zur Wissenschaftsgeschichte* 38(3): 227–42.
"L.B.". 1880. 'Bibliographie', *L'Exploration: Revue des conquêtes de la civilisation sur tous les points du globe* 9: 160.
Mahaim, Ernest. 1896. 'Du danger des traductions', *Revue d'économie politique* 10: 489–98.
McCartney, Paul J. 1977. *Henry De la Beche: Observations on an Observer*. Cardiff: Friends of the National Museum of Wales.
McCartney, Paul J., and Tom Sharpe. 1998. *The Papers of H.T. De la Beche (1796–1855) in the National Museum of Wales*. Cardiff: National Museums and Galleries of Wales.
Meadows, Arthur. 1980. *The Development of Science Publishing in Europe*. Amsterdam: Elsevier.
Migneron, Pierre-Henry. 1846. 'Notice nécrologique sur M. Brochant de Villiers', *Annales de Mines* 4(10): 707–54.
Murchison, Roderick. 1832. 'Address to the Geological Society, Delivered on the Evening of the 17th of February 1832', *Proceedings of the Geological Society of London* 25: 362–86.

Olohan, Maeve. 2007. 'The Status of Scientific Translation', *Journal of Translation Studies* 10(1): 131–44.
Olohan, Maeve. 2014. 'Gate-keeping and Localizing in Scientific Translation Publishing: The Case of Richard Taylor and *Scientific Memoirs*', *The British Journal for the History of Science* 47(3): 433–50.
Olohan, Maeve. 2018. 'Translating cultures of science', in Sue-Ann Harding and Ovidi Carbonell Cortés (eds), *Routledge Handbook of Translation and Culture*, pp. 501–16. Abingdon, New York: Routledge.
Pickford, Susan. 2015. '"I Have No Pleasure in Collecting for Myself Alone": Social Authorship, Networks of Knowledge and Etheldred Benett's *Catalogue of the Organic Remains of the County of Wiltshire* (1831)', *Journal of Literature and Science* 8(1): 69–85.
Pinchuk, Isidore. 1977. *Scientific and Technical Translation*. London: André Deutsch.
Porter, Roy. 1978. 'Gentlemen and Geology: The Emergence of a Scientific Career, 1660–1920', *The Historical Journal* 21(4): 809–36.
Prout, William. 1834. *Chemistry, Meteorology, and the Function of Digestion, Considered with Reference to Natural Theology*. Philadelphia: Carey, Lea and Blanchard.
Rudwick, Martin. 1976. 'The Emergence of a Visual Language for Geological Science 1760–1840', *History of Science* 14: 149–95.
Savaton, Pierre. 2002. 'De la minéralogie aux sciences de la terre: la géologie dans l'enseignement secondaire de 1795 à 1988', *Revue d'histoire des sciences* 55(4): 533–58.
Sigrist, René, and Eric Widmer. 2011. 'Training Links and Transmission of Knowledge in 18th-century Botany: A Social Network Analysis', *REDES-Revista hispana para el análisis de redes sociales* 21(7): 347–87.
Simeoni, Daniel. 1998. 'The Pivotal Status of the Translator's Habitus', *Target* 10(1): 1–39.
'Sylvanus Urban'. 1832. Review of the *Geological Manual*. *Gentleman's Magazine, and Historical Chronicle for the Year 1832* 102(1): 43–5.
Xu, Minhui, and Chi Yu Chu. 2015. 'Translators' Professional Habitus and the Adjacent Discipline: The Case of Edgar Snow', *Target* 27(2): 173–91.
Zittel, Karl August von. 1901. *History of Geology and Palaeontology, to the End of the Nineteenth* Century, trans. Maria Ogilvie-Gordon. London: Walter Scott.

8

TRANSLATING TEXTS TO SPREAD NEW IDEAS

The Transmission of Modern European Scientific Materialism and Monism in Ottoman Intellectual Circles in the Long Nineteenth Century

M. Sait Özervarlı

Although the rise of scientific translations was the outcome of considerable interest in modern science among nineteenth-century Ottoman intellectuals, it was also the result of a strong desire to transfer European intellectual culture from various circles, including positivism, materialism, evolutionism, and intuitionism (see Özervarlı 2018; 2022). In this chapter, I will focus on the transmission of scientific materialism and monism via translation, a process of knowledge transfer closely followed by Ottoman scholars.[1] In the first section, I highlight the development of this interest and activity between the second half of the nineteenth and the early twentieth century. In the subsequent sections, I discuss the European – predominantly German – sources of Ottoman materialism and monism, the earliest translations of these texts into Turkish by followers of these schools of thought, and criticisms of the views held in these texts by some non-materialist opponents. I will argue that the interest in and the suspicion towards modern European materialism started before these translations. However, the wide accessibility and spread of materialist ideas in the Ottoman lands, as well as the controversy following their reception, mostly derived from translations. I will also emphasize that the transmission of materialism was not via direct translations, but rather through indirect translation, i.e. translations of translations.

The transfer of scientific ideas via translations and journal publications has usually tended to be understood in terms of the copying of Western texts and their passive distribution. However, recent literature has demonstrated that this was a much more active process in which 'ideas were appropriated, internalised, adopted and integrated into already existing knowledge production processes' (Afacan 2021: 331). Moreover, translation needs to be seen as a tool that interconnects science and scientists globally. Scientific

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translations thus give us new insight into the transformation and mediation of scientific knowledge (Elshakry 2008: 702–3). In the late nineteenth century, the Ottomans were translating various Western texts and transferring scientific concepts into Ottoman Turkish and transforming Ottoman materials into the conceptual framing of Western scientific discourse. The Committee of Union and Progress (CUP), a revolutionary group who came to power in 1908, finally created the *Istılahât-i İlmiye Encümeni* [Committee on Scientific Terminology][2] in 1913, in an effort to standardize the process (Hughes 2021: 24). These developments show that translation not only played an active role in the transfer of modern knowledge and sciences, but also was an important factor in the conceptualization and institutionalization of science.

Modern European Science and Its Translation in the Ottoman Empire

Although several interesting historical studies have been produced (İhsanoğlu 2004; Shefer-Mossenson 2015; Yalçınkaya 2015), the history of the reception of modern science among Ottomans is still under debate and yet to be fully documented. Modern Western science, following earlier introductions, became the centre of attention in Ottoman culture with the establishment of higher educational schools. Leading institutions such as engineering, medical, and military schools became the channels of modern scientific transmission (Özmen 2016: 151–3; İhsanoğlu 2004). The first encounter was through inviting experts and teachers of science from the West and writing introductory textbooks for students through translations. Thus, the translator-educators who contributed translations to the newly established military and technical schools played a key role in the development of Ottoman scientific repertoires (Özmen 2016: 156). Despite the dominance of classical Aristotelian methodology in pre-modern Ottoman thought, some awareness of modern science became influential and gradually more visible by the eighteenth century. The Italian abbot and man of letters Giambattista Toderini (1789: 1, 189) wrote that Vizier Ragıb Paşa (1698–1763) had told him he was interested in modern European physics and wanted to translate the *Éléments de la philosophie de Newton* (1738) [Elements of Newton's philosophy] by the French philosopher Voltaire (1694–1778). Early Ottoman contacts with modern science in the seventeenth and eighteenth centuries, especially in astronomy, medicine, and chemistry, also cannot be ignored (see Günergün 2007). However, this is not the main focus here.

During the reign of Mahmud II from 1808 to 1839, the reform project continued and led the Empire into the Reorganization Period (1839–76), known as *Tanzimat*. This marked a turning point, with the efforts of the Grand Vizier Mustafa Reşid Paşa to make more decisive moves towards modernization. The publication of the first weekly Ottoman official gazette, *Takvîm-i*

Vekâyi [Calendar of Events], in 1831 also contributed significantly to growing awareness of modern science and thought. During this period of rapid transformation, Ottoman scholars paid special attention to the translation of books with scientific and philosophical content. Science was considered a useful tool in certain professional fields, such as the military, engineering, and medicine, in order to accelerate the modernization process. The intensity of modern Ottoman translation activities started with the establishment of the *Babıâli Tercüme Odası* [Royal Translation Office] in 1821, which constituted a major step towards the institutionalization of translation training and practices. In the 1830s, the Translation Office became a major centre of scholarly activities, including the teaching of foreign languages to young diplomats and bureaucrats. It was established under the direction of Bulgarzâde Yahya Nâci (?-1824) and Stavrakis Aristarkis (?-1822). Following the death of Nâci, Başhoca İshak Efendi replaced him as the chief translator in 1824 (Bilim 1990; Balcı 2013). Although translations and scientific texts written by Ottomans during the early nineteenth century were generally technical and educational in focus, they contributed to creating an atmosphere for more theoretical discussions. Books were also reproduced that were based on the general content and systemization of Western scientific works (İshak Efendi 1831–34). Through such rewritings and translations, modern science came to be seen by many officials and learned figures of the early nineteenth century as the only tool by which to gain the necessary knowledge for their age. These modern educated authors and translators were the representatives of the new intelligentsia or *münevver*, who took over the position of the traditional elite of scholars or *ulemâ*.

Moreover, major Ottoman scientific journals, the earliest of which were the *Vekâyi-i Tıbbiye* [Medical Events] (1849–51) in medicine and *Mecmua-i Fünûn* [Journal of Natural Sciences] (1862–67) in the natural sciences, included many articles in translation. One of the most prominent statesmen and educational reformers of this era, Mehmed Münif (Paşa) (1828–1910), was committed to the transformative authority of science in society. Münif worked as an Arabic and Persian translator in the Translation Office, held diplomatic posts abroad, founded Cemiyet-i İlmiyye-i Osmaniyye, the first Ottoman Scientific Society, and finally became a leading minister. Münif understood science as a decisive factor for change both in world history and human life. He believed that contemporary prosperity and strength were based on modern science, and without the guidance of science it was not possible to reform a country. He tried to transform the scientific knowledge generated by European thinkers into approved knowledge in a traditional sense. In his view, science-educated people were able to learn from natural and social events, access new ideas, and produce new instruments; as a result, they would live happier lives (Münif 1862). Through his articulation of these ideas, Münif became an influential figure, who removed obstacles to

the entry of modern science and philosophy into Ottoman intellectual circles as a tool of modernization in the second half of the nineteenth century.

Other scholarly journals, which were closely identified with their editors, such as *Ulûm* [Sciences] (1869–70) launched by Ali Suavî, Hoca Tahsin's *Mecmua-i Ulûm* [Journal of Sciences] (1878–79), and *Mecmua-i Ebüzziya* [Journal of Ebüzziya] (1880–87), followed in the wake of the aforementioned *Mecmua-yi Fünûn*. In addition, some explicitly ideologically motivated intellectual journals had also appeared by the early twentieth century. Ahmed Rıza's *Mechveret* [Consultation] (1905–08) and Abdullah Cevdet's *Ictihad* [Reasoning] (1904–28, with interruptions), which had positivist and materialist tendencies, also played a role in the translation of modern scientific texts into Turkish via articles. Moreover, in order to increase the number of scientific works and improve their comprehensibility by a lay audience, translators were advised to favour stylistically freer translations of scientific texts, which emphasized rewriting instead of literal translations (Âsım 1893: 172).

Such focused interest on science resulted in the heavy reliance on Western sources due to the lack of materials in native Turkish. French initially gained prominence in Ottoman culture as a language of diplomacy but spread to other fields as literary works such as François Fénélon's *Les Adventures de Télémaque* [The Adventures of Telemachus] (1699; trans. 1862 by Yusuf Kamil Paşa) were put into Turkish and scientific journals and institutions were established. French became almost like a second scientific language within the country, as evidenced by the opening of the *Galatasaray Mekteb-i Sultanisi* [Galatasaray Imperial School] in 1868, with French as its language of instruction. One translator, in the introduction to his compilation of selected passages from French texts in physics and chemistry, underlined the undeniable benefits of progress brought by importing information about developments in modern science (Vehbi 1883: 2). Likewise, Kemalpaşazâde Said (1848–1921), in his preface to a selection of texts by well-known authors in translation, argued that translation informed readers about innovations and helped to disseminate scientific methods, which made people interested in political, scientific, and technical issues (Said 1889: 3; also see Demircioğlu 2012). Thinkers such as Auguste Comte (1798–1857), Herbert Spencer (1820–1903), Gustave Le Bon (1841–1931), and Henri Bergson (1859–1941) were considered leading sources of modern scientific thought, while a group of young Ottoman intellectuals increasingly came under the influence of the popular materialist movement in Germany, as we shall see in what follows. The Ottomans also emphasized the importance of translatorial expertise in science. A book on science or technology, Said argued, should be translated by a person familiar with that field, hence a work on algebra needed to be translated by an expert in that particular area of mathematics (Bolulu Talat 1899: 15).

An Overview of Scientific Materialism and Monism as Sources of Ottoman Translations

The most influential sources of Ottoman materialism were the French translations of the German materialists Ludwig Büchner (1824–99) and Ernst Haeckel (1834–1919), along with the works of other French and European scientists, who were known for their opposition to metaphysics (Akgün 1988: 107–12). Materialism suggests that all things that exist are made up of matter, which consists of energy, atoms, molecules, forces, and other related entities. It denies the existence of non-physical or non-material existents that are discussed in metaphysics. Ottoman followers of post-Hegelian materialism, which based itself on modern science, began to translate their sources and presented them as cutting-edge scientific ideas (Maleckova 1994). In this section, I focus on the German authors who were the main sources of Ottoman materialism in the second half of the nineteenth century. The German materialist school, often differentiated from 'scientific', 'mechanical', or 'vulgar' materialism, included other names, such as Karl Vogt (1817–95) and Jacob Moleschott (1822–93). It was involved in a heated controversy, the *Materialismusstreit* [Materialism controversy], with the creationist Rudolf Wagner (1805–64), who propounded the belief that nature, and related aspects such as the universe, Earth, life, and humans, originated with supernatural acts of divine creation.

Büchner, one of the most popular and polemical thinkers on radical materialism in nineteenth-century Germany, was commonly associated with other materialists, such as Vogt and Moleschott. Born in Darmstadt, Germany, Büchner studied medicine at the University of Giessen and became a lecturer at the University of Tübingen, but soon lost his job when his well-received but controversial book *Kraft und Stoff oder Grundzüge der natürlichen Weltordnung* [Force and Matter or Fundamental Features of a Natural Global Order] (1855) was published. Following his brief teaching career, he returned to Darmstadt, worked as a practising doctor, spending all his efforts popularizing materialistic science and publishing books related to this field (Heidelberger 1998: 48–51; Gregory 1977: 100–21). Büchner's writings aimed to strengthen progressive and rational traditions but were also examples of the uncritical belief in science's role to save humankind from all evil (Heidelberger 1998: 48).

Büchner's *Kraft und Stoff* was seen as a manifesto for materialistic thought and considered the Bible of materialism. He preferred writing for the general public, without using complex rhetoric, and defended his radical views in plain language. He did not go into philosophical discussions and theoretical analyses, which he regarded as outdated, but rather presented scientific data based on experimental methods and observations to support his case (Beiser 2014: 70). While maintaining this approach of relying solely

on physical reality, Büchner paid little heed to accusations by other thinkers of not being a real philosopher.[3]

Translated into French as *Force et matière* (1863) and into English as *Force and Matter* (1870), the book rapidly became the most popular and exemplary work of the materialist movement in Germany and Europe, with many editions and several translations into other languages. Büchner presented a formulation of the principles of materialism as the true science of the contemporary age. He tried to develop a comprehensive philosophy based on his uncritical belief in science's capacity to liberate humankind from all problems. He followed an empiricist worldview, excluding metaphysics and other sorts of theoretical philosophy. As he described in his letter to the publisher of the English translation, natural events were only explicable via functionalities of matter and not spiritual and idealistic rationalizations (Büchner 1870: xiii).

For Büchner, the world consisted of motional matter, which produces force. These are interdependent, one not existing without the other. Matter is eternal but changes through time, while force is based on natural laws which are mechanical. Force is empowered only by matter; therefore, considering force without matter would be like accepting the concept of sight without an eye. He summarizes it thus: 'No force without matter – no matter without force! Neither can be thought of per se; separated, they become empty abstractions' (Büchner 1870: 2). Hence force and motion are essential to matter, which is self-organizing, having the power to form diverse elements into a unified whole. This system explains the origin of life. As a result of continuous motions, therefore, life is a complex force deriving from the chemical and physical powers of matter (Beiser 2014: 71–2).

In his approach, force and matter are inseparably connected. However, force cannot be regarded as a spiritual, supernatural, or transcendent entity (Gregory 1977: 107). Matter is ruled by rigid and universal laws which do not allow for miracles. Soul or mind, as well as organic life, are the product of combined materials that are endowed with special mechanical forces. There is no certain spiritual substance, or vital force, or externally established purpose of nature (Heidelberger: 49). Büchner connects more complicated issues like consciousness and soul to the brain and nervous system. Thinking is therefore the result of a special form of motion in the brain, something like the production of electricity (Büchner 1870: 135–40). In Büchner's opinion, '[a]s there is no bile without liver and no urine without kidneys, so there is no thought without a brain' (Büchner 1870: 139).

Since matter is the only source of existence and life, Büchner excluded the idea of creation ex nihilo. He adopted a firm stance against metaphysical and spiritual ideas. He even considered mathematical concepts to be rooted in experience (Gregory 1977: 113). He described matter as an eternal and essential part of existence. Instead of discussing the mortal body and the

immortal soul, he proposed the immortality of matter (Büchner 1870: 13, 23–7). It is therefore wrong, according to Büchner, to consider the idea of God in the system of nature in a theistic or pantheistic way (Büchner 1870: 189). He gave morality the role of freeing humans from superstition: for him, humanity needed moral principles, which were open to change according to conditions, in order to survive (Büchner 1870: 174). Thus, he did not approve of universal standards of justice and morality for all peoples, but rather changeable regulations corresponding to the circumstances of societies.

Büchner's assumptions about the relations between matter and force, and body and soul cannot be scientifically proven and are therefore a matter for debate, but his clear language and simple presentation attracted many people. As Frederick Beiser emphasized:

> many of his criticisms of religion are crude and hasty, directed against a straw man, and many of his explanations of mental life are highly speculative. But Büchner's great merit was to have presented, in a consistent and lively manner, the materialist worldview to a broad public. Any careful reader could learn from it the materialist stance on a wide array of issues. Whatever the ultimate defects of materialism, we can be grateful to Büchner for presenting its standpoint so clearly and simply. We have good reason to bestow upon him a title he would have loved: the German Lucretius.
>
> *(Beiser 2014: 76–7)*

Thus, *Kraft und Stoff* was, generally speaking, a collection of basic scientific materialist views written in a powerful and decisive language to persuade the general public. Büchner did not think that theoretical philosophy could be effective in spreading modern scientific methods and ideas. Concrete theories such as evolutionism were, from his perspective, more significant indications of new scientific achievements.

Haeckel was the other German evolutionary thinker who was likewise translated and frequently referred to by the Ottoman materialists. Born in Potsdam, he studied at the medical school in Würzburg, Germany, where he worked with Albert von Kölliker (1817–1905) and Rudolf Virchow (1821–1902), two of the most eminent biological and medical researchers of the period. He also worked in the laboratory of the Berlin physiologist Johannes Peter Müller (1801–58), and then took up a post at Jena offered by Carl Gegenbaur (1826–1903). Haeckel's travels to southern Italy and Sicily for his habilitation research saw him enter into regular correspondence with Charles Darwin (1809–82), and the two became good friends, exchanging letters over the next 20 years. In the course of their friendship, Haeckel visited Darwin three times at his country home. He adopted the Darwinian theory of evolution with further explanations and adjustments

to his naturalist philosophical system. He conducted research trips abroad and published his findings on new species and forms of plankton known as radiolarians. In 1907, he had a museum built in Jena to teach the public about evolution. Haeckel retired from teaching in 1909 and devoted the last decade of his life to the popularization of his teachings.[4]

Haeckel's reputation as an evolutionist and materialist polemicist, coupled with the translations of his works into many languages, brought him significant international renown. He was also the defender of natural philosophical monism and the founder of the Monist League. Rejecting all aspects of dualism in existence, monism is a philosophical system which considers the set of existing things as reducible to unity from structural, moral, and practical aspects. Invited to Altenburg, near Leipzig, to participate in the seventy-fifth anniversary of the *Naturforschende Gesellschaft des Osterlandes* [Osterland Natural History Society], Haeckel gave a summary talk on his evolutionary scientific views. During the meeting on 9 October 1892, a speaker gave a presentation about the relationship between science and religion, which caused discontent among certain participants. Among them was Haeckel, who instead of reading out his prepared text gave a spontaneous lecture on natural monism, which he later committed to paper with additional notes and clarifications. Published in the popular press as a short monograph with the title *Der Monismus als Band zwischen Religion und Wissenschaft* [Monism as the Bond between Religion and Science] the same year, it reached its sixteenth edition in Haeckel's lifetime. It attracted the interest of evolutionary scientists all over the world and became the starting point for Haeckel's popularity. Aiming to separate all anthropomorphisms from religion, he believed that altruism, the selfless love of one's neighbour, functioned as the chief moral virtue, not appeal to a divine hereafter, which reduced morality to a desire for reward (Richards 2008: 353–4).

Among Haeckel's books, *Die Welträtsel: Gemeinverständliche Studien über monistische Philosophie* [The Riddles of the World: Common Studies in Monistic Philosophy], published in 1899 with a high print run, was the most significant. It went through several editions and was translated into more than 30 languages, including an English edition, *The Riddle of the Universe at the Close of the Nineteenth Century* (1901). On the debate about the origins of humans, for instance, Haeckel proposed a new evolutionary system of the world to explain the relation of body and soul. In his philosophical system of monism, Haeckel tried to explain change in natural continuity. The metaphysical views of God, freedom, and immortality propounded by Immanuel Kant (1724–1804), insists Haeckel, were due to the natural sciences still being in their infancy: 'Kant's system of critical philosophy would have turned out quite otherwise from what it was, and purely monistic, if he had had at his disposal the then unsuspected treasures of empirical natural knowledge which we now possess' (Haeckel 2005: 27).

Haeckel argued for a universe in which uniform atoms disseminate their effects from the inorganic to the simplest organisms up to humans, in a continuous unity of natural laws. Contrary to Büchner's dualism of matter and force, he described this unified system of natural function as monism and retained the ethical core of religion, without referring to the idea of revelation (Haeckel 2005: 2). Religious conceptions and the philosophical systems regarding God and the world, creator and creature, spirit and matter, Haeckel argued, look dualistic as two completely separate fields. It is the case 'especially in the three most important forms of monotheism which the three most renowned prophets of the eastern Mediterranean – Moses, Christ, and Mohammed – founded'. Therefore, '[i]n all these dualistic and pluralistic systems the fundamental idea is that of anthropomorphism, or the humanizing of God; man himself, as godlike (or directly descended from God), occupies a special position in the world, and is separated by a great gulf from the rest of nature'. Just as Copernicus challenged geocentric dogma and Darwin anthropocentric ideas, it became clear, according to Haeckel, that 'all the wonderful phenomena of nature around us, organic as well as inorganic, are only various products of one and the same original force, various combinations of one and the same primitive matter' (Haeckel 2005: 5–6).

Moreover, what is designated as the 'human soul' is also the sum of feelings and thinking as physiological functions of the brain. Contrary to the well-known address *Über die Grenzen des Naturerkennens* [On the Limits of Natural Science] (1872) by the German physiologist Emil Du Bois-Reymond (1818–96), Haeckel argued from a monistic point of view that consciousness was based on functions of the central nervous system. The older mystical conception of the immortal soul, like a finer invisible being resembling the mobile, light, and thin substance of the ether, as conceived by modern physics, was refuted (Haeckel 2005: 13–14). However, the fallacy of the current materialist view, in Haeckel's opinion, lay in regarding matter and force as separate, since the two are inseparably connected from the outset (Haeckel 1892: 485). Haeckel considered materialism to be as ambiguous as spiritualism, and presented monism as the unity-philosophy that brings matter and spirit together, inseparably combined in every atom. Therefore, all mythological stories, miracles and so-called revelations which claimed that they came about in some supernatural way need to be put aside. Only thus are true religion and pure ethics attainable (Haeckel 2005: 16–17).

The monistic idea of God, in Haeckel's understanding, is also different from pantheism, which brings God into nature. A monistic investigation of nature, according to Haeckel, is knowledge of the true, monistic ethic. It constitutes training for the good, while the monistic aesthetic is pursuit of the beautiful. As he puts it, 'the True, the Beautiful, and the Good, these are the three august Divine Ones before which we bow the knee in

adoration; in the unforced combination and mutual supplementing of these we gain the pure idea of God. To this "triune" Divine Ideal shall the coming twentieth century build its altars' (Haeckel 2005: 22). For Haeckel, the unity of matter and spirit in substance was needed for the unity of knowledge in natural science. He promised to clear up the 'world riddles' created by dualistic thinking. However, monism, like positivism's religion of humanity, paradoxically developed a clear religious project of immanent transcendence, with God as the summation of the laws of causation as well as the 'monist Sunday sermons' delivered by the Monist League (Weir 2012: 2–3).

The Ottoman Transmitters of Scientific Materialism and Monism through Translations

Scientific materialism and monism entered Ottoman scholarly circles mainly through journals and book translations. Publishers such as *Ictihad Evi* [House of Reasoning] and *Teceddüd-i İlmî ve Felsefî Kütübhanesi* [Bookshop of Scientific and Philosophical Reform] were major locations which published translations of materialist and monist authors. In this section I will highlight translations of works by Büchner and Haeckel, discussed above, who were at the centre of attention among Ottoman materialist intellectuals. What is known as 'Ottoman materialism' consists of reflections by Beşir Fuad (1852–87), and translations by Abdullah Cevdet (1869–1932) and Bâha Tevfik (1884–1914).

The focus on materialist authors started with Beşir Fuad. In his exchanges with Muallim Nâci (1849–93), Fuad described the French translation of Büchner's *Kraft und Stoff* as a book combining the two words and creating a history of reform (*tarih-i teceddüd*) (Nâci 1887: 70). He frequently associated philosophy with modern science and excluded metaphysics from philosophy, since in his view it did not have any scientific basis (Fuad and Necib 1894: 31). He aimed to change society through science and was described as a 'self-appointed agent of change' and 'trendsetter', who dedicated himself to promoting scientific thought through critical writings and translations (Arslan and Işıklar Koçak 2014: 46–7). Fuad was thus known among Ottomans for his materialist and radical modernist approach. He had a good command of French and other Western languages like English and German, but no interest in Ottoman Islamic culture or Arabic language. His education was completely secular, and he even admitted to his master Ahmed Midhat, whom he genuinely trusted and whose opinion he often consulted, that he had read the Qur'an in French translation (Midhat 1887: 32–3). At the meeting with Midhat, he emphasized that his philosophical thoughts were entirely materialistic, and he did not recognize anything other than matter (Midhat 1887: 15).

The main translators of scientific materialism, however, were Cevdet, and Tevfik together with his associates. Before analysing their translations, it is helpful to gain some sense of their goals and achievements. Cevdet was attracted to materialistic ideas by reading European scientific texts during his early studies in medicine. As a result of his opposition to the rule of Abdulhamid II, he was exiled to Tripoli in 1896. He subsequently fled to Tunisia, which was at that time under French occupation and would remain so for a decade. The following year, Cevdet found his way to Paris and met other Young Turk dissidents there. He wrote articles in various journals, and on 1 September 1904, he published during exile in Geneva the first issue of his own bilingual journal *Ictihad* [Reasoning] in French and Ottoman Turkish. However, under continuous pressure from the Ottoman Empire, the Swiss authorities forced him to leave the country, and he went to Egypt in 1905 to continue publishing the journal in Ottoman Turkish and writing other books. He stayed in Cairo for two more years after the Constitutional Revolution and returned to Istanbul in 1910 to focus his efforts on writing and publishing. During World War I, he worked mainly on translations of scientific and philosophical works from French into Ottoman Turkish, but after the war held a position as a medical doctor in public health administration. In the Republican period, he did not receive any official posts from the newly established nationalist government in Ankara because his pro-European political views were considered to be against national sovereignty. He died in Istanbul in 1932 (See Ülken 1992: 32–3; Hanioğlu 2004, n.d.: 5–59).

Through his numerous translations of popular scientific texts, Cevdet aimed to spread materialistic ideas among the masses (Ayluçturhan 2007: 99–136). He was the most prolific translator of the late Ottoman period, translating numerous complete and partial translations in physiology, psychology, and philosophy, especially the works of Gustave Le Bon. He also translated a biography of Le Bon by Ichirō Motono (1925), and several other texts by various French authors, such as Guyot-Daubès (1850–1950) and Voltaire. His interest in Büchner was related to the German thinker's materialist scientism, whereas Cevdet's predilection for Le Bon was connected to the author's elitist views and dismissive opinions of the masses. Guyot-Daubès, however, influenced him through his views on education and morality (Bürüngüz 2005: 22–31).

A first partial translation of Büchner's book by Cevdet, titled *Fizyolocya-yi Tefekkür* [Physiology of Thinking], was published in 1891 and presented itself as counter to traditional theories of soul, as the cover page of the work indicates. The title of the book includes the French phrase 'La Pensée', which is a section title from the French translation (1863) of *Kraft und Stoff* by L. F. Gamper. In the text, Cevdet cites Ottoman concepts alongside their French equivalents. In the translator's introduction, while discussing whether thinking was a product of the soul or the brain, he distinguishes

between 'old thinkers' and 'new thinkers' (Büchner 1890: 12). He admires countries which abandoned the old vision and supported the new scientific approach that enabled scientists to create new inventions (Büchner 1890: 3ff.). Another rendering by Cevdet is the translation of the 'Gorilla' section of Büchner's *Aus Natur und Wissenschaft* [From Nature and Science], from the French version *Nature et science* (Büchner 1894). It introduces some new ape species discovered recently in Africa, especially the gorilla, and describes their similarities to humans. In the preface, Cevdet stated that the translation was from French and first published in the local newspaper, before being converted into a pamphlet. Cevdet's other work from Büchner (Cevdet 1896) is titled *Fünûn ve Felsefe* [Sciences and Philosophy]. It is an annotated translation of a chapter from Büchner's *Aus Natur und Wissenschaft*, which was extended by Cevdet after its first publication. It is a collection of various quotations and short comments that aims to show correlations between traditional Islamic sources and modern scientific ideas (Cevdet 1896; Çıkla 2003: 51–8). Later he published another partial translation from *Force and Matter*, entitled *Fenn-i Ruh* [The Sciences of the Soul], which includes sections on 'Brain and Spirit', 'Thinking', 'Conscience' and 'Brain and Mind' (Büchner 1911). Cevdet emphasizes that the increasing popularity of spiritism encouraged him to write about the soul from a scientific perspective.

The other translator, Tevfik, was a rigorous follower of modern science and co-founder of a publication centre with Ahmed Nebil (?-1945). Apart from his translations, he wrote other scientific and philosophical works and was extremely prodigious during his short life (Bağcı 1996: 11–38). He became the most significant figure associated with materialistic ideas in the late Ottoman Empire through his attention to philosophical thinking and its role in society. Under the impact of Beşir Fuad and especially Cevdet, he helped to introduce scientific materialism more forcefully and to transmit the views of Büchner and Haeckel to late Ottoman society. Most significantly, he translated *Kraft und Stoff* fully into Ottoman Turkish together with Nebil (Büchner 1911).[5] Tevfik states in an article that they compared various editions and also consulted the eighteenth edition of the German original for this translation (Tevfik 1913b: 68). Unlike Cevdet, he did not present his materialistic arguments and ideas in an Islamic context and using religious terminology but preferred a more straightforward defence of materialism. Thus, instead of addressing the masses, he preferred to theorize scientific materialism for educated elites, who were already familiar with science. Furthermore, he argued that scientific philosophy was not well grounded among those contemporary Ottoman thinkers who favoured metaphysics. In his view, there was a close and interactive relation between science and philosophy since the philosophy of yesterday was today's science, and tomorrow's science and technology were today's philosophy. The method of philosophy should draw on contemporary science, he argued,

otherwise it would be mere speculation (Tevfik 1913a: i–ii). Tevfik pointed out that his numerous translations, together with Nebil, of both Büchner and Haeckel served this purpose and received attention from readers who bought many copies (Büchner 1911: 5).

To avoid criticism, the translators were quick to inform readers in their introduction that the religion in question in the book was Christianity, not Islam, and a forged (*muharref*) form of Christianity at that. As they put it, the author only addressed this illogical form of religion, listed his objections, and made his refutation. They suggested that if these objections had been assumed to cover Islam too, there were many Islamic scholars (*hâceler*) among Ottomans who would refute them. They also emphasized that they had only translated the book literally for the attention of those who would like to respond but were not able to do so because of their lack of knowledge of foreign languages, and all responsibility for the views belonged to the author, i.e. Büchner. These statements were therefore written in order to protect themselves from the reactions to the views in the text (Büchner 1911: 6).

Büchner's book and its approach had already faced criticism in his own scholarly environment. The most significant of these came from Friedrich Albert Lange in his *Geschichte des Materialismus und Kritik seiner Bedeutung in der Gegenwart* [History of Materialism and Critical Reflections on its Significance for the Present] (1925: 265–76). Lange gave a formidable analysis of the weaknesses and inconsistencies in Büchner's thought and arguments. Tevfik, in his response to the critics, suggested that Büchner's ideas were not in conflict with contemporary ideas but some of its theories and thoughts were not supported by clear evidence. This view, he asserted, was most seriously held by Lange, who had, however, only seen the first edition of *Kraft und Stoff* at that time, as Tevfik concedes. As the work was now in its seventeenth edition, and in each edition the author had improved its content, the most recent was almost four times larger than the original. Tevfik and his fellow translator, therefore, had had to compare various French versions with the latest German edition. Views and texts were swiftly changed in Europe, he noted, because everybody read and discussed them in various languages. It was for critics to indicate if there were conflicts with modern science in Büchner's book (Tevfik 1913b: 68).

Haeckel's texts were also translated by Tevfik and his associates. *Die Welträtsel*, for instance, was partially translated into Turkish by Tevfik, Nebil, and Subhi Edhem (1880–1923?). Two chapters were initially published as a series of articles in *Felsefe Mecmuası* [Journal of Philosophy], but the rest remained in manuscript form. Although an announcement in the eighth issue stated that the serialization would continue, the second volume was never published. Moreover, in a footnote in his *Lamarkizm* [Lamarckism], Edhem indicated that he was about to complete the unfinished translation started with Tevfik, but there is no sign of its publication

(Edhem 1912: 10). Later in the Republican period, a separate translation of Haeckel's *Die Welträtsel* was translated and published by Ali Haydar Daner (Haeckel 1936).

Another work by Haeckel, *Der Monismus* [Monism], was translated in its entirety by Tevfik and Nebil from French under the title *Vahdet-i Mevcûd – Bir Tabiat 'Âliminin Dîni* [The Unity of the Existent: Religion of a Scholar of Nature]. In their introduction the translators underlined that the views presented in the book were not unfamiliar in the Ottoman context. They compared monism with the mystical theory of the unity of existence (*vahdet-i vücûd*) proposed by Ibn al-Arabi (1165–1240) while highlighting that the former was more scientific. They also emphasized that the aim of translating it was solely to search for and reach the truth. Besides, they suggested that the work would help those who wanted to learn new ideas through the clearer style of Ottoman Turkish (Haeckel n.d.a.: 3–6). The book is enriched with annotations and quotations by the translators to appropriate Haeckelian views in Ottoman Islamic discourse, and an endnote is added stressing the compatibility of Islamic religion with science.

Haeckel's *Über unsere gegenwaertige Kentniss vom Ursprung des Menschen* [On Our Current Knowledge of the Origin of Humankind] was also translated and published as *İnsanın Menşei – Nesl-i Beşer* [The Origin of Man – The Generation of Humanity] by Nebil. The work is based on a speech Haeckel gave at the Fourth International Congress of Zoologists in Cambridge in August 1898. Tevfik wrote a foreword to the translation, described the content of the book, and evaluated the importance of the work with the following words: 'It is nothing more than a perfect explanation of Darwinism' (Tevfik, 'Foreword,' in Haeckel n.d.b). The translation is headed by pictures and brief introductions to Haeckel, Darwin, and Büchner as great scholars and predecessors of Haeckel. As the words under the picture of Büchner before the Foreword note: 'Büchner passed away in 1899. But his works are still alive and will live on'.

In this period, there were other short translations from Büchner and Haeckel, although these are not relevant to our analysis of the broader trends among translators. These were to disseminate the materialist and monist views of the aforementioned German authors, and to pique the curiosity of educated Ottomans with their translations. By stating that the objections to religious discourses in Büchner and Haeckel's books were only aimed at Christianity, they sought to prevent disapproval from Muslim Ottoman intellectuals, as they considered that these figures would have an impact on the publication and popularization of these works. However, as we shall see in the following section, they failed to convince one particular group of religious and conservative scholars.

Criticisms of Ottoman Translations on Materialism and Monism

Despite the promotion and popularization of Büchner and Haeckel's views through intensive translation activities, Ottoman intellectual circles were not uncritical. One of the earliest reactions to promoting scientific materialist thought came from Ali Suavî (1839–78). He asserted that pre-Socratic materialism had re-emerged in Germany and spread across Europe (1870: 1008–24). He also highlighted the popularity of Büchner among the French and warned young Ottomans sent to France for educational purposes to be aware of the negative influence of his thought.

An initial comprehensive response came from İsmail Ferid (1852-?), a bureaucrat and scholar, who wrote a refutation of Büchner's *Force and Matter* before it was fully translated into Turkish. It was written after the author had received questions from a young person with no Turkish books in his library, who had read Büchner's book and now began to doubt traditional views on nature and creation. According to the motive for writing the book given in the introduction, Ferid asked the young person to translate Büchner's claims for him. The person responded that the book was 600 pages long with further annotations, so he would convey Büchner's chapters in summary (Ferîd 1895: 5–6). The book then continues topic by topic in dialogue form with passages spoken by 'He' [O] and 'Me' [Ben]. These responses aimed to show the inconsistencies of Büchner's views via Qur'anic and Islamic philosophical arguments (Ferîd 1895: 7ff.).

In her work on substances, Fatma Âliye (1862–1936) likewise considered debates about physical matter in Europe, showing the inadequacy of the views put forward by materialists, and defending the argument that metaphysical issues could not be reduced merely to matter, since they were beyond the limits of the human mind. She criticized scientific materialist views by relying on Islamic philosophical arguments as well as the work by Paul Janet (1823–99) entitled *Le Matérialisme contemporain en Allemagne* [Contemporary Materialism in Germany] (1885).

The work of Harputîzâde Mustafa Lütfî (1867–1920), *Red ve İsbât* [Refutation and Proof], provided another critical angle on materialist thought, and underlined on the title page that it rejected Büchner's *Force and Matter*, as translated by Nebil and Tevfik (Lütfî 1912). In his introduction, Lütfî claimed that the content of Büchner's book was incompatible with reason and logic and was an ordinary text that simply explained the conditions and features of things rather than being a scientific-philosophical work. He also emphasized that the book did not only target Christianity, as the translators claimed, but rather religion and the idea of God *per se*. He suggested that certain passages had inconsistencies but that he could not be sure whether they were there in the original source text or caused

by translator error. He in fact devoted an entire section to how translations require more effort and attention than simply writing a book (Lütfî 1912: 3–18).[6]

The work by Şehbenderzâde Filibeli Ahmed Hilmi (1865–1914) on the fallacy of the materialists under the guidance of reason and science was also an Ottoman text critical of materialism. It targeted *Tarih-i İstikbâl* [History of the Future] by Celal Nuri (1882–1936), which, according to Hilmi, represented the ideas of Büchner, Haeckel, Moleschott, and Lange (Hilmi 1914: 3–7). Hilmi regarded materialists as dogmatists and referred to the views of Wilhelm Ostwald (1853–1932) on energy as well as the principle of entropy that countered Büchner's views on the relation of force and matter (Hilmi 1914: 51–2). Other, later responses to Büchner or materialism in general by scholars such as Mehmed Emin Feyzi (1862–1929) and İsmail Fenni (1855–1946) in the Republican period exist, but these go beyond the remit of this chapter, which takes us to the end of the Ottoman Empire.[7]

Traditional and religious intellectuals were apparently not content with the conclusions which emerged from the translations of works by Büchner and Haeckel: these ideas did not directly represent science, and the scientific data they used were no longer valid according to new physical theories such as entropy and quantum. They also emphasized that although the fields of religion and science were separate, Büchner and Haeckel targeted religious beliefs in the name of science. They also rejected assertions made by the translators that the claims of German materialists did not target the Islamic faith. While refuting materialists, some of their arguments were based on modern scientific knowledge, while others were derived from classical thought.

Conclusions

Translation has, throughout history, been the most common carrier for the transmission, reception, and dissemination of knowledge and ideas. It also played a major role in circulating modern scientific thought and discussions in the nineteenth century. This chapter has analysed the effects of the transition of modern materialist and monist movements, which emerged in Germany and spread to Europe with translations by and aimed at Ottoman intellectuals. Some of them, such as Fuad, Cevdet, Tevfik, and Nebil, who saw themselves as modernist followers of scientific developments, were influenced by the new materialist, monist, and evolutionist movements that emerged from the scientific debates spearheaded by Büchner and Haeckel. They considered it their responsibility to translate the works of these German scientists into Turkish, through the medium of French, the second scholarly language among intellectuals in the Ottoman world. Although German materialist and monist sources were translated from French, comparisons by translators with

the German originals resulted in greater familiarity with German texts and authors. As a result, they transmitted both German thought and its French perception into Ottoman culture. Although the translated texts carried with them problematic ideological issues in terms of target culture reception, they also strengthened interest in new scientific developments. Moreover, they fuelled debates and arguments among Ottoman scholars, notably regarding the *Materialismusstreit* in mid-nineteenth-century Germany, which is an intriguing example of the power and impact of translation and cultural interaction.

Notes

1 I thank Micah A. Hughes for reading the early draft of this chapter and giving valuable suggestions.
2 All translations are by the author unless otherwise stated.
3 Büchner's gravestone is engraved with a verse from the last edition of *Kraft und Stoff*: 'Das Warum wird offenbar/Wenn die Toten auferstehen/Doch das Wie ist sonnenklar/Wenn die Welt wir recht verstehen.' [The 'why' is revealed/When the dead rise/But the 'how' is clear as day/If we understand the world correctly] (Gregory 1977: 120–1).
4 Some authors writing on Haeckel, such as Daniel Gasman, linked his evolutionary thought to the rise of the Nazi movement. Stephen Jay Gould has also argued that Haeckel's biological theories contributed to the rise of Nazism. Adrian Desmond and James Moore underlined that Haeckel's mode of thinking and admiration for Goethe's pantheistic philosophy led him to mystical Nature-worship.
5 Although the existence of co-translator Ahmed Nebil has been disputed in some sources – with suggestions that Ahmed Nebil was only a penname for Bâha Tevfik – there is reliable proof that he was a close associate of Bâha Tevfik.
6 Nebil responded in *Yirminci Asırda Zekâ* [Intellect in Twentieth Century] criticising Harputîzâde and his work 'Bir İzah', 8 (1328 [1912]). He emphasized Harputîzâde's inadequacy as a scientist. Nebil called for translations of solid texts by Muslims into European languages to show the whole world the sublimity and greatness of Islamic points of view (Nebil 1912). Following this article by Nebil, an interview with Harputîzâde was published in *Beyânü'l Hak* [Explanation of the Truth] (1328 [1912]), where the author responded to Nebil's criticisms.
7 For instance, Mehmed Emin Feyzi's *İlim ve İrâde* [Science and Will], subtitled 'Contains the Rejection of the Materialist School' and İsmail Fenni's *Maddiyyun Mezhebinin İzmihlali* [The Downfall of the Materialist School] (Fennî 1928).

References

Afacan, Şeyma. 2021. 'Idle Souls, Regulated Emotions of a Mind Industry: A New Look at Ottoman Materialism', *Journal of Islamic Studies* 32(3): 317–353.
Akgün, Mehmet. 1988. *Materyalizmin Türkiye'ye Girişi ve İlk Etkileri*. Ankara: Kültür ve Turizm Bakanlığı.
Âliye, Fatma. 1899. *Tedkîk-i Ecsâm*. Istanbul: Hanımlara Mahsûs Gazete Matbaası.
Arslan, Devrim Ulaş, and Işıklar Koçak, Müge. 2014. 'Beşir Fuad as a Self-Appointed Agent of Change: A Microhistorical Study', *Istanbul University Journal of Translation Studies* 8: 41–64.

Âsım, Necîb. 1893. *Kitâb*. Istanbul: Matbaa-i Safa ve Enver.
Ayluçtarhan, Sevda. 2007. *Dr. Abdullah Cevdet's Translations (1908–1910): The Making of a Westernist and Materialist 'Culture Repertoire' in a 'Resistant' Ottoman Context*, MA Dissertation, Boğaziçi University.
Bağcı, Rıza. 1996. *Baha Tevfik'in Hayatı Edebi ve Felsefî Eserleri Üzerine Bir Araştırma*. İzmir: Kaynak Yayınları.
Balcı, Sezai. 2013. *Babıali Tercüme Odası*. Istanbul: Libra.
Beiser, Frederick C. 2014. *After Hegel: German Philosophy, 1840–1900*. Princeton, NJ: Princeton University Press.
Bilim, Cahit. 1990. 'Tercüme Odası', *OTAM Dergisi* 1: 29–43.
Büchner, Ludwig. 1855. *Kraft und Stoff oder Grundzüge der natürlichen Weltordnung*. Frankfurt: Meidiger Verlag.
Büchner, Ludwig. 1863. *Force et matière: études philosophiques et empiriques de sciences naturelles*, trans. L. F. Gamper. Paris: C. Reinwald.
Büchner, Ludwig. 1870. *Force and Matter: Empirico-Philosophical Studies, Intelligibly Rendered*, trans J. Frederick Collingwood. London: Trubner & Co.
Büchner, Ludwig. 1890. *Fizyolocya-yı Tefekkür*, trans. Abdullah Cevdet. Istanbul: İstepan Matbaası.
Büchner, Ludwig. 1894. *Goril*, trans. Abdullah Cevdet. Mamûretülaziz: np.
Büchner, Ludwig. 1911. *Fenn-i Ruh: Dimağ ve Ruh, Tefekkür, Vicdan*, trans. Abdullah Cevdet. Istanbul: Matbaa-i İctihad.
Bürüngüz, Refik. 2005. *Abdullah Cevdet and the Garpçılık Movement*. MA Dissertation, Fatih University.
Cevdet, Abdullah. 1896. *Fünun ve Felsefe*. Cairo: Matba'at İctihad.
Çıkla, Selçuk. 2003. 'Baha Tevfik'in Hayatı, Yazarlığı, Mizacı ve Felsefeciliği: Muhalif, Asî ve Sıra Dışı-I', *Tarih ve Toplum* 234: 51–8.
Demircioğlu, Cemal. 2012. 'Müntehabât-i Terâcim-i Meşâhir: An Exploration of Its Paratext from the Perspective of Cultural Memory', *I.U. Journal of Translation Studies* 2(6): 15–43.
Edhem, Subhi. 1912. *Lamarkizm*. Istanbul: Nefâset Matbaası.
Elshakry, Marwa S. 2008. 'Knowledge in Motion: The Cultural Politics of Modern Science Translations in Arabic', *Isis* 99 (4): 701–730.
Fennî, İsmail. 1928. *Maddiyyun Mezhebinin İzmihlali*. Istanbul: Orhaniye Matbaası.
Ferîd, İsmail. 1895. *İbtâl-i Mezheb-i Maddiyyûn*. İzmir: Ahmed Celâdet ve Şürekâsı Matbaası.
Feyzi, Mehmed Emin. 1927. *İlim ve İrâde* (Science and Will), Istanbul: Necm-i İstikbâl Matbaası.
Fuad, Beşir, and Necîb Fazlı. 1894. *Mektûbât* (Letters). Istanbul: Şafak Kütübhanesi.
Gregory, Frederick. 1977. *Scientific Materialism in Nineteenth-Century Germany*. Dordrecht: D. Reidel Publishing Company.
Günergun, Feza. 2007. 'Ottoman Encounters with European Science: Sixteenth- and Seventeenth-century Translations into Turkish', in Peter Burke and R. Po-Chia Hsia (eds), *Cultural Translation in Early Modern Europe*, pp. 192–211. Cambridge: Cambridge University Press.
Haeckel, Ernst. 1901. *The Riddle of the Universe at the Close of the Nineteenth Century,* trans. J. McCabe. New York and London: Harper and Brothers.
Haeckel, Ernst. 1892. *The History of Creation or the Development of the Earth and Its Inhabitants by the Action of Natural Causes: A Popular Exposition of the Doctrine of Evolution in General, and of that of Darwin, Goethe, and Lamarck in Particular*, trans. anon., revised by E. Ray Lankester. New York: D. Appleton & Co.
Haeckel, Ernst. 1936. *Ka'inatın Mu'ammaları* Istanbul: Devlet Basımevi.

Haeckel, Ernst. 2005. *Monism as Connecting Religion and Science*, trans. J. Gilchrist. The Project Gutenberg Ebook.
Haeckel, Ernst. n.d.a. *Vahdet-i Mevcûd: Bir Tabiat Âliminin Dîni,* trans. Bâha Tevfik and Ahmed Nebîl. Istanbul: Dersaadet Kütüphanesi.
Haeckel, Ernst. n.d.b. *İnsânın Menşei – Nesl-i Beşer*, trans. Ahmed Nebîl. Istanbul: Matbaa-i Nefâset.
Hanioğlu, M. Şükrü. 2004. 'Blueprints for a Future Society: Late Ottoman Materialists on Science, Religion, and Art', in Elisabeth Özdalga (ed.), *Late Ottoman Society: The Intellectual Legacy*, pp. 28–116. London: Routledge.
Heidelberger, Michael. 1998. 'Büchner, Friedrich Karl Christian Ludwig (Louis) (1824–99)', in Edward Craig (ed.), *Routledge Encyclopedia of Philosophy*, vol. 2, pp. 48–51. London, New York: Routledge.
Hilmi, Filibeli Ahmed. 1914. *Huzûr-ı Akl u Fende Maddiyyûn Meslek-i Dalâleti*. Istanbul: Hikmet Matbaa-i İslâmiyesi.
Hughes, Micah A. 2021. *Religion's Revolution: Islam, Social Science and the University in the Republic of Turkey*. Unpublished PhD Dissertation. University of North Carolina, Chapel Hill.
İhsanoğlu, Ekmeleddin. 2004. *Science, Technology and Learning in the Ottoman Empire: Western Influence, Local Institutions, and the Transfer of Knowledge*. Surrey: Ashgate.
İshak Efendi, Başhoca. 1831–34. *Mecmua-i Ulûm-i Riyâziyye*. Istanbul: Matbaa-i Amire.
Janet, Paul. 1885. *Le matérialisme contemporaine*. Paris: Librairie Germer Baillière.
Lange, Frederick Albert. 1925. *The History of Materialism and Criticism of Its Present Importance,* trans. Ernest Chester Thomas. London: Kegan Paul, Trench, and Trübner & Co. Ltd.
Lütfî, Harputîzâde Mustafa. 1912. *Red ve İsbât*. Istanbul: Hikmet Matbaa-i İslâmiyesi.
Maleckova, Jitka. 1994. 'Ludwig Büchner Versus Nat Pinkerton: Turkish Translations from Western Languages, 1880–1914', *Mediterranean Historical Review* 9 (1): 73–99.
Midhat, Ahmed. 1887. *Beşir Fuad*. Istanbul: Tercüman-ı Hakîkat Matbaası.
Motono, Le Baron. 1925. *Bir zekâ-i Feyyaz: Doktor Gustave Le Bon'un İlim ve Tefekkür Aleminde Gördüğü İş*. Istanbul: Necm-i İstikbal Matbaası.
Münif, Mehmed. 1862. 'Mukayese-i İlm ü Cehl', *Mecmua-i Fünun* 1(1): 21–35.
Nâci, Muallim, and Fuad, Beşir. 1887. *Intikad: Muallim Nâcî Efendi ile Beşir Fuad Beg Arasında 'Viktor Hügo" Hakkında Cereyân Eden Muhasebedir*. Istanbul: Mahmud Beg Matbaası.
Nebil, Ahmed. 1912. 'Bir İzah', *Yirminci Asırda Zekâ* 8: 120–122.
Özervarlı, M. Sait. 2018. 'Positivism in the Late Ottoman Empire: The "Young Turks" as Mediators and Multipliers', in Johannes Feichtinger, Franz L. Fillafer, Jan Surman (eds), *The Worlds of Positivism: A Global Intellectual History, 1770–1930*, pp. 81–108. London: Palgrave Macmillan.
Özervarlı, M. Sait. 2022. 'Ottoman-Turkish Thought from a Global Intellectual History Perspective: An Analysis of Disenchantment from Positivism and Engagement with Bergsonian Intuitionism', in Deniz Kuru and Hazal Pabuççular (eds), *The Turkish Connection: Global Intellectual Histories of the Late Ottoman Empire and Republican Turkey*, pp. 83–110. Berlin: De Gruyter.
Özmen, Ceyda. 2016. 'Translating Science in the Ottoman Empire: Translator-educators as "Agents of Change" in the Ottoman Scientific Repertoires (1789–1939)', *The Journal of Ottoman Studies* 48: 143–170.
Richards, Robert J. 2008. *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought*. Chicago: The University of Chicago Press.

Said, Kemalpaşazâde. 1889. 'Mutalaanâme (Presentation)', in İbrahim Fehim and İsmail Hakkı (eds), *Müntehabât-i Terâcîm-i Meşâhir*, pp. 3–4. Istanbul: Artin Asuduryan Matbaası.

Shefer-Mossensohn, Miri. 2015. *Science among the Ottomans: The Cultural Creation and Exchange of Knowledge*. Austin: University of Texas Press.

Suavî, Ali. 1870. 'Materyalist: Ehl-i Mâdde, Ehl-i Hiss, Müşebbihe', *Ulûm* 17: 1008–24.

Talat, Bolulu H. 1899. 'Tercüme Hakkında Tarihe Müstenid Bir Mütalaa', *İrtika* 4: 15.

Tevfik, Bâha. 1913a. 'Maksad ve Meslek', *Felsefe Mecmuası* 1: 1–2.

Tevfik, Bâha. 1913b. 'Tenkîd-I Felsefî: Ali Kemal Bey'in 8 Haziran Tarihli İkdâm Gazetesindeki Makalesine Cevabdır', *Felsefe Mecmuası* 5: 65–69.

Toderini, L'Abbé [Giambattista]. 1789. *De la littérature des Turcs*, trans. L'Abbé [Antoine] de Cournand. Paris: Poinçot.

Ülken, Hilmi Ziya. 1992. *Türkiye'de Çağdaş Düşünce Tarihi*. Istanbul: Ülken Yayınları.

Vehbi, Ahmed. 1883. *Tecarib-i hikemiyye ve kimyeviyye*. Istanbul: Mahmud Beg Matbaası.

Weir, Todd H. 2012. 'The Riddles of Monism: An Introductory Essay', in Todd H. Weir (ed.), *Monism: Science, Philosophy, Religion, and the History of the Worldview*, pp. 1–44. New York: Palgrave Macmillan.

Yalçınkaya, M. Alper. 2015. *Learned Patriots: Debating Science, State, and Society in the Nineteenth-Century Ottoman Empire*. Chicago: University of Chicago Press.

9

MEDIATING JOHANN GEORG ZIMMERMANN'S *VON DER ERFAHRUNG* IN FRANCE AND BRITAIN

Laura Tarkka and Caroline Mannweiler

Introduction

The Swiss physician Johann Georg Zimmermann earned his M.D. degree at the University of Göttingen under the guidance of his renowned countryman Albrecht von Haller. After graduating in 1752 with his *Dissertatio physiologica de irritabilitate* [Physiological Dissertation on Irritability][1] (1751), Zimmermann continued to rely on his mentor, but unlike Haller, he gave up using Latin as a lingua franca in his publications (Zenker 2007: 27–31; Boschung 1998: 32). The rationale behind this was that Zimmermann did not become an academic, but the physician or '*Stadtphysikus*' of his hometown Brugg, later rising to the position of first physician or '*Leibmedicus*' to the prince elector George III in Hanover. Nevertheless, Zimmermann had ambitions in the world of learning. In the preface to his second major medical publication, *Von der Erfahrung in der Arzneykunst* [On Experience in Medicine] (1763/1764), he declared that the work was written for the *Jünglinge* [young men] at Göttingen – for the students he might have taught in person, had he accepted the university's recent offer of a professorial position (Zimmermann 1763: iv). As such, *Von der Erfahrung* appears to have stemmed from the pen of a scholar who found himself confined to a small town and, instead of pursuing an academic career, made himself useful to the local community (see Zenker 2007: 40).

This literary gesture proved successful, as Zimmermann soon not only gained a more prestigious position in Hanover but also caught the attention of colleagues abroad. One of them was Charles Rivington Hopson, M.D., who translated *Von der Ruhr* [On Dysentery] (1767), Zimmermann's description of a dysentery epidemic that had recently raged in the canton of Bern.

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Dedicating his translation to Professor William Cullen of the University of Edinburgh, Hopson noted that Cullen had already recommended the original work to his disciples (Zimmermann 1771: 'Dedication', n.p.). Moreover, a review of the translation in *The London Magazine* (Anon 1771b: 164) affirmed that 'Dr Zimmermann' was such 'a name of eminence in the medical world' that 'any work of his' had to 'excite the curiosity of the physical reader'. According to Hopson, Zimmermann's '*Experience in Medicine*' was 'universally admired', although it had not yet been translated (Zimmermann 1771: 'Preface', n.p.).

Evidently, the circles of academic medicine were small, and it was precisely this educated elite whose attention Zimmermann courted by furnishing the title page of *Von der Erfahrung* with the motto 'Non ex vulgi opinione, sed ex sano judicio. Bacon' [Not based on popular opinion, but on sound judgement. Bacon]. Invoking Francis Bacon's *De dignitate et augmentis scientiarum* [On the Dignity and Advancement of Learning], this motto reflects Zimmermann's wish to appear a Baconian scholar and underlines that he was not writing for the 'vulgar' but for those who aspired to be physicians of 'true learning'. This points to a hierarchical view of society, in which universal access to knowledge was neither the norm nor the ultimate aim (Venuti 2018/1995: 35–7; Peltonen 2013: 25–6, 222–6). Indeed, Zimmermann wrote about 'der Pöbel (le vulgaire)' [the mob] as people incapable of grasping 'das grosse [sic] und das wahre [sic]' [the great and the true] (Zimmermann 1763: 10). Accordingly, it seems apposite that the French and British translators of *Von der Erfahrung* were, like Hopson, physicians with an academic background.

The first of them, Jean-Baptiste Lefebvre de Villebrune, translated *Von der Erfahrung* into French as *Traité de l'expérience* (1774). Recently characterized as a 'médecin philologue' (Bret and Moerman 2014: 660), Villebrune also translated Zimmermann's *Von der Ruhr* as *Traité de la dyssenterie* (1775), as well as other medical and non-medical works from English, Spanish, Italian, Swedish, Latin, and Greek. *Traité de l'expérience* was subsequently translated into English as *A Treatise on Experience in Physic* (1778). This translation was anonymous, but, as revealed by *The Critical Review* (Anon 1782a: 42), it was the work of Samuel Foart Simmons, M.D., a member of the French *Société Royale de Médecine* [Royal Society of Medicine] and later president of the Medical Society of London (Brock 2004: n.p.).

Yet, as these translations demonstrate, a doctorate in medicine did not necessarily entail faithfulness in the role of translator. In a 1794 letter to Dr John Coakley Lettsom, Zimmermann complained that Villebrune, instead of giving in French what *Von der Erfahrung* conveyed in German, had frequently inserted his own ideas into the text and offered them to the public as if they had been those of Zimmermann (Pettigrew 1817: 153–4). Thus, Zimmermann called Villebrune 'un fourbe' [a crook] while deeming

Hopson's translation of *Von der Ruhr* 'réüssi' [sic] [successful] (Pettigrew 1817: 152–3). He also regretted that a 'respectable' English physician (i. e. Simmons) had made the mistake of translating Villebrune's *Traité de l'expérience* into English, albeit with very good additional notes (Pettigrew 1817: 154).

Zimmermann's strong reaction is understandable: *Traité de l'expérience* does indeed often diverge from its source text, as shown below. Interestingly, however, contemporary reviewers display a more relaxed attitude to the matter. Both the *Journal des sçavans* [Journal of the Learned] (Anon 1774b: 729) and *L'Année littéraire* [The Literary Year] (Anon 1774a: 64) uncritically repeated Villebrune's statement that the translation incorporated some 'necessary' changes. The *Journal de médecine, chirurgie, pharmacie, &c* [Journal of Medicine, Surgery, Pharmacy, etc.] (Anon 1774c: 503) even noted that the translation appeared to have been done 'avec soin' [with care]. Such views probably had to do with Villebrune's affirmation that the changes did not pertain to 'l'art' [the art] of medicine (Zimmermann 1774: I.viii); many of Villebrune's French critics were in any case unable to read the German source text.

Most British readers of Simmons's indirect English translation would have been unaware of Villebrune's interventions, though *The Critical Review* directed attention to the multiple voices in the text:

> If this volume has a fault, it is sometimes a little inconsistent in its different parts [...] for, though in the whole passage he speaks in the language of a materialist, vide p. 98 to 107, yet, in other parts of his work, he often speaks of the efforts of the soul independent of the body.
>
> *(Anon 1782a: 45–6)*

This reader was clearly an expert who may have been familiar with Zimmermann's original German text, as it seems that he noticed the substantial rewriting occurring in the fifth chapter of Book II. Here, Zimmermann originally declared that the experience of former times and peoples was the physician's best instructor [Lehrmeisterin] (Zimmermann 1763: 130). However, Villebrune adjusted the message, cautioning against overconfidence in erudition and adding a long section relating to the debate on the relationship between body and soul (Zimmermann 1763: 130–6; Zimmermann 1774: I.138–66; Thomson 2008: 178, 184). Despite noticing that the translation contained different voices, the reviewer nevertheless refrained from calling out Villebrune's translation and its covert additions as Simmons's unacknowledged source text.

Notwithstanding Zimmermann's own good opinion, Hopson's translation of *Von der Ruhr* was likewise heavily adapted by way of omissions. Still, Hopson's agency was first ignored both in *The Critical Review* (Anon

1771a: 177; Anon 1782a: 41) and *The Monthly Review* (Dawson, 1772: 21; Nangle 1934: 13–14, 226) and misunderstood in *The London Magazine* (Anon 1772: 542), although Hopson himself admitted that he had removed a part of the work and 'occasionally' abridged it (Zimmermann 1771: 'Preface', n.p.). Only the *Göttingische Anzeigen* [Göttingen Advertiser] (Anon 1773: 369) paid due attention to the translation process, noting that Hopson had omitted everything regarding 'die Ausrottung medicinischer Vorurtheile' [the eradication of medical prejudices].

These observations raise the question of how the three translating physicians acted as judicious interpreters in reshaping the ethos of Zimmermann's work for their own target readers. As will be shown, they all acknowledged the obligation to transfer Zimmermann's medical experience in a transparent manner. However, their translations also display the various liberties they took when judging how the essence of Zimmermann's work and his authorial persona should be presented to readers who were neither Swiss citizens nor students at the University of Göttingen.

Judicious Physicians as 'Philosophical Doctors'

As a member of the Helvetic Society, Zimmermann depicted himself as a patriot and aspired to prove himself useful to his country. This was reflected in his manner of writing, which sought to engage the reader with skilful rhetoric. Consequently, Hopson affirmed that Zimmermann's works displayed 'a purity and elegance of stile [sic], which have contributed to place him in the first class of German writers' (Zimmermann 1771: 'Dedication', n.p.). Yet, considering that Zimmermann perceived himself as Swiss, it is important to read him as a physician who aimed to heal the particular society in which he lived and worked, and who therefore sought to bring about reforms in the canton of Bern. If such 'philosophische Ärzte' [philosophical doctors] are considered a recognizable scientific persona in the Enlightenment period, Zimmermann's manner of writing can be connected with his medical practice (Zenker 2007: 1–14; Langenbacher 1998: 15; Daston and Sibum 2003: 3). Indeed, like popular philosophers of the time, Zimmermann made use of the public sphere not only to encourage critical thinking, but also to address specific societal problems. This, in turn, raises the question of how his socially situated persona was communicated by translators based in different contexts.

Like Zimmermann himself, his translators had to consider the impression they would make on their audience. Simply 'copying' the source text without bringing their own expertise to bear would have meant acting like hack translators, ignorant of and indifferent to the project of advancing medical knowledge. For educated readers of the time, it was clear that poetry translators had to be poets themselves and that the limits to their own creativity

were flexible (Venuti 2018/1995: 37–54; Steiner 1975: 53–6). As noted by Felicity Henderson, a similar challenge faced translators of science: 'philosophical translators' who shared the expertise of the author 'took on some of the responsibility for the spirit of the text', although in their case this meant speaking with authority instead of displaying poetic genius (Henderson 2013: 117). Indeed, the translation of knowledge was 'not just an exercise in linguistics' but a process in which the ideas and methods proposed by the source text could be tested in a new context (Bycroft 2017: 88–9).

Besides the conventional idea of enriching the target language, the choices of translating physicians were guided by their professional role in a community composed of colleagues, patients, and the rest of the polity in which they were situated. This inevitably necessitated some interference with the source text, which means that a close reading of the translations reveals what kind of accommodative choices were acceptable for physicians. Since Zimmermann's translators resorted to diverse strategies, they do not seem to have shared any clear-cut norms. However, if they are all considered as 'philosophical' translators translating the persona of a 'philosophical doctor', interesting patterns emerge. Indeed, when this persona is perceived as a way of 'being in the world' recognized at the time, the divergent accommodative choices of the physician-translators can be appreciated as expressions of the kind of judiciousness and dedication to public welfare promoted by Zimmermann (Daston and Sibum 2003: 6). At the same time, it makes sense to ask how translatable Zimmermann's persona really was in these circumstances. In short, why should learned physicians have 'copied' the image of a colleague who was addressing a foreign audience when they could make the translation speak more directly to their own readers?

Hopson's Omission of the Public-Spirited Orator

The idea of 'translating as an orator' and paying attention to the translation's impact on the intended audience was put forward by Cicero, whose works attracted increasing interest in the eighteenth century (Stecconi 2018: 95–6; Smith 2020: 294–6). The related idea of the translation as a 'rival' surpassing, rather than copying, the original text was also influential in the period (Chesterman 2016: 22). In addition, early-modern European authors with a liberal education adhered to a classical distinction between the styles of poets, orators, and historians, and each 'orator' could have their own personal style and adapt it 'from passage to passage' (Rener 1989: 172–6).

Zimmermann's attention to rhetoric is evidenced, for example, by a passage in *Von der Ruhr* (1767: 237) which draws a parallel between his medical speech and Mark Antony's address to the Roman people. As Zimmermann explained, the preceding chapter was meant to influence the senses and the imagination, while the one at hand should appeal to the faculty of reason

(Zimmermann 1767: 237). The situated agency of Hopson – who was later confronted with this passage – is perceptible in the fact that he decided to exclude the entire chapter from his English translation. Puzzling as the choice may seem, it directs attention to factors behind the willingness of early-modern translators to 'domesticate' or 'rewrite' texts by measures that may now seem incomprehensibly drastic (Venuti 2018/1995: xii-xiii; Lefevere 2017 [1992]: 5–6). At the time, however, the rhetoric of such translations succeeded when it appeared natural enough to pass unnoticed (Smith 2020: 23–4).

The reason why Hopson thought that a chapter appealing to the senses should be included in *A Treatise on the Dysentery* while one which engaged the faculty of reason could be left out seems to lie in the sociopolitical dimension of Zimmermann's writing. In fact, Hopson omitted most of chapters I, VIII, and IX, which dealt with local circumstances and local government, because they were simply irrelevant to his British readership. Though beginning his translation with the opening paragraph of the first chapter, he swiftly moved on from the geography of the 1765 epidemic to the description of the disease itself (Zimmermann 1771: 2; Zimmermann 1767: 2–9). Perhaps for the same reason, he mistranslated 'nicht verschweigen' [not to withhold information] as not 'stilling' the dysentery in the body, whereas Zimmermann stressed that it was important not to keep quiet about the disease (Zimmermann 1767: 63; Zimmermann 1771: 38).

In short, Hopson did not translate Zimmermann's suggestions for the reform of public health policy in Switzerland but focused on descriptions of the disease, as observed in patients. This approach is already manifest on the translation's title page, which omitted all reference to the healing of prejudices as well as the engraving dedicating the work to 'dem Vaterlande' [the Fatherland]. The preface, in which Zimmermann presented himself as a physician serving the fatherland, was also omitted. Hopson wrote his own preface apologizing for the style of the translation, declaring his aim to be 'exactness' rather than 'elegance'. By way of explanation, he noted that Zimmermann had 'frequently indulged himself (agreeably to the genius of his countrymen) in such high flights of metaphorical expression and poetical language' that the English translation had 'not in general ventured to imitate' (Zimmermann 1771: 'Dedication', n.p.). This 'not imitating' typically meant omitting, arguably because Zimmermann used the styles of oration and poetry when discussing public health policy. In fact, Hopson referred to Zimmermann as a 'public-spirited author' who hoped 'to dissipate the prejudices of his countrymen (especially those of the lower class) with regard to the treatment to be used in the dysentery' (Zimmermann 1771: 'Preface', n.p.), thereby showing that he recognized Zimmermann's patriotic efforts.

Hopson's approach made sense from a strictly user-oriented perspective. At the beginning of the omitted chapter, Zimmermann presented

himself as a political orator laying out the prejudices which – he claimed – had prevented sound policy against the dysentery epidemic in Bern (Zimmermann 1767: 187; Zenker 2007: 36). Since this oration was not addressed to a British audience, its sardonic air might have discredited the author in the eyes of readers uninterested in the decisions of the Bernese *Gesundheitsrath* [Public Health Committee]. In fact, Hopson also toned down Zimmermann's irony on page 33, omitting his reference to a sardonic smile (Zimmermann 1771: 33; Zimmermann 1767: 56). Accordingly, Hopson introduced Zimmermann as capable of eloquence while telling the reader that the ethos of the translation did not reflect this aspect of his persona. Thus, the translator did not mean that the words and expressions he *had* translated were mere approximations, but rather that he had filtered out entire sections of 'oration', focusing on translating the 'history' contained in the original work.

That Hopson perceived the chapter which appealed to the senses and the imagination as more valuable than the one in which Zimmermann engaged the readers' judgement stresses the importance of taking the different styles of 'history' and 'oration' into account in analysing scientific translations (see Rener 1989: 330). What ended up being translated in *A Treatise on the Dysentery* consisted predominantly of observations enabling the reader to see patients' symptoms and reactions to treatment. Moreover, by modifying Zimmermann's syntax and voice, Hopson strengthened his ethos as a careful observer:

> Alle diese *von mir selbst* nicht mit einem unstätigen und über die Gegenstände der Kunst leichtsinnig wegflatternden Auge *gemachte Beobachtungen* erschöpfen unstreitig nicht alles, was auch andere Aerzte während unserer Epidemie werden gesehen haben, aber für meine Absicht sind sie zureichend.
>
> *(Zimmermann 1767: 19, our emphasis)*

> [All these *observations, made by me personally* and not with an inattentive eye that carelessly flits across the objects of the art, admittedly do not offer an exhaustive description of all that other doctors have also seen during our epidemic, but for my purpose they are sufficient.]
>
> *I have* taken the whole of these remarks from *observations made by myself*, and that not with a superficial inattentive eye, but *with all the exactness that the object of my profession required*; and though, without doubt, this does not comprehend every thing that other physicians might have seen during our epidemy, yet it is *quite* sufficient for my purpose.
>
> *(Zimmermann 1771: 9–10, our emphasis)*

Such preferences can be linked to the tradition of experimental science and the Royal Society of London's promotion of 'direct, plain observation' in lieu of 'rhetorical tropes and figures' (Skouen and Stark 2015: 2). This strategy sought to achieve a 'shared witnessing of experiments': if 'matters of fact' could be brought 'before the inner eye' of the reader, this provided a sense of presence (Skouen and Stark 2015: 9, 14). Thus, although close attention to 'what is lost' in translation may also reveal cultural differences, in this case, a shared culture of science directed attention to historical observations at the expense of political oration (Burke 2007: 38; Venuti 2018 [1995]: xiv, 14; Lefevere 2017 [1992]: 67–70).

The culture of experimental science is also present in *Von der Erfahrung*, a work about how doctors should relate experience to their reasoning when constructing medical knowledge. Zimmermann affirmed that diseases could be made 'durchsichtig' [transparent] with descriptions that related to them 'wie ein gutes Nachbild zu seinem Original' [like a good copy to the original] (Zimmermann 1763: 215, 248). He also stressed that 'die wahre Geschichte der Krankheiten' [true history of diseases] constituted 'die wahre und unveränderliche Grundlage' [true and immutable foundation] of medicine (Zimmermann 1763: 474; Boschung 1998: 36–7). Yet Zimmermann also wished to contribute to the discussion on the concept of experience. Consequently, *Von der Erfahrung* did not contain as much descriptive 'history' as *Von der Ruhr*. Instead, it can be seen as consisting mainly of 'orations' guiding the reader on the path to a proper understanding of the role of experience in medicine. Thus, as shown in the next section, a judicious translator could take the liberty of rewriting – or speaking over the original author – without annoying his readers.

Villebrune's Covert Orations

Since *Von der Erfahrung* explicitly stressed that a philosopher should put his penetrating eye and erudition to good use, Zimmermann can be seen as having given his 'philosophical' translators tacit licence to adapt his text (Zimmermann 1763: 4, 113, 129). Accordingly, Villebrune radicalized the approach of rhetorical translation, rewriting some of Zimmermann's orations with his French audience in mind. The 'persuasive eloquence' of his adapted translation thus supported its reception as a truthful piece of philosophy (Smith 2020: 31, 279–80). From this perspective, Villebrune's persona resembled that of Zimmermann, whom he introduced not only as a prudent philosopher and an enlightened physician, but also as a zealous citizen (Zimmermann 1774: I.vii–viii).

However, Villebrune's persona and translation style were not uncontroversial: his translation/re-edition of *Hippocratis Aphorismi ad fidem veterum monumentorum castigati, latinè versi* [Hippocrates' Aphorisms in

Latin Verse, Corrected Trusting Old Sources] (Paris: Clousier 1779) received thorough criticism from another Hippocrates translator/editor, Édouard François Marie Bosquillon (Anon 1779). This provoked a debate between Bosquillon and Villebrune, whose self-defence was perceived as lacking substance and courtesy (Anon 1780). Villebrune's entry in the *Biographie universelle et portative des contemporains* [Universal and Portable Biography of Contemporaries] (Anon 1836: 1524) characterized him as being maybe too harshly treated by his critics: it implied that their critiques were not unjustified but did not entirely invalidate his overall achievements as a translator.

Villebrune's translations of Zimmermann certainly form an important part of these achievements. They helped to familiarize the French audience with the Swiss medical writer, who was read by Diderot (Rudolph 1967: 40), and appreciated by the influential Montpellier medical school, which interpreted his work as pertinent to its vitalistic doctrine (Lohff 1997: 174–87), in connection with Zimmermann's mentor Haller. Unsurprisingly, Villebrune also used Haller's prominence when legitimating the translation of Zimmermann's oeuvre in his translator's preface to *Traité de l'expérience* (Zimmermann 1774: I.vii). In many respects, this preface is fairly typical of the time: it includes praise for the author of the original work and mentions the removal of repetitions and less relevant passages and the addition of references to other works contributing to the subject at hand. Even the seemingly vague expression 'Je me suis fait une loi essentielle de ne pas toucher aux choses qui regardoient l'art, de quelque maniere que ce fût' [I have made it my essential rule not to modify things concerned with the art in any way] (Zimmermann 1774: I.viii) is perfectly common, the rendering of the content of a work being considered as more important than stylistic resemblance to the source text in scientific translations of the time.

Somewhat less typical is the unusual length of Villebrune's preface, due not to Villebrune's desire to give an extensive account of the scientific context of Zimmermann's oeuvre or add his own observations – two frequent agendas found in prefaces – but to Villebrune's particular fondness for Hippocrates. His admiration far surpassed the generally high prestige in which the eighteenth-century French medical sphere held Hippocrates as a model for 'un sage raisonnement toujours fondé sur une observation exacte & judicieuse' [wise reasoning always based on accurate, judicious observation] (Anon 1765, VIII: 213). Besides his own translations of Hippocrates, Villebrune used every opportunity to present his knowledge of the 'father of medicine': his preface to Zimmermann's *Von der Erfahrung,* ends with lengthy citations of and a commentary on Hippocrates. He further commented on the source text in footnotes quoting from Hippocrates wherever he found reason to do so (Zimmermann 1774: I.257–9; II.12, 27–8, 35, 42–3, 62, 68, 75, 81, 219, 293; III.345).

Since Zimmermann himself generally held Hippocrates in high regard, these footnotes do not usually adopt an overly critical stance towards the source text. But in one passage where Zimmermann dares to point out an unsatisfactory aspect of Hippocrates's work, Villebrune immediately intervenes with a footnote in his defence (Zimmermann 1774: II.2–7). This disproportionate insistence on Hippocrates points to an aspect of Villebrune's translation that he might implicitly have alluded to in his own preface when he states: 'Du reste, je traduis sans m'attacher à la lettre, cherchant plus à m'approprier les réflexions de mon original, qu'à le rendre mot à mot' [Furthermore, I translate without focusing on the letter of the text, but rather seeking to make the considerations in the original my own, rather than rendering it word for word] (Zimmermann 1774: I.ix). At first sight, this phrase is perfectly in line with the strategy of translating the meaning rather than the word, but it also hints at Villebrune's very personal appropriation of Zimmermann's text.

This appropriation goes well beyond usual adaptations to the target context, in translations of terminology, with 'Franzosenholz' [guaiacum] (Zimmermann 1763: 78) becoming 'gayac' (Zimmermann 1774: I.77) and 'podagra' (Zimmermann 1763: 293) becoming 'goutte' (Zimmermann 1774: I.342). Other instances involve the inclusion of references closer to the target audience: Villebrune refers to Descartes (Zimmermann 1774: I.102) where Zimmermann only mentions Bacon and Newton as examples of great minds (Zimmermann 1763: 101). Moments of abridgement also occur when local particularities are excluded: Villebrune omits a passage where Zimmermann mocks practitioners who refuse to adapt their treatment routines by claiming them a necessity demanded by the 'Austrian climate': 'aber so oft der Herr von Haen wider diese Brechmittel Einwürfe machte, gaben die Practici zur Antwort: Das Oesterreichische Climat will es so haben' [but as often as Mr von Haen raised objections against this emetic, the practitioners replied: The Austrian climate wants it that way] (Zimmermann 1763: 73). The translation also goes beyond usual self-promotional references. For example, where Zimmermann only mentions Sydenham (Zimmermann 1763: 80), Villebrune includes pointers to other physicians such as William Grant, which let him refer to his translation of Grant in a footnote (Zimmermann 1774: I.79). Villebrune also brings in his own medical expertise, describing his experience with the therapeutical use of seasonal fruits (Zimmermann 1774: III.26).

Villebrune in fact rewrites entire passages from Zimmermann following a more or less transparent agenda. Some of these rewritings are clearly intended to render Zimmermann more 'acceptable' to a French audience: the softening of Zimmermann's tirade against Paracelsus (Zimmermann 1763: 118–23) is a case in point. Here Villebrune, accompanied by a cautionary footnote indicating his reservations about the following passage,

leaves out details – included by Zimmermann – about Paracelsus' drinking habits and views on menstruating women. However, Villebrune nonetheless maintains Zimmermann's main critique of Paracelsus and the 'indefensible' doctrine that his devotees fervently adhere to (Zimmermann 1774: I.124–8). Zimmermann's very personal engagement with Paracelsus, partly motivated by his conflict with medical competitors in Switzerland who supported Paracelsus, is thus omitted in the translation, which makes the critique on Paracelsus appear somewhat more objective and probably more convincing to an audience unfamiliar with Zimmermann's personal context.

Other omissions are harder to identify, but help make Zimmermann appear less eccentric to a French audience. When Zimmermann writes 'Wir entscheiden nicht, ob die Menschen durch Korn und Eisen zuerst gesittet, *und ewig unglücklich* worden […]' [We do not get to decide whether people first became civilized, *and forever unhappy*, through grain and iron […] (Zimmermann 1763: 13; our emphasis), Villebrune simply translates 'civilisé' [civilized] (Zimmermann 1774: I.19), thereby omitting Zimmermann's pessimistic expression relating civilisation and unhappiness. This is not to say that the idea of civilisation as making people unhappier was unthinkable in France (Rousseau was contemporary to both Villebrune and Zimmermann), but it must have appeared to Villebrune as an unnecessary obstacle to mediating Zimmermann's work in France. Moreover, it must have seemed counter-productive to his own agenda, given that he included a whole paragraph of his own about the necessity of the faculties of medicine to unite against charlatans who endanger people's health (Zimmermann 1774: I.42). This passage has no counterpart in the source text, but is not marked as an addition. Rather it involves the silent merging of the translator's voice and the 'I' of the source text, a merging which remains opaque to the vast majority of readers unable to compare source and translation.

Similar interpolations occur at several points, for instance when Villebrune silently introduces passages on Pyrrhonism, Sextus, and Voltaire (Zimmermann 1774: I.90), and the genius of Corneille and Homer (Zimmermann 1774: I.106–7). Villebrune also uses explicit and marked commentary, for instance when he opposes Zimmermann's cultural pessimism and critique of libertinage, stating that his contemporaries were no more prone to vice than their predecessors (Zimmermann 1774: III.292–3). However, Villebrune's translation does retain much of Zimmermann's individual style, almost joyfully at times. For instance, he renders Zimmermann's vivid imagery, 'Aber viel leichter wäre es Alpen zu versetzen, als ein hirnloses Weib von den Nachtheilen des Breies zu überführen' [But it would be much easier to move the Alps than to convince a brainless woman of the disadvantages of gruel] (Zimmermann 1764: 265) as the no less figurative, 'Mais il serait plus aisé de transporter les Alpes dans les vastes plaines de l'Asie que de désabuser une femme écervelée' [But it would be much easier to move

the Alps to the vast plains of Asia than to disillusion a brainless woman] (Zimmermann 1774: III.36).

Such examples show that Zimmermann's 'literary' style is not in itself an obstacle for Villebrune. The latter chooses case by case which images to keep, and which to omit or modify. This can be observed in his rendering of Zimmermann's tirade against equating advanced age with competence: 'Ein unwürdiger Greis ist in meinen Augen mehr nichts als ein erwachsenes Kind, seine ganze Stärke ist Hartnäckigkeit, sein zahnloser Mund die Quelle seines Stolzes' [An unworthy dotard is from my perspective nothing more than an overgrown child, his entire strength lies in his obstinacy, his toothless mouth the source of his pride] (Zimmermann 1763: 9). In this case, Villebrune keeps most of the sentence, except the rather graphic 'toothless mouth': 'Un vieux médecin, sans mérite, n'est à mes yeux qu'un homme redevenu une seconde fois enfant. Il n'a de force que dans son opiniâtreté' [An old doctor, without merit, is in my eyes nothing more than a man who has once again become a child. His only strength lies in his stubbornness] (Zimmermann 1774: I.12).

Villebrune clearly does not render Zimmermann's literary persona in all its mannerisms and peculiarities. But nor does he hide the 'literary' aspects of Zimmermann's work, insofar as they are not merely empty rhetoric, but part of a work that engages its author not only as a physician but also as a citizen concerned with the welfare of his community. After all, *Von der Erfahrung* is not just a sum of observations on maladies and treatment options gathered from experience and current medical literature, but also a reflection on the nature of experience and the observed lack of such considerations in the medical field. Zimmermann takes issue above all with doctors who blindly follow routines rather than study the relevant literature and engage with complex pathologies. Yet in addressing the lived practice of medicine, Zimmermann obviously cannot help being personally involved in his writing, as evidenced by his style.

As a 'médecin philologue' (who also translated what we would now term 'literary' texts, such as Cervantes' novellas), Villebrune was doubtless not deterred by Zimmermann's writerly style. Furthermore, he agreed with one of Zimmermann's general tenets – the importance of observation supported by knowledge of former observations. As a result, despite the numerous modifications, his translation successfully mediated Zimmermann's work. This also applies to Villebrune's translation of Zimmermann's *Von der Ruhr* (1767) as *Traité de la dyssentérie* (1775), which according to Villebrune's (again rather long) preface has the merit of presenting observations of nature instead of 'systems' built upon selective quotations of literature favouring the author's hypotheses (Zimmermann 1775: iv). Villebrune then added many pages covering aspects of the literature on dysentery, including, but not limited to, Hippocrates – though such references are less frequent than in the (much longer) *Traité de l'expérience* (Zimmermann 1775: 41). As in the

earlier work, he also references his own translations (Zimmermann 1775: xxx) and his own expertise (Zimmermann 1775: 183–5).

Traité de la dyssentérie softens 'graphic' imagery in some instances: Zimmermann's 'die grossen Curen, die man uns ins Angesicht speyt' [the great cures, which are spat into our faces] (Zimmermann 1767: 224) becomes Villebrune's 'voilà les cures merveilleuses qu'on nous objecte' [the marvellous cures which others hold up as counterexamples] (Zimmermann 1775: 164). The French text also occasionally omits passages symptomatic of Zimmermann's rather eccentric style, for example, when he describes how Mark Antony held Caesar's bloodied cloak up for the Romans (Zimmermann 1767: 237). Significantly, Villebrune keeps more area-specific information than Hopson while nonetheless shortening certain chapters containing numerous details about local practices and jurisdictions – a decision he justifies in a footnote (Zimmermann 1775: 201–2).

Overall, Villebrune's *Traité de la dyssentérie* can be viewed as a successful mediation of Zimmermann's treatise on dysentery. A revised version correcting severe translation errors concerning dosages was included in the 1839 *Collection des auteurs classiques* [Collection of Classical Authors] (Encyclopédie des sciences médicales. 7e division), alongside Villebrune's other Zimmermann translation, *Traité de l'expérience*.

Simmons's Anonymous Notes

While Villebrune reshaped the points of reference in *Von der Erfahrung* and covertly redefined the aims of its persuasive eloquence, the English translator Samuel Foart Simmons chose to add judicious notes which, as observed by *The European Magazine* (Anon 1782b: 42), increased the value of his own translation. It is unclear why Simmons chose to remain anonymous and merely marked some of his notes with the initial 'S.' (Zimmermann 1778: I.255–6, 258). That he was aware of Villebrune's substantial adaptations seems, however, a possible explanation: perhaps he did not wish to be known as someone translating indirectly via French and, in so doing, accrediting a version which was not entirely faithful to Zimmermann. In his address 'To the Reader', he called himself an 'editor' and declared 'that the translation is not, in every place, strictly conformable to the original' (Zimmermann 1778: I.iii). Still, Villebrune's liberties were far greater than indicated in this address, which gave the impression that except for the notes, all 'alterations' to the original work consisted of cuts (Zimmermann 1778: I.iv). Simmons also made it clear that all notes were his own. They spoke to the reader in the first person, referring to Zimmermann as 'Dr Z.' and localizing the English translation with references such as 'in Britain', 'this country', 'our Shakespeare', and 'our English Aristophanes' (Zimmermann 1778: I.50, 52, 69, 168). As the translation suggested, a good physician was 'able, from his

reading, to draw together all the lights which different authors may afford him on the subject' (Zimmermann 1778: I.89). Strikingly, Simmons put this principle into practice at the very beginning of the first chapter by adding a note quoting Locke's *Essay concerning Human Understanding*, implying an affinity of ideas between this work and the source text (Zimmermann 1778: I.1–2). Moreover, he added a similar note on Hannah More's *Essays on Various Subjects* to the opening of the second volume (Zimmermann 1778: II.5).

One note also includes a reference to Simmons's own work, *Elements of Anatomy and the Animal Oeconomy* (Zimmermann 1778: II.326). Generally, the notes offered complementary and explanatory information, but at times Simmons also expressed disagreement with Zimmermann's claims (Zimmermann 1778: II.190–1). Appearing not only as a translator but also as an expert mediator, Simmons used his own voice in the footnotes to relate the main text to the experience of his target audience:

> (*f*) None of our English surgeons, I believe, now think of performing the operation of the paracentesis, without making a suitable compression on the abdomen, but they almost all of them place the patient in a chair, during the operation; and even Mr. Sharpe recommends such a position. An horizontal posture, however, will be found to be much more safe and advantageous.
>
> *(Zimmermann 1778: II.29–30)*

Simmons's notes also informed readers about his career, such that some colleagues may have been in a position to guess his identity (Zimmermann 1778: I.258). Besides building the anonymous ethos of the translator-editor Simmons, separate from the translated ethos of the author, the notes enabled him to assess the arguments in the main text. Though professional, Simmons at times also assumed a casual manner:

> (*y*) I have heard a very celebrated anatomist, of this country, relate, with his usual pleasantry, in one of his lectures, that after a smart attack of fever, which had confined him during many days in his chamber, he felt this return of appetite, and a longing for something savory [sic]. He immediately sent out his servant to a cook's shop, who soon returned to him with a plate of ham, and another of cold beef. I very greedily devoured both, said the professor, and from that moment I dated my recovery.
>
> *(Zimmermann 1778: I.295)*

While Zimmermann wrote for students and Villebrune for the 'lecteur curieux' [curious reader] as well as practising physicians, Simmons's declared aim was to provide 'a useful work to Gentlemen who devote themselves

to the study of physic' (Zimmermann 1763: iv; Zimmermann 1774: I.vi, 8; Zimmermann 1778: I.iv). Interestingly, this target audience was likewise mentioned in passing in the source text (Zimmermann 1763: 31). Reading Simmons's translation, gentleman physicians therefore had to ask themselves whether England was a place 'where the most celebrated physicians sacrifice their leisure moments to the fine arts, philosophy, and the mathematics, rather than in composing any works which may contribute to the progress of physic' (Zimmermann 1778: I.23–4). In the second volume, Simmons confessed to abridging his source text in several places, first and foremost in a section on gynaecology. Here, he indicated awareness of an audience that was not limited to physicians but extended to 'every class', including women:

> (*c*) If an apology for altering and mutilating the expressions of Dr Z, is any where necessary, it will be particularly so in this part of the work, where I say much less than he has said, and with considerable variations. The truth is that some of his observations, tho' exceedingly just and useful, seemed improper for readers of every class, and they who read with a view to instruct themselves in physic will find the same things in a work written by Dr Tissot.
>
> *(Zimmermann 1778: II.253)*

According to one contemporary commentator, Simmons's translation was useful not only to 'the faculty'; owing to the 'elegance' of its language, it also 'found its way into other hands' and instructed 'the softer sex' (Zimmermann 1797: xv).

Interestingly, one of Simmons's footnotes issues a call to a colleague in response to a rhetorical question added by Villebrune: 'The celebrated Dr Cadogan, will at once reply to this query of the learned author' (Zimmermann 1763: 234; Zimmermann 1774: I.276; Zimmermann 1778: I.175). The footnote, extending over six pages, explored the value of classical learning for the modern physician. Given that Simmons here referred to 'the learned author' instead of 'Dr Z.', he may have known he was engaging with one of Villebrune's interventions.

The surgeon and apothecary William Bewley, who reviewed the second edition of Simmons's translation for *The Monthly Review* (Anon 1783: 205–12; Nangle 1934: 4, 212), chose to examine the work from the perspective of the curious patient, rapidly turning his review into comedy by ridiculing Zimmermann's blunders. He further observed that 'Though the Translator informs us, that he has abridged many passages in this work, and has omitted others, the English reader will, we apprehend, wish with us, that he had taken these liberties much oftener' (Anon 1783: 206). Accordingly, Bewley's review left the English readers just as ignorant of Villebrune's added orations as other reviewers had left them of Hopson's extensive omissions. Akin to

the French reviews of Villebrune's translation cited above, it also represented the view that a medical translator could legitimately make changes to the source text, at least by way of omission.

Conclusions

Evidently, the persona of the philosophical 'Dr Zimmermann' mentioned on the title pages of his various works was transformed in the hands of the three expert translators discussed in this chapter. While introducing Zimmermann as a Swiss patriot and an eloquent German-language author, they adopted diverse strategies to domesticate his patriotic orations. While Hopson confidently left out sections which he considered irrelevant for a British audience interested in medical texts, Villebrune rewrote Zimmermann's work by adding elements tailored to a French audience and to his own personal agenda. Simmons's agency is particularly palpable in the footnotes that documented his own medical expertise, as indicated by Zimmermann's letter to John Coakley Lettsom. Why Simmons chose to translate Villebrune's translation instead of Zimmermann's original cannot be determined with absolute certainty. On the one hand, the practice of indirect translation was widespread, with French often serving as a pivot language for German. On the other hand, however, the ideal of translating directly from the original was already established, which might well explain why Simmons chose not to clarify his use of Villebrune's translation.

In any case, the relative lack of German language skills in eighteenth-century France and England must be taken into consideration when dealing with translations of Zimmermann. While Zimmermann was perfectly able to judge the quality of French and English translations, the majority of readers of his translated works had little or no access to the original. Particularly in the French context, the *belles infidèles* translation still influenced the reception of translations. Readability and accommodation to French taste were widely appreciated and the approving reference to stylistic adaptations, including shortening and rearrangement of text, a common feature in translational paratexts. This is not to say that translations were not criticized for lack of 'faithfulness', but readability might have been more of a priority than victims of bad translations such as Zimmermann might have wished. This also often applies to the ideal of traceability of authorship within a translation, with little clear distinction between the translated text and the translator's additions, footnotes, etc.

While Villebrune clearly pushed the limits of contemporary norms of translation when he embedded his own deliberations into his translation without in any way signalling them as his own, contemporary reviews indicate that such practices were still widely tolerated, provided that the result was readable and did not falsify the basic tenets of the source text.

If Simmons was aware of these changes, he also seems to have considered Villebrune's translation true enough to be passed on to English readers, though his choice to remain an anonymous editor might signal discomfort with the necessity of relying on a French version of Zimmermann's work. In the case of Hopson's translation, English readers could certainly gain new knowledge from Zimmermann's experiences with dysentery in Switzerland, but they did not get the full picture of Zimmermann as a patriot serving his fatherland. Rather, the role of the patriot was in all translations reserved for the translating physicians whose efforts could be seen as improving knowledge among their own target audience.

Note

1 All translations are by the authors unless otherwise stated.

References

Anon. 1765. 'Hippocratisme', in *Encyclopédie ou Dictionnaire raisonné des sciences, des arts et des métiers de Diderot, d'Alembert et Jaucourt*, vol. 8, pp. 221a–214a.

Anon. 1771a. 'II. *A Treatise on the Dysentery*', *The Critical Review* 32: 171–7.

Anon. 1771b. 'XVII. *A Treatise on the Dysentery*', *The London Magazine* 40: 164.

Anon. 1772. 'II. *A Treatise on the Dysentery*', *The London Magazine* 41: 542.

Anon. 1773. 'London', *Göttingische Anzeigen von Gelehrten Sachen* 44: 369–70.

Anon. 1774a. '*Traité de l'Expérience*', *L'Année littéraire* 5: 63–72.

Anon. 1774b. '*Traité de l'Expérience*', *Journal des sçavans*, November 1774: 729–34.

Anon. 1774c. 'Extrait. *Traité de l'Expérience*', *Journal de médecine, chirurgie, pharmacie, &c*. 41: 483–504.

Anon. 1779. *Lettre de M. Bosquillon à M. *** Sur la nouvelle édition in-12 des Aphorismes d'Hippocrate qui se trouve à Paris chez Clousier et Segaud*. Paris: Didot.

Anon. 1780. *Lettre de M. Bourgeois, étudiant en médecine, à M...: pour servir de réplique à un libelle intitulé: Lettre très honnête à M. Bosquillon*. Amsterdam.

Anon. 1782a. '*A Treatise on Experience in Physic*', *The Critical Review* 54: 41–6.

Anon. 1782b. '*A Treatise on Experience in Physic*', *The European Magazine* 2: 41–2.

Anon [= Bewley, William]. 1783. 'Art. IV. A Treatise on Experience in Physic', *The Monthly Review* 68: 205–12.

Anon. 1836. 'Villebrune', *Biographie universelle et portative* 4: 1523–4.

Boschung, Urs. 1998. 'Von "*...dem ersten Schritte, den ich als Arzt in die Welt* that...". Die Anfänge von Johann Georg Zimmermanns ärztlicher Praxis, Bern 1752–1754', in Hans-Peter Schramm (ed.), *Johann Georg Zimmermann: königlich großbritannischer Leibarzt (1728–1795)*, pp. 31–48. Wiesbaden: Harrassowitz.

Bret, Patrice and Ellen Moerman. 2014. 'Sciences et arts', in Yves Chevrel, Annie Cointre, and Yen-Mai Tran-Gervat (eds), *Histoire des traductions en langue française. XVIIe et XVIIIe siècles*, pp. 595–772. Lagrasse: Verdier.

Brock, Helen. 2004. 'Simmons, Samuel Foart (1750–1813), Physician', *Oxford Dictionary of National Biography*. Oxford University Press. URL: https://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-25565 (accessed 6 May 2022)

Burke, Peter. 2007. 'Cultures of translation in early modern Europe', in Peter Burke and R. Po-chia Hsia (eds), *Cultural Translation in Early Modern Europe*, pp. 7–38. Cambridge: Cambridge University Press.

Bycroft, Michael. 2017. 'What Difference does a Translation Make? The *Traité des vernis* (1723) in the Career of Charles Dufay', in Sietske Fransen, Niall Hodson, and Karl A. E. Enenkel (eds), *Translating Early Modern Science*, pp. 66–90. Leiden: Brill.

Chesterman, Andrew. 2016. *Memes of Translation: The Spread of Ideas in Translation Theory*. Amsterdam: John Benjamins.

Daston, Lorraine and H. Otto Sibum. 2003. 'Introduction: Scientific Personae and Their Histories', *Science in Context* 16(1/2): 1–8.

Dawson, Thomas. 1772. 'Art. III. *A Treatise on the Dysentery*', *The Monthly Review* 46: 15–21.

Henderson, Felicity. 2013. 'Faithful interpreters', *Notes and Records of the Royal Society* 67: 101–22.

Langenbacher, Andreas. 1998. 'Mit Skalpell und Federkiel: Der Philosophische Arzt Johann Georg Zimmermann', in Hans-Peter Schramm (ed.), *Johann Georg Zimmermann: königlich großbritannischer Leibarzt (1728–1795)*, pp. 15–20. Wiesbaden: Harrassowitz.

Lefevere, André. 2017 [1992]. *Translation, Rewriting, and the Manipulation of Literary Fame*. London: Routledge.

Lohff, Brigitte. 1997. 'Die Rezeption der Werke Johann Georg Zimmermanns in Montpellier', *Gesnerus: Swiss Journal of the History of Medicine and Sciences* 54: 174–87.

Nangle, Benjamin Christie. 1934. *The Monthly Review First Series 1749–1789: Indexes of Contributors and Articles*. Oxford: Clarendon.

Peltonen, Markku. 2013. *Rhetoric, Politics and Popularity in Pre-Revolutionary England*. Cambridge: Cambridge University Press.

Pettigrew, Thomas Joseph. 1817. *Memoirs of the Life and Writings of the Late John Coakley Lettsom. In Three Volumes. Vol. I*. London: Longman, Hurst, Rees, Orme, and Brown.

Rener, Frederick M. 1989. *Interpretatio: Language and Translation from Cicero to Tytler*. Amsterdam: Rodopi.

Rudolph, G. 1967. 'Diderots Elemente der Physiologie', *Gesnerus: Swiss Journal of the History of Medicine and Sciences* 24: 24–45.

Skouen, Tina and Ryan J. Stark. 2015. 'Introduction', in Tina Skouen and Ryan J. Stark (eds), *Rhetoric and the Early Royal Society: A Sourcebook*, pp. 1–50. Leiden: Brill.

Smith, Tania S. 2020. *Classical Rhetoric in English, 1650–1800: A Critical Anthology*. Leiden: Brill.

Stecconi, Ubaldo. 2018. 'Rhetoric', in Lieven D'hulst and Yves Gambier (eds), *A History of Modern Translation Knowledge: Sources, Concepts, Effects*, pp. 95–98. Amsterdam: John Benjamins.

Steiner, T. R. 1975. *English Translation Theory 1650–1800*. Assen: Van Gorcum.

Thomson, Ann. 2008. *Bodies of Thought: Science, Religion, and the Soul in the Early Enlightenment*. Oxford: Oxford University Press.

Venuti, Lawrence. 2018 [1995]. *The Translator's Invisibility: A History of Translation*. London: Routledge.

Zenker, Markus. 2007. *Therapie im literarischen Text: Johann Georg Zimmermanns Werk* Über die Einsamkeit *in seiner Zeit*. Tübingen: Max Niemeyer.

Zimmermann, Johann Georg. 1751. *Dissertatio physiologica de irritabilitate quam divinis auspiciis consensu gratiosae facultatis medicae pro obtinendis doctoris*

medici honoribus publice defendet auctor Ioannes Georgius Zimmerman. Gottingae: typis Georg Ludov. Schulzii.

Zimmermann, Johann Georg. 1763–64. *Von der Erfahrung in der Arzneykunst*. Zürich: Heidegger und Compagnie, 2 vols.

Zimmermann, Johann Georg. 1767. *Johann Georg Zimmermann, Mitglied der Königlich-Preußischen Academie der Wissenschaften in Berlin, und Stadtphysicus in Brugg, von der Ruhr unter dem Volke im Jahr 1765, und denen mit derselben eingedrungenen Vorurtheilen, nebst einigen allgemeinen Aussichten in die Heilung dieser Vorurtheile*. Zürich: Fueßlin und Compagnie.

Zimmermann, Johann Georg. 1771. *A Treatise on the Dysentery: With a Description of the Epidemic Dysentery That happened in Switzerland in the Year 1765*, trans. C. R. Hopson. London: John and Francis Rivington.

Zimmermann, Johann Georg. 1774. *Traité de l'expérience en général, et en particulier dans l'art de guérir; Par M. George Zimmermann, D.M. Membre des Académies de Berlin, de Munich, de Palerme, de Pesare; des Sociétés de Zurich, de Bâle, de Berne, &c.*, trans. M. Le Febvre de Villebrune. Paris: Vincent.

Zimmermann, Johann Georg. 1775. *Traité de la dyssentérie, Par M. Zimmermann, D. M. Membre des Académies de Berlin, de Munich, de Palerme, de Pesare; des Sociétés de Zurich, de Basle, de Berne, & médecin de Brugg*, trans. M. Le Febvre de Villebrune. Paris: Vincent.

Zimmermann, Johann Georg. 1778. *A Treatise on Experience in Physic*. London: J. Wilkie.

Zimmermann, Johann Georg. 1797. *Essay on National Pride. To Which Are Added Memoirs of the Author's Life and Writings*, trans. Samuel Hull Wilcocke. London: C. Dilly.

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PART IV

Science, Translation, and Ideology

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10

TRANSLATING ALEXANDER VON HUMBOLDT'S WRITINGS ON THE AMERICAS IN THE TWENTY-FIRST CENTURY

Vera M. Kutzinski

Alexander von Humboldt was known for being loquacious in several languages. The naturalist and painter Charles Willson Peale, who welcomed Humboldt and his two travel companions, Aimé Bonpland and Carlos Montúfar, to the US in Philadelphia harbour on 24 May 1804, was notably impressed by the language abilities of his Prussian guest. Peale noted in his journal that 'the Baron [...] possessed a surprising fluency of Speach, & it was amusing to hear him Speak English, French and the Spanish Languages, mixing them together in rapid Speach' (original spelling and capitalization; Peale quoted in Harvey and Sues 2020: 48). Intermixing different languages in speech, which Humboldt apparently did throughout much of his life, is of course not the same as creating multilingual texts, which he also did. Because he insisted in writing in this fashion, to read Humboldt means to be caught up in and engage with continuous processes of translation. Countless words and phrases from other languages – Italian, English, Latin, ancient Greek, Portuguese, and above all Spanish – suffuse much of his German and French prose; some are translated, many others not. His work about the Americas also includes indigenous languages such as Nahuatl and Quechua. Such linguistic entanglements challenge the entrenched monolingual habits of many European and Eurocentric readers by questioning assumptions about cultural privilege and domination. Because Humboldt rarely translates words and concepts from other languages in expected ways, if at all, his writing may also be understood as an invitation to European readers to stray from the well-trodden paths of thinking into spaces where they may experience how linguistic contact with other cultures can change their own ingrained perspectives. This invitation applied to his contemporaries as much

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as it does to today's readers. It should not be surprising, then, that such a textual inclusion of foreign cultural resources also shifted Humboldt's own European views.[1]

In this essay, I focus on the practice and the ethics of translating Alexander von Humboldt today. First, I examine how Humboldt himself approached translation in his writings on the Americas. Secondly, I want to think through the implications of his method for how one might render his work in English at a remove of roughly two centuries. To this end, I revisit my collaborative translational and editorial efforts as part of the *Alexander von Humboldt in English Project* (HiE), which began in 2008 and has led to the publication of new English versions of three of Humboldt's key works on the Americas: *Essai politique sur l'Île de Cuba* (1826), *Vues des Cordillères et monumens des peuples indigènes de l'Amérique* (1810–13), and *Essai politique sur le royaume de la Nouvelle Espagne* (1825–27). By parsing passages from these texts and their HiE versions – *Political Essay on the Island of Cuba* (2011), *Views of the Cordilleras and Monuments of the Indigenous Peoples of the New Continent* (2012), and *Political Essay on the Kingdom of New Spain* (2019) – I compare and contrast the theoretical assumptions about translation lodged in the paratexts, notably in the introductory 'Notes on the Text' and the 'Editorial Notes' in each volume, with specific translational decisions. While contemporary theorists have had little to say about translating multilingual source texts, where the distinction between source and target languages is too reductive to be useful, Lawrence Venuti's provocative call to define translation as 'the establishment of a *variable equivalence* to the source text' (2019, ix, my emphasis) helps me approach Humboldt's texts as early examples of the practical translational applications of what I call differential equivalencies. Because Humboldt provides alternatives to narrow framings of fidelity, his handling of multiple languages raises issues of broader relevance for translators.

Before I turn to details, let me ask this: Why translate Humboldt into English – again? What do we value about Humboldt today, enough to translate him? Alison E. Martin (2018) has demonstrated how Humboldt's nineteenth-century British translators, each in his or her (mostly her) own distinctive styles, embraced the responsibility for disseminating Humboldt's natural-scientific results and lexica in English. Among other things, this circulation helped consolidate the epistemologies of imperialism by differentiating and splitting knowledge into the new academic disciplines that underwrote capitalist economics at a time when industrialization was getting underway in Europe and parts of the Americas. What Humboldt had to offer at the time was valuable information, and not just for natural scientists.[2] The value Humboldt's writing has today is, by necessity, rather different. What many Humboldt scholars appreciate about his writing is that it works against the very systematizing and standardizing of knowledge to which the

early British and American translations of his work had contributed. More important than the dissemination of natural-scientific terminologies and empirical data is that Humboldt was sceptical of totalizing epistemologies.[3] Because this scepticism manifests itself at the level of linguistic detail, it has specific implications for his translators.

Some have deemed Humboldt's texts, suffused as they are with many of the world's languages, reader-unfriendly, indeed often almost unreadable (Prüfer-Leske 2001). But should a translation render Alexander von Humboldt's writing (more) readable, and what would such readability look like? How does one render Humboldt's linguistic dexterity intelligible in translation, given that transforming multilingual texts into monolingual versions in English and other languages leaves behind at least some of their key features?[4] An example from 2001 is the reprint edition of John Thrasher's significantly changed 1856 version of Humboldt's *Essai politique sur l'Île de Cuba*. The publisher, Marcus Wiener, notes in his introduction that the translation 'reads well today' because 'he [Thrasher] used colloquial language, divided the book into subchapters, and added the latest statistics, since his translation was released thirty years after the original' (Humboldt 2001, n.p.). That the journalist Thrasher, intent on speaking to a wide audience in the US to garner support for his annexationist political agenda, suppressed Humboldt's entire section on the need to abolish slavery cannot, however, be swept aside by adding the chapter in question to the new edition's appendix, as if it were not part of the narrative. Reusing Thrasher's title, *The Island of Cuba*, the new edition – still omitting the qualification 'Political Essay' – also suggests that readability remains more important than respecting the integrity of Humboldt's text, albeit for different reasons than in 1856. Thrasher's version of Humboldt's *Cuba* is an example of a translation gone awry by being appropriated for political agendas diametrically opposed to Humboldt's own.[5] Other more recent truncations, such as Irene Prüfer-Leske's 2004 German-language version of the same text, do not further specific politics but simplify Humboldt's prose, presumably to increase the text's marketability. In constructing different Humboldts, such popularizing translations foreground their interpretive biases often more than is comfortable for (academic) audiences wedded to ideas of 'originals' and fidelity.[6] At the same time that I harbour the suspicion that such popularizations underestimate non-academic readers' willingness to find their interpretive paths through Humboldt's dense polyvocal thickets, I find such texts useful illustrations of how source *and* target texts are both transformed in the process of translation. The question, however, is when the transformation of the source text goes too far, when translation becomes an unethical transgression, as in Thrasher's case: his book registers as a purposeful misappropriation only in the context of mid-nineteenth-century colonial politics and abolitionist debates. With increasing distance from the

source text, translations are less likely to be perceived as crossing such lines. This is precisely why Thrasher's version could be reissued in 2001 without anyone blinking an eye.

Contexts matter in translations, which are inescapably intercultural and thus always relational. The question is which contexts a translator decides to emphasize, why, and how. For this reason, it is necessary, and not just in theory, to free the practice of translation from the constraints of what we know, variably, as translation proper, literal translation, or 'instrumentalism', which Venuti defines as 'an interpretation that grossly oversimplifies translation practice, fostering an illusion of immediate access to the source text' (2019: 5). Even if Humboldt at times resorts to such forms of translation, relational translation occurs at many levels in his writings on the Americas in the ever-shifting interactions among the text's linguistic, discursive, generic, and medial components. With the latter, I refer to the 'tableaux' that are integral parts of Humboldt's narrative, not just illustrations. Do we translate the French *tableau(x)* as 'table(s)'? While the HiE versions often use 'table' for 'tableau', they also retain 'tableau(s)' as an English loan word to signal at least some of the time that Humboldt's text-images are not exactly what we now understand as statistical tables (Kutzinski 2024).

At the micro-level, Humboldt's frequent non-translations of words and locutions in Spanish and Portuguese, combined with his inconsistent spellings, renders meanings uncertain. As I mention above, *Cordillères* and *Nouvelle Espagne* add (Europeanized) indigenous languages into the linguistic mix, notably names of places, plants, and animals, along with culturally specific local expressions, such as the Nahuatl composite 'amatlacuilolitquitcatlaxtlahuilli' (Humboldt 1825–27: 316). Humboldt presents this compound word as an example of the imaginative resources he admired about indigenous American languages – their polysynthetic ability to combine many diverse ideas in a single word.[7] He emphasizes right at the beginning of *Nouvelle Espagne* that '[l]a connaissance des langues n'est pas seulement necessaire pour pouvoir puiser aux sources, et recueillir un grand nombre de données qui, sans cela, resteraient perdues pour la science' [knowing languages is a necessity not only for being able to consult sources and for collecting a lot of material that would otherwise be lost to science] (Humboldt 1825–27: I.12; 2019: 17).[8] He finds such knowledge indispensable 'pour faciliter une espèce d'examen philologique auquel le géographe instruit doit soumettre le nom des rivières, des lacs, des montagnes et des peuplades, pour découvrir leur identité dans un grand nombre de cartes' [for facilitating certain kinds of philological analysis to which a skilled geographer must subject the names of rivers, lakes, mountains, and local peoples in order to be able to find them on many maps] (Humboldt 1825–27: I.12; 2019: 17). One of countless examples is that of the Río Huasacualco, south-west of Veracruz in the former Viceroyalty of

New Spain. By placing alternative spellings in parentheses on some occasions, Humboldt suggests that this river has more than a single spelling – Huasacualco, Guasacualco, Goazacualcos, etc. He never standardizes the spelling. Why was it apparently important for Humboldt not to do so? And how does his decision not to standardise affect the meaning(s) of what we read here? One can think about the relationship among the different spellings in two ways: on the one hand, they signify the same thing (a river), especially when sounded; on the other hand, they do not. An orthographic standardization would reduce the linguistic plenitude created by the additive confluence of Spanish and Nahuatl to a single version, a single instance, and would thus represent a non-existent historical consensus about naming. Such a standardization would erase any cultural-historical dimension, notably, any trace of the history of colonialism in South America, by suggesting that the name of this river, like the names of so many others, is an authentic Nahuatl sign, whereas the proliferation of names is clearly the result of how different European cartographers (mis)represented it over time.[9] Orthographic standardisation, then, can be viewed as an abridgement of sorts.

Humboldt does not withhold anything from his readers by not translating certain words or by refusing to settle on a singular orthographic representation. He only refuses to offer up something that does not exist in the first place: an invariant equivalent. In the following discursive footnote attached to his 'Tableau de la Richesse Agricole de la Province de la Havane, en 1817' [Tableau of Agricultural Wealth in the Province of Havana, 1817] from *Cuba*, Humboldt explains his approach to intercultural representation. Note that Humboldt's use of italics here is not consistent; it never is. Italics are not reserved for foreign-language words but at times, as with '*marquer*', spill over into French and look as if they were Spanish.

> Pour ne pas altérer les traits caractéristiques de l'agriculture des colonies espagnoles, je m'abstiens de substituer des mots françois aux mots espagnols consacrés par un long usage. Les *Hatos* ou *Haciendas de cría* et les *Potreros* sont les uns et les autres des fermes à bétail; mais les premiers, dont l'étendue est souvent de 2 à 3 lieues de diamètre et qui sont dépourvus de clôture, renferment du bétail presque sauvage; ils ne demandent que les soins de 3 ou 4 hommes à cheval (*peones*) qui parcourent le pays pour y découvrir les vaches et les jumens qui ont mis bas, et pour *marquer* les jeunes animaux. Les *Potreros* sont des pâturages en enclos dont souvent une petite partie est cultivée en maïs, en bananes ou en manioc. On y engraisse les animaux nés dans les *Hatos*, et l'on s'y occupe secondairement aussi de la multiplication du bétail *(de pequenas crías)*.
>
> *(Humboldt 1826: I.229–30)*

> So as not to mischaracterize agriculture in the Spanish colonies, I am abstaining from using French words in place of well-worn Spanish terms. The *Hatos* or *Haciendas de cría* and *Potreros* are types of livestock ranches. But the former, which are generally 2 to 3 leagues in diameter and are not enclosed, have animals that are almost entirely wild. They require no more than 3 or 4 men on horseback (*peones*) roaming the countryside in search of cows and mares that have just given birth so as to *brand* the young animals. *Potreros* consist of enclosed pastures, a small part of which is often turned over to corn, banana, and manioc cultivation. Potreros are used to fatten the animals born on the *Hatos*; livestock breeding occurs as well, but it is of secondary concern (*de pequeñas crías*).
>
> *(Humboldt 2011: 112)*

Not content to substitute 'pâturages', pastures, for 'potreros', Humboldt highlights how unsuitable such a replacement is in conveying the precise nature and use of pastureland in the Spanish colonies. His explanations let him distinguish among different types of Cuban cattle ranches, further opening a cultural and economic context that escapes the French noun. The HiE version follows Humboldt's cues to the point of adding another unitalicized 'potreros' in place of the French pronoun 'y'. It would not have made much sense to try to offer perceived English equivalents for the Spanish when Humboldt shows why doing so is neither desirable nor in fact possible given the deep embeddedness of each word in a cultural context that does not align with the others.[10]

Is the above English version an example of keeping the source text intact in the target language – keeping it complete, as it were? Insisting on completeness is tricky because the concept is grounded in the assumption that a source text is invariant in content and form rather than something that is always also transformed by the very existence of translations. In Humboldt's case, completeness is doubly complicated because he was an inveterate reviser. As the 'Editorial Note' in *The Political Essay on the Island of Cuba* acknowledges, '[it] is well worth asking what *accuracy* and *reliability* might mean, given that Humboldt revised and amended his writings almost obsessively and that his texts were issued by different publishers in different editions often simultaneously, over the course of almost thirty years' (Humboldt 2011: 470; emphasis in the original). Even though Humboldt stopped revising *Cuba* after the two-volume freestanding edition on which the HiE translation is based, this does not change the fact that there are multiple source texts that historically coexist with each other and with past, present, and future translations of *Cuba*, all of which should be viewed as autonomous texts. In the end, the idea of a single and singular original text is a fiction endorsed by the existence of a translation that seeks to 'immobilize Humboldt's unstable textual creations to satisfy some readers' desire for an

original' (Humboldt 2011: 470). To the extent that claims to completeness seek to confer authority (meaning: prestige), they also imply the desire for an authoritative translation; the genre of the critical edition is a case in point. But, as Scott Montgomery has rightly pointed out, '[t]he unending struggles to establish what are called "authoritative editions" represent nothing if not recognition of the book's true instability […]. It is an irony of textual history that the term "authoritative" has long meant "temporary authority over" a particular work' (2000: 282).

Recognizing the temporariness of authority and hence the instability of Humboldtian texts opens the door to a different translation strategy, which challenges the notion of completeness by suggesting that a source text is never, in and of itself, complete: to supplement Humboldt's texts, to exceed them, an approach that Humboldt himself invites through his insistent writing-together of multiple languages and the simultaneous use of different spellings. What signals such supplementation or excess in the HiE translations are square brackets, which are put to different uses. Most often, square brackets add contemporary geographical names to their nineteenth-century appellations, as in 'Bourbon [Réunion]' and 'Île de France [Mauritius]' (Humboldt 2011: 52). Using both names reflects the colonial practice of (mis)naming places (and people) on which I comment above, and it suggests the continued variability of such names. At other times, square brackets add an English version to words, phrases, and quotations in Spanish, Latin, and Italian. An example here is Humboldt's quotation of the Cuban astronomer Antonio Robredo's account of how different conditions affected his temperature measurements:

> Ce dernier observateur remarque lui-même 'que, dans son appartement à la Havane, le courant d'air n'étoit pas assez libre *(pieza no muy ventilada)*; tandis que l'exposition à Ubajay étoit telle qu'on pouvoit la désirer, *un lugar abierto de todo vientos, pero cubierto contra el sol y la lluvia*.'
>
> *(Humboldt 1826: I.89)*

> Mr. Robredo himself admits that his Havana apartment did not allow the air to flow freely ('no muy ventilada' [not well ventilated], while his situation in Wajay was ideal: it was 'un lugar abierto de todos vientos pero cubierto contra el sol y la lluvia' [a place open to the wind but protected from the sun and the rain].
>
> *(Humboldt 2011: 56).*

At issue here is not the translatability of the Spanish passages but the decision to retain them *and* add an English version. This addition sets specific English words and sentences apart from the rest of the English text, embedding these and other foreign-language passages in a dynamic multilingual

environment in which the English translation does not signify alone but *in conjunction* with Spanish. The use of square brackets, to which the reader is alerted in the prefatory Note on the Text, creates a measure of translational and editorial transparency. To the extent that such transparency produces translational accountability, it also suggests that reliability (which is closely tied to completeness) is not, or not necessarily, a matter of *not* making any changes to a source text. Instead, the concept of reliability becomes visible as a scholarly artifice created by drawing attention to any alteration, no matter how small, by making changes both a part of the translation and at the same time drawing attention to them. Such visualized changes make legible how temporary any authority over a text really is: it is transient or provisional, attached to the historical time of the translator as it collides with that of the source text.

A different example of the ways in which such translational interventions exceed the source text comes from the 'Note on the Text' in *Cuba* in the HiE edition. This Note offers a partial inventory of topics culled from Humboldt's section and subsection titles. It includes two untitled sections in square brackets. One of them is the very section on slavery omitted in Thrasher's English version.

> Surface Area, Territorial Divisions, Climate 37
> Population 66
> Agriculture (Sugar, Coffee, Wax, Trade) 95
> [Unmarked Section on Slavery] 142
> [Unmarked Section on Travels to Trinidad, the Jardines y Jardinillos, etc.] 154
> On the Consumption of Sugar in Europe 177
> On the Temperature in Different Parts of the Torrid Zone at Sea Level 197
> *(Humboldt 2011: xxv)*

Because this inventory is not intended as a substitute for the table of contents Humboldt himself chose not to provide, it was important that it be displaced into the 'Note on the Text'. Because *Cuba*, like all of Humboldt's writing on the Americas, is, as this inventory suggests, non-linear and otherwise unruly, it made sense not to supply the reader with an advance ordering mechanism.[11]

Elsewhere in *Cuba*, translational excess stands as a perpetual reminder that cultural gaps and historical differences cannot be bridged easily, and certainly not by erasing them, which would collapse the time of Humboldt's writing with that of our reading/translating. Rendering Humboldt's text and the translation ahistorical (rather than *trans*historical) proves especially tricky when it comes to the racialized terms that abound in Humboldt's writings on the Americas. Square brackets were put to use in this context as well,

but now their purpose was a different form of supplementation: to retain parts of Humboldt's French text in English, adapting a lesson learnt from his frequent refusal to translate. As the Editorial Note in *Cuba* explains: 'While we have translated "nègre" as "black" throughout, we have rendered Humboldt's "gens de couleur" as "people of color" and his "mulâtres" and "mulâtresses" as men and women of "mixed race." For any other racial or ethnic categories, we have preserved the specific French terms Humboldt employs in [square brackets]' (Humboldt 2011: 470–1). Inconsistencies aside, this decision has at least two disadvantages: for one, 'noir', which Humboldt uses with much greater frequency than 'nègre', tacitly drops out; by also translating it, again tacitly, as 'black', 'noir' is treated as synonymous to 'nègre', which it is not. We will shortly see why throwing terms indiscriminately into the same racial category may be undesirable. There is also no good reason (other than perhaps convenience) why these two racial terms should be invisibilized while other parts of the same lexicon become strangely hyper-visible. A case in point hails from the section on slavery, where Humboldt poses what now strikes us as a rhetorical question, but one that was not so rhetorical at the time: 'Croit-on acquérir le droit de se dispenser de la commisération, si l'on compare* l'état des noirs avec celui des serfs [du] moyen âge, avec l'état d'oppression dans lequel gémissent encore quelques classes dans le nord et dans l'est de l'Europe?' [Do people really consider themselves exempt from compassion when they compare* the status of black people **[noirs]** with that of medieval serfs or with the yoke under which certain classes of humans in northern and Eastern Europe still groan] (Humboldt 1826, I.307-8; 2011: 143). The footnote, which I have marked with an asterisk in this quotation, shows what happens when we translate Humboldt into English with the assumption that the relationship between 'noir', 'nègre', and 'black' is one of equivalence rather than of incommensurability, of both similarity and difference. What happens is that the English-speaking reader loses the ability to distinguish Humboldt's own lexical choices from those of others whom he either quotes or paraphrases. In the two passages below, I offer the entire footnote in French and in English, using boldface, as I did in the above quotation, to mark both my additions to the HiE version and the racial terms in the French text. Doing so emphasizes the differences between Humboldt's writing and Henry Bolingbroke's *Voyage to Demerary* (1807), from which Humboldt quotes somewhat loosely here. He renders Bolingbroke's words in French, retaining only one phrase in English and, as he often does, using italics to mark it as a direct quotation.

> Ces rapprochements ne tranquillisent que ceux qui, partisans secrets de la traite des noirs, cherchent à s'étourdir sur les malheurs de **la race noire**, et se révoltent, pour ainsi dire, contre toute émotion qui pourroit les surprendre. Souvent on confond l'état permanent d'une caste, fondé sur la

barbarie des lois et des institutions, avec les excès d'un pouvoir exercé momentanément sur quelques individus. C'est ainsi que M. Bolingbroke, qui a vécu sept ans à Demerary et qui a visité les Antilles, n'hésite pas de répéter 'qu'à bord d'un vaisseau de guerre anglois on donne le fouet plus souvent que dans les plantations des colonies angloises.' Il ajoute 'qu'en général on fouette très peu **les nègres**, mais qu'on a imaginé des moyens de correction très-raisonnables, comme de faire manger de la soupe bouillante et fortement poivrée, ou de boire, avec une cuiller très-petite, une solution de sel de Glauber.' La traite lui paroit un *universal benefit*, et il est persuadé que si l'on laissoit retourner aux côtes d'Afrique les **nègres** qui, pendant vingt ans, ont joui, a Demerary, 'de toutes les commodités de la vie des esclaves,' ils y feroient une belle recrue et amèneroient des nations entières aux possessions angloises.' (*Voyage to Demarary* 1807, p. 107, 108, 116, 136.) Voilà sans doute une *foi de colon* bien ferme et bien naïve; cependant M. Bolingbroke, comme le prouvent plusieurs autres passages de son livre, est un homme modéré, rempli d'intentions bienveillantes pour les esclaves.

(Humboldt 1826: I.308)

These comparisons calm only those secret partisans of the slave trade who seek to numb themselves to the afflictions of the black race **[race noir]** and thus resist, in a manner of speaking, all emotions that might surprise them. Often one confuses a caste's permanent condition, founded upon legal and institutional barbarity, with an excess of power temporarily wielded over a few individuals. This is why Mr. Bolingbroke, who lived in Demerary [for seven years][12] and visited the Antilles, does not hesitate to repeat 'that on board a British warship, the whip is used more often than on the plantations of the British colonies.' He adds 'that, normally, one seldom whips blacks **[nègres]** but has thought up other, more reasonable correctional methods, such as forcing them to eat boiling, heavily spiced soup or to drink a solution of Glauber salt with a small spoon.' The slave trade strikes him as a *universal benefit*, and he is convinced that if one were to let the blacks **[nègres]**, who enjoyed 'all the comforts of a slave's life' in Demerary for twenty years, return to the African coast, they would serve as wonderful recruiters, bringing entire nations under British domination. (*Voyage to Demerary*, 1807, pp. 107, 108, 116, 136). Here, we have a clear example of the very stubborn, naïve *colonist's faith*. Nevertheless, as many other passages in his book prove, Mr. Bolingbroke is a moderate man full of kind intentions toward slaves.

(Humboldt 2011, 143)

Notable about Bolingbroke's book is the consistent use of lower-case 'negro', hardly unusual for his times.[13] That Humboldt, who typically prefers 'noir'

and resorts to 'nègre' mainly when he refers to slaves, uses the second term consistently in his French version of Bolingbroke shows that he is aware of the differences between terms such as 'negroes', 'nègres', 'noirs', and blacks in their local usages in the Americas. This distinction is also a reason for reading the final clause as highly ironic. Bolingbroke's benevolence is quite compatible with his belief in the slave trade's 'universal benefit' because that universality is predicated on excluding the Africans, important to him only as units of labour or potential emissaries who may help extend the reach of the British empire. That Humboldt deems Bolingbroke 'full of good intentions' is hardly a compliment in conjunction with his 'naïve *colonist's faith*'. The sentence in which the footnote appears exacerbates Humboldt's irony; after all, Bolingbroke was among those who resorted to specious comparisons to justify the African slave trade.

My comments beg the question of why not just turn 'nègre' back into 'negro'? Using 'black' clearly transforms Bolingbroke's English by transporting it into the mid-twentieth century, whereas 'negro' would echo the historical context. Does this change signal a departure from or a return to translational fidelity? Perhaps it is both. '[T]he philosophy of fidelity', Montgomery suggests, 'has often resulted in more substantive change […] than even the most *ad libitum* paraphrase. The reason is simple, and well known: the more a translator seeks loyalty to an "original," the more he or she is forced to create a linguistic hybrid residing somewhere between the two languages at issue" (2000: 291). I want to pursue this question in connection with similar translational issues that arise, even more conspicuously, in connection with Humboldt's treatment of the French and Spanish colonial lexicon for people of mixed racial descent, notably in his population tableaus, where we encounter terms such as 'gens de couleur', 'sang-mêlés', 'races mélangées', 'races mixtes', 'mulâtres et métis', 'jaune pale', 'zambos', and 'pardos'. Humboldt spends what seems an inordinate amount of time on population statistics (Table 10.1 and Table 10.2). He derived his information from official documents, to which he had access through Cuban acquaintances, first and foremost the statesman, planter, and slave owner Francisco de Arango y Parreño, and from reading numerous older colonial writings. We will see later why these statistics are so important to Humboldt.

In this tableau, Humboldt creates French-Spanish hybrids by combining the Spanish noun 'pardos' with the French adjectives 'libres' and 'esclaves', which the HiE translation imitates as 'free pardos' and 'enslaved pardos' (rather than 'free dark-skinned persons' or 'enslaved blacks'). In the sentence that immediately follows the tableau, Humboldt renders 'pardos' parenthetically as 'gens de couleur', explaining that the word describes 'tous les hommes qui ne sont pas morenos, c'est-à-dire, de race nègre pure' – 'everyone who is not *moreno*, that is, pure black' – (Humboldt 1826: I.26, 2011: 32). Even if we grant that Humboldt had ample familiarity with the

TABLE 10.1 Table from Humboldt's *Essai politique sur l'Île de Cuba* detailing census data for the city of Havana for the year 1810, broken down by differences in colour and legal status, age, and sex. Humboldt 1826, I:19.

COULEURS.	*HOMMES*			*FEMMES*			*TOTAL Des HOMMES et des FEMMES. g.*
	a. d'un jour à 15 ans.	*b. de 15 à 60 ans.*	*c. de 60 à 100 ans.*	*d. d'un jour à 15 ans.*	*e. de 15 à 60 ans.*	*f. de 60 à 100 ans.*	
Blancs.....	3.146	6.057	348	2.860	5.478	476	18.365
Pardos libres.....	804	1.103	116	725	1.515	141	4.414
Noirs libres.....	833	1.149	133	819	2.308	284	5.886
Pardos esclaves.....	227	153	194	197	119	183	1.073
Noirs esclaves.....	1.781	4.699	78	1.561	5.224	94	13.437
Total.....	6.791	13.161	869	6.162	14.644	1,178	43.175

TABLE 10.2 Table from Humboldt's *Essai politique sur l'Île de Cuba* in English translation detailing census data for the city of Havana for the year 1810, broken down by differences in colour and legal status, age, and sex. Humboldt 2011: 29.

COLORS.	*MEN*			*WOMEN*			*TOTAL of MEN and WOMEN g.*
	a. from one day to 15 years	*b. from 15 to 60 years*	*c. from 60 to 100 years*	*d. from one day to 15 years*	*e. from 15 to 60 years*	*f. from 60 to 100 years*	
Whites.....	3,146	6,057	348	2,860	5,478	476	18,365
Free Pardos.....	804	1,103	116	725	1,515	141	4,414
Free Blacks.....	833	1,149	133	819	2,308	284	5,886
Enslaved Pardos.....	227	153	194	197	119	183	1,073
Enslaved Blacks.....	1,781	4,699	78	1,561	5,224	94	13,437
Total.....	6,791	13,161	869	6,162	14,644	1,178	43,175

racialized lexicon in colonial Cuba, his explanation is murky because the appositive clause can refer at once to *pardo* and to *moreno*. Both are categorized as 'gens de couleur' (or gente de color), an appellation that recurs when Humboldt, in the context of Venezuela's efforts at political independence, unites 'noirs, mulâtres, et *mestizos*' under the banner of 'les hommes de couleur libres' who 'ont embrassé avec chaleur la cause nationale' – 'Free men of color [blacks, mixed-race, and mestizos] have embraced the national cause warmly' (Humboldt 1826: I.316; 2011, 146). Interestingly, Humboldt focuses less on racial taxonomies than on distinguishing the parts of the population who are free from those who are not. The differences in socio-legal status also affect the ways in which he uses 'noir' and 'nègre'. The next tableau suggests that the latter signifies enslavement, the former (at least potential) freedom.[14]

The way in which the HiE version handles racial categories here resembles how the terms resonate across the linguistic divide in the source text. The parenthetical presence of the Portuguese words add to and exceed their French and English versions, suggesting more than simple one-to-one correspondences. Humboldt's emphasis is once again less on racial attributes than on socio-legal status, free or unfree, a pattern consistent across *Cuba*. What is not at all uniform is Humboldt's use of 'sang-mêlé' and 'race mixte'. When he breaks down census data by gender, he adds terms such as 'mulâtres' and 'mulâtresses', along with 'négresses', none of which leave any notable traces in the HiE translation (see Humboldt 1826: I.128; 2011: 71).

I mention above that Humboldt expends an enormous amount of narrative energy on population statistics pertaining to Cuba and the rest of the Americas. With these statistics, he created a basis for his arguments against slavery and the already illegal trade in Africans. Because the arguments he advanced were political and economic ones, his statistics helped him address the foundational relation between slavery and the fabled yields of Caribbean and other plantation economies in the Americas. Moral arguments against slavery, he realized, had proven ineffective: 'Ces comparaisons, ces artifices

TABLE 10.3 Table from Humboldt's *Essai politique sur l'Île de Cuba* listing census data for the Portuguese colony of Brazil for around 1818, broken down by differences in colour and legal status. Humboldt 1826, II:135.

1,728,000	nègres esclaves (*pretos captivos*).
843,000	blancs (*brancos*).
426,000	libres, de sang melé (*mestissos*, *mulatos*, *mamalucos libertos*).
259,400	Indiens de différentes tribus (*Indios de todas as castas*).
202,000	esclaves de sang melé (*mulatos captivos*).
159,500	noirs libres (*pretos foros de todas as naçoes africanas*).
3.617.900	

TABLE 10.4 Table from Humboldt's *Essai politique sur l'Île de Cuba* in English translation listing census data for the Portuguese colony of Brazil for around 1818, broken down by differences in colour and legal status. Humboldt 2011: 219.

1,728,000	Black slaves (*pretos captivos*).
843,000	Whites (*brancos*).
426,000	Free, of mixed blood (*mestissos*, *mulatos*, *mamalucos libertos*).
259,400	Indians of different tribes (*Indios de todas as castas*).
202,000	Slaves of mixed blood (*mulatos captivos*).
159,500	Free blacks (*pretos foros de todas as naçoes africanas*).
3.617.900	

de langage, cette impatience dédaigneuse avec laquelle on repousse, comme chimérique, jusqu'à l'espoir d'un abolissement graduel de l'esclavage, sont des armes inutiles dans les temps où nous vivons' – 'In the times in which we live, the comparisons, the rhetoric, and the disdainful impatience with which some shrug off as chimerical even the hope for slavery's gradual abolition are useless weapons' (Humboldt 1826: I.308; 2011: 143). This statement may explain why Humboldt did not seek to humanize the slaves through personalized eyewitness accounts that would somehow offset 'ces calculs révoltans sur la consommation de l'espèce humaine' – 'the dreadful calculations about the consumption of human beings' (Humboldt 1826: I.322; 2011: 148) represented in his tableaus. His last resort, then, was to deploy numbers to fan the fears among the outnumbered white colonists in the Antilles after the Haitian Revolution:

> Dans tout l'archipel des Antilles, les hommes de couleur (nègres et mulâtres, libres et esclaves) forment une masse de 2,360,000 ou de 83/100 de la population totale. Si la législation des Antilles et l'état des gens de couleur n'éprouvent pas bientôt des changemens salutaires, si l'on continue à discuter sans agir, la prépondérance politique passera entre les mains de ceux qui ont la force du travail, la volonté de s'affranchir et le courage d'endurer de longues privations. […] La crainte de cet évènement agit sans doute plus puissamment sur les esprits que les principes d'humanité et de justice; mais, dans chaque île, les blancs croient leur pouvoir inébranlable.
>
> *(Humboldt 1826: I.118–19)*

> In all of the Antilles, men of color (black and of mixed race, free and enslaved) add up to 2,360,000 or 83 percent of the total population.[15] If the laws in the Antilles and the legal status of people of color do not

> change for the better soon and if we continue to talk without acting, political supremacy will pass into the hands of those who have the power of labor, the will to emancipate themselves, and the courage to endure long privations. […] The fear of this eventuality no doubt affects the spirit more than do the principles of humanity and justice. But the whites on each island believe their power to be unassailable.
>
> *(Humboldt 2011: 68)*

> In all of the Antilles, **men of colour, hommes de couleur** (**nègres and mulâtres, libres and esclaves**) add up to 2,360,000 or 83 percent of the total population. If the laws in the Antilles and the legal status of **people of colour, gens de couleur,** do not change for the better soon and if we continue to talk without acting, political supremacy will pass into the hands of those who have the power of labor, the will to emancipate themselves, and the courage to endure long privations. […] The fear of this eventuality no doubt affects the spirit more than do the principles of humanity and justice. But **the whites**, **les blancs,** on each island believe their power to be unassailable.[16]

In keeping with my argument that, by themselves, 'black', 'people of colour', and 'mixed race' are largely decontextualized translational simplifications, I have transformed the HiE version of this passage in the bolded instances in ways that go further even than the adjustments I suggest above. Eschewing the square brackets conventionally placed around translations – because the French terms here are not translational additions but words from Humboldt's text that now follow the English version – allows for a sort of non-hierarchical double exposure, especially when one also removes the italics for foreign-language words, as Humboldt himself often does. (Switching the order of the two languages would have a similar effect.) I have also included 'whites, les blancs', as a racialized term alongside 'nègres' and 'mulâtres' rather than treating whiteness as somehow exempt from racial classification. Finally, I have not offered English words for the adjectives 'nègres', 'mulâtres', 'libres', and 'esclaves' to let them resonate with the other French words and evoke the context of the Haitian Revolution. Instead of resorting to imitation, I have used differential equivalencies to show how a translator might create a work that is 'in the beginning of its life, *alien to both languages*' it brings into 'purposeful contact' (Montgomery 2000: 291, my emphasis). My intent in re-translating this passage has not been to attempt somehow to humanize nineteenth-century racialized language, but to retain the dehumanizing violence inscribed in racial taxonomies that would later become naturalized in connection with Darwin's evolutionary theory and pseudo-scientific eugenics. This violence lives on in Humboldt's political discourse on the inextricability of plantation economics from enslavement.

In his tableaus, populations are broken down into units – sometimes even abbreviated as 'escl.' for 'esclaves' – in the same way that colonial products are itemized and measured in 'kilog'. and other units. In my reading, the value of Humboldt's writings on the Americas for the twenty-first century resides less in the humanitarian sentiments he expresses than in his making pervasive the effects of colonial extraction on everybody and everything, including, of course, language. Humboldt's refusal to standardize across languages the terms of his own discourse on colonialism in the Americas disrupts perceptions of the smooth functioning of the colonial societies he describes in great detail. Such disruptions are key components of his larger ethical project, with which my translational choices seek to align themselves. But the kinds of linguistic disturbances I have created in the process also, perhaps primarily, mark the places where the demands and constraints of my own cultural precarity in the US academy most visibly collide with the historical contexts of and in Humboldt's writing.

Notes

1 For dissenting views see Pratt 2007; Thurner and Cañizares Esguerra 2022.
2 A good example is the impact that John Black's *Political Essay on the Kingdom of New Spain* (1810) had on the boom and bust of the silver market in the 1810s.
3 Doing so was easier for him in his day than it is for us now: Humboldt did not have to worry about staying within or crossing disciplinary boundaries because academic disciplines did not yet have the territorial boundaries that started to be drawn near the end of the nineteenth century – and any of us who have ever engaged in what we call interdisciplinary scholarship are aware of how entrenched this territoriality still is. Humboldt's pre-disciplinary thinking may offer useful strategies for the humanities to think beyond disciplinarity or to think their way into un-disciplinarity. By implication, Humboldt's writing speaks to the ways in which knowledge is *disciplined* at our colleges and universities, to how academic and other institutions colonise and police the production of knowledge by either granting or withholding funding. Administrative decisions about what fields of inquiry will either flourish or perish are all parts of such disciplining.
4 Such translational choices strike me as especially problematic in English, a language that many readers today regard as a universal language. This does not, however, mean that it is unproblematic in translations into other languages, such as Spanish or German, as evidenced by Humboldt 2004a and 2004b, and also Ette 2009: 277–91.
5 Humboldt protested Thrasher's transgressions from afar (Kutzinski 2009).
6 See also Ette 2009, 292–318.
7 Humboldt does not, however, explain what different ideas this 33-letter word brings together. He may not have known. In our day, we can use internet resources to find English circumscriptions including Henry Dunn's and Reginald Mason's respective versions – 'The reward given to the messenger who carries a paper on which is painted tidings' and 'The-reward-given-to-the-messenger-who-carries-a-paper-on-which-is-painted-tidings' – and, even more detailed, 'the reward given to a messenger, the bearer of a paper on which is indicated either by symbolic characters or painting, intelligence which it is desirable to transmit' (Dunn 1828: 266; Mason 1852: 101; Anonymous 1861: 67).

8 All translations are by the author unless otherwise indicated.
9 This point is very difficult to communicate to copy editors, today's gatekeepers of linguistic standardisation.
10 'In a historical sense, it may be of greater help to avoid the solar myth of "cognitive content" and instead accept *in*commensurability as a given' (Montgomery 2000: 291).
11 Compare this to the 'Indice' in Humboldt 2004b: 39–41.
12 These words were accidentally omitted in the HiE version.
13 'I assert with confidence and satisfaction, that there is not so much flogging on a West India plantation, as there is obliged to be on board our men of war. […] It was formerly thought necessary […] to correct negroes for every fault that was committed, and the driver's whip was continually cracking […]. Different measures have since been adopted […]. If the cook spoils the soup…, he is made to eat it, warmly peppered with cayenne, at other times obliged to eat an ounce of Glauber salts, or to sip them with a tea spoon when dissolved in half a pint of water. (Bolingbroke 1807: 107–8). 'If some trusty negroes, who have been attached for 20 years to plantations in the West Indies, were sent over the Africa to enlist voluntary recruits only, they would, I doubt not, be followed back by whole nations of their own accord' (130). On the purported comforts of slave life, see p. 115, which Humboldt paraphrases.
14 This population breakdown for Brazil for 1818 appears in the second volume of *Cuba* as part of a lengthy supplement dedicated to comparing Cuba with other Caribbean islands and with the Spanish and Portuguese colonies in South America, at times also with the US.
15 As we can see even in this short excerpt, Humboldt often uses 'hommes de couleur', men of colour, and 'gens de couleur', people of colour, more or less interchangeably. However, given his discussions of the extreme gender disparities among slaves in Cuba and the rest of the Caribbean, we decided to use 'men of colour' here.
16 My emphasis.

References

Anonymous. 1861. 'Long Words – Short Epistles, and Oddities Generally', *Southern Literary Messenger* 33, New Series Vol. XII: 67–71. URL: https://play.google.com/books/reader?id=CWYAAAAAYAAJ&hl=en&pg=GBS.PA67 (accessed 27 March 2020)

Bolingbroke, Henry. 1807. *A Voyage to the Demerary: Containing a Statistical Account of the Settlements There, and of Those on the Essequebo, the Berbice, and Other Contiguous Rivers of Guyana*. London: Printed for Richard Phillips. URL: https://catalog.loc.gov/vwebv/search?searchCode=LCCN&searchArg=02011758&searchType=1&permalink=y (accessed 31 March 2023)

Dunn, Henry. 1828. *Guatimala, or, The United Provinces of Central America, in 1827–8. Being Sketches and Memorandums Made During a Twelve Months Residence*. New York: G. & C. Carvill.

Ette, Ottmar. 2009. *Alexander von Humboldt und die Globalisierung*. Frankfurt am Main: Insel.

Harvey, Eleanor, and Hans-Dieter Sues. 2020. *Alexander von Humboldt and the United States: Art, Nature, and Culture*. Princeton, NJ: Princeton University Press.

Humboldt, Alexander von. 1825–27. *Essai politique sur le royaume de la Nouvelle-Espagne par Alexandre de Humboldt*, second edition. Paris: Antoine-Augustin Renouard.

Humboldt, Alexander von. 1810–13. *Vues des Cordillères et Monuments des Peuples Indigènes de l'Amérique*. Paris: F. Schoell.
Humboldt, Alexander von. 1826. *Essai politique sur l'Île de Cuba*. Paris: Gide fils.
Humboldt, Alexander von. 1856. *The Island of Cuba by Alexander Humboldt*, trans. J. S. Thrasher. Cincinnati: Derby & Jackson.
Humboldt, Alexander von. 2001. *The Island of Cuba. A Political Essay by Alexander von Humboldt*. Luis Martínez-Fernández (ed). Princeton and Kingston: Markus Wiener and Ian Randle Publishers.
Humboldt, Alexander von. 2004a. *Politischer Essay über die Insel Kuba*, trans. Irene Prüfer-Leske. Alicante: ECU.
Humboldt, Alexander von. 2004b. *Ensayo politico sobre la Isla de Cuba (1826)*, trans. María Rosario Martí Marco and Irene Prüfer-Leske. San Vicente del Raspeig: Universidad de Alicante.
Humboldt, Alexander von. 2011. *Political Essay on the Island of Cuba*. Vera M. Kutzinski and Ottmar Ette (eds), trans. J. Bradford Anderson, Vera M. Kutzinski, and Anja Becker. Annotations by Tobias Kraft, Anja Becker, and Giorleny Altamirano Rayo. Chicago: University of Chicago Press.
Humboldt, Alexander von. 2012. *Views of the Cordilleras and the Monuments of the Indigenous Peoples of the New Continent*. Vera M. Kutzinski and Ottmar Ette (eds), trans. John Ryan Poynter. Annotations by Giorleny Altamirano Rayo and Tobias Kraft. Chicago: University of Chicago Press.
Humboldt, Alexander von. 2019. *Political Essay on the Kingdom of New Spain. A Critical Edition*. Vera M. Kutzinski and Ottmar Ette (eds), trans. John Ryan Poynter, Ken Berri, and Vera M. Kutzinski. Annotations by Giorleny Altamirano Rayo, Vera M. Kutzinski, and Tobias Kraft. Chicago: University of Chicago Press.
Kutzinski, Vera M. 2009. 'Translations of Cuba: Fernando Ortiz, Alexander von Humboldt, and the Curious Case of John Sidney Thrasher', *Atlantic Studies* 6(3): 303–26.
Kutzinski, Vera M. 2024. 'Off-Road Adventures: Reading Statistics in Alexander von Humboldt's *Political Essay on the Kingdom of New Spain*.' *Humboldt in the Net* (HiN) XXV(48): 64–85. URL: https://www.hin-online.de/index.php/hin/article/view/367
Martin, Alison E. 2018. *Nature Translated: Alexander von Humboldt's Works in Nineteenth-Century Britain*. Edinburgh: Edinburgh University Press.
Mason, Reginald Herbert. 1852. *Pictures of Life in Mexico*. Vol. II. London: Smith and Elder.
Montgomery, Scott L. 2000. *Science in Translation. Movements of Knowledge through Cultures and Time*. Chicago: University of Chicago Press.
Pratt, Mary Louise. 2007. *Imperial Eyes. Travel Writing and Transculturation*. New York: Routledge.
Prüfer-Leske, Irene. 2001. 'Übersetzungen, Manipulationen und Neuübersetzungen des *Essai politique sur l'Île de Cuba* Alexander von Humboldts', in Ottmar Ette and Walther L. Bernecker (eds), *Ansichten Amerikas. Neuere Studien zu Alexander von Humboldt*, pp. 219–30. Frankfurt am Main: Vervuert.
Thurner, Mark, and Jorge Cañizares Esguerra (eds). 2022. *The Invention of Humboldt. On the Geopolitics of Knowledge*. New York: Routledge.
Venuti, Lawrence. 2019. *Contra Instrumentalism. A Translation Polemic*. Lincoln: University of Nebraska Press.

11

TRANSLATING M. *ET* MME/MR *AND* MRS

The Case of Male Scientific Translators in the Forging of Nineteenth-Century Natural Science by Women

Mary Orr

Introduction

This chapter looks afresh at the importance of nineteenth-century Nature translated, to borrow the title of the inspiring work by Alison E. Martin (2018). Her study of the strategic importance of women translators in the reception of Alexander von Humboldt's works in the Anglophone world then begs the related research question that we address. Were a role reversal to apply – the woman the scientist, her translator a man – (how) would it reset critical narratives about work in science by women? Because translation as activity and metaphor is pivotal to interdisciplinary as well as cross-cultural knowledge exchange, such a question also promotes the curiosity and untapped potential of interlingual research inquiry. As a researcher in nineteenth-century French literature and science informed by comparative Anglophone and Germanic interests (Orr 2021a), I stop to ask whether the text I am examining was translated into other language(s), and if so by whom. This chapter showcases three representative results to spearhead further research on the larger significance of scientific translation in the long eighteenth and nineteenth centuries in translation studies and in the comparative history of European sciences.

Nature translated in the period, therefore, requires context-critical subject awareness – of persons and disciplines – because specific (inter-)cultural parameters and expectations frame the work(ers) of both source and target text productions in science. Indeed, the automatically assumed order and relational status of source and target text may also be in question, as we will discover. This chapter, therefore, makes its larger context-critical point through investigating three very different nineteenth-century science source

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texts in French and English authored by women, and women clearly named and titled 'Madame', 'Mistress', or 'Mrs' on their covers. I will reveal them shortly, because non-recognition of female authors and negligible appraisal of their texts in Anglophone or Francophone history of science comes with their territories. All three works, however, promptly appeared in translation in the other language. Strikingly, all three also have a named male translator. These basic facts challenge the assumed male authorities and hierarchies in science-making and dissemination in nineteenth-century France and Britain, and the accepted reasons explaining them, including in feminist study. For example, because women of the period lacked the necessary science education, theirs could only be 'uneasy careers' in secondary roles (Abir-Am and Outram 1987), by editing, translating, and illustrating the science undertaken by their fathers, husbands, and brothers. The topic of women's science translated by men immediately changes such scripts, by propelling multi-contextual critical inquiry on at least two major counts. First, it accounts for many more women undertaking primary roles in science, who are otherwise unheralded because they are neither exceptional (in the class of a Marie Curie), nor 'uneasy' enough (a Margaret Gatty). Second, few were the 'professional' men in nineteenth-century sciences in France or Britain who had 'easy' careers in the period before 1860, or were exceptional thereafter, despite their often extensive scientific work and publications. If much better understanding is needed of the 'uneasy careers' of secondary men – by rank, education and creed – in long nineteenth-century British, French, and other European national science production, their importance for this chapter is primarily as spotlights on neglected women authors of science. The latter immediately and variously acquire a differently qualitative status and importance, when their works are translated by men also in their fields of French and English scientific expertise. Not only does such informed authority in the translator make him a diffuser and promoter of women's scientific knowledge. The named woman author in science also becomes primary by dint of her source text. In consequence, her scientific authority is newly illuminated in her work, because it is concomitantly a source and target text in at least two national-cultural contexts. Scientific translation is, therefore, a strategic bi-directional lens for evaluating the woman author's primary contributions and larger transnational significance in science of the time. How, then, can researchers better address women's science translated by men? The next section offers a practical reply in its proposed translingual research methodology. The chapter then applies the simple questions of its moves to a closer examination of the translations of three women-authored nineteenth-century science texts, as indicative of unheralded others. The chapter's larger result through further applications of its methodology will be recovery of other overlooked (primary) women and (secondary) men in science in European, and non-European, language cultures.

The all-important affirmative to my basic first question above – that a scientific translation exists – sets the course for translingual critical investigation of source and target text authors in science.

Figure 11.1 maps its methodological steps as a flow chart. Its second 'when?' question then clarifies the potential first-order significance of the female-authored source text if it was translated immediately, and/or if the source text was reprinted/retranslated. Such chronologies then make relative and comparative the monodirectional models in time assumed for scientific advances and progress in (Whig and French Positivist) sciences of the period. The seemingly contrarian step in this chapter – the anti-chronological order of its three case studies – deliberately upturns and reassesses such benchmarks for progress, set by the ('easy') male professional career scientist of the 1860s onwards as the supposed model for scientific endeavour. It still determines the place and roles of women in science today in its 'leaky pipeline' reformulation (Pell 1996; Ysseldyk et al. 2019). And the third simple 'who?' question, to ascertain the expertise of the male translator of women's science, then determines how he does justice (or not) to her scientific subject, as well as to the (lexical) semantics of her work. If he also pens a translator's preface, it may say as much about his (self-)positioning in science as about her status as (a woman) author of science. Our translingual research methodology can thus reveal – via translators' prefaces and/or notes – where the woman author of science also in translation is more overtly promoted or downplayed.

But there is a further important aspect of this methodology. The text in translation alerts us to differing historical specificities for female-authored science, because its dual source and target contexts inform its double dissemination to meet audience expectations of science that are (multi-)culture-specific. For example, science translations are often understood as part of the

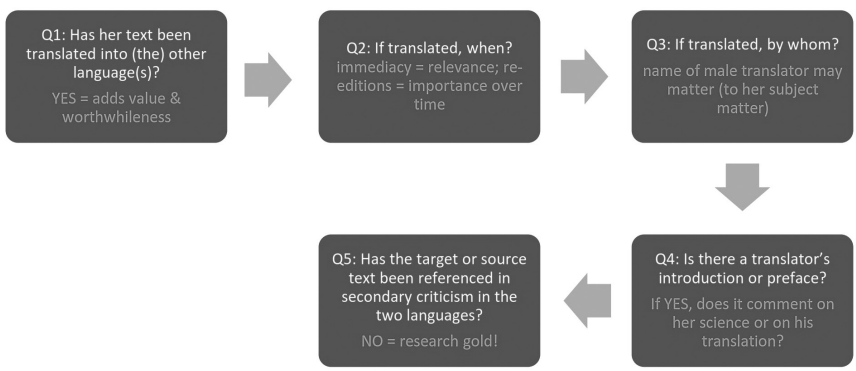

FIGURE 11.1 Translingual Research Methodology for Examining Scientific Texts

Source: The author.

popularization of science. Yet the expert disseminator of French science, the *vulgarisateur* – translated as 'populariser' in English – is of a different order and training from the Victorian popularizer as magisterially explored by David Allen (1976) and Bernard Lightman (2007). Already clearly gendered masculine in French (collocating with his position and roles in science), the activity of the *vulgarisateur* overlaps substantially with the work and contributions of primary men in science ('hommes scientifiques'), because of his similar science education, expertise, and authorship of science. The distinction of the *vulgarisateur* (as secondary) is in his public-facing, rather than elite institutional, publication of scientific work (Bensaude-Vincent 1995). In consequence, expert *vulgarisateurs* could forge serious careers in France by disseminating its latest science *intra-* as well as *inter*-lingually for informed French publics. First-order (career) *vulgarisateurs* all born after 1819 include Arthur Mangin (1824–87), the astronomer Camille Flammarion (1842–1925), and Louis Figuier (1819–94), who also became editor-in-chief of the periodical, *La Science illustrée* [Illustrated Science].

This necessary methodological and context-critical excursus now explains why and how investigation of translations by men of female-authored nineteenth-century science in French and English variously sheds new light on the scientific value of her name on the cover of both her source and target text. The concomitant merit and 'worthwhileness' – economic and intellectual – of publishing her work may be further increased by the status in science of her (male) scientific translator. Those promoting and disseminating our indicative women-authored science therefore need brief contextualization to ascertain their standing and qualifications for the task. The first, William Henry Davenport Adams (1828–91), was the most prolific of the three. An accomplished, regularly commissioned translator of French history of ideas – including the works of Louis Figuier already mentioned, and the French historiographer Jules Michelet (1789–1874) – Davenport Adams was also a published writer, for example, of *Celebrated Women Travellers of the Nineteenth Century* (1883). The second male scientific translator is Théodore Lacordaire (1801–70). A Belgian of French extraction, he is known only peripherally in French history of science not as a translator or *vulgarisateur*, but as an expert entomologist. When Georges Cuvier (1769–1832) invited him to Paris in 1830, he became a founding member in 1832 of the Société Entomologique de France with André Marie Constant Duméril (1774–1860), Jean Victor Audouin (1797–1841) and Pierre André Latreille (1762–1833). As Professor of Zoology in 1837, and thereafter Professor of Comparative Anatomy at the University of Liège, Lacordaire produced definitive, multi-volume works on insects. Lastly, Gerson Hesse (n.d.) translated various compendia of British natural history into French, but also authored histories in French for children, on the Greeks, on France, and on other ancient peoples. Hesse also translated the mathematical work

of his German countryman, Gerhard Ulrich Anton Vieth, into French in 1835. All three male scientific translators are therefore highly educated published authors, with polymathic scientific and intercultural interests beyond their expertise as translator-*vulgarisateurs*. Why would they additionally undertake the translation of works authored by women in science, except where these have particular importance for knowledge? We now turn to the prefaces of their translations to frame our women source text authors, and to investigate if and how the translator promotes her science. Our case study subtitles hint at some answers.

Case Study 1. W. H. Davenport Adams: Translating M. et Mme/Mr and Mrs Michelet

The title for this chapter is now revealed in Davenport Adams's short preface illuminating our first woman scientific author and her work, *Madame* (Athénaïs) Michelet's *Nature, or The Poetry of Earth and Sea* of 1872:

> The volume […] was written expressly for its English Publishers by Madame Michelet, and would have been produced at an earlier date but for the interruption caused by the Franco-Prussian War, and, afterwards, by the illness of M. Michelet. It is not for the Translator to take upon himself the critic's office, but he cannot refrain from expressing his conviction that it is distinguished by a peculiar delicacy of sentiment and poetry of feeling, and that many of the descriptive passages are remarkable both for truth and brilliancy. In the following pages Madame Michelet reviews almost every aspect of 'Nature,' and presents a series of pictures which are seldom deficient in boldness of outline and warmth of colouring. The Illustrations were also designed expressly for the Publishers by M. Giacomelli; already favourably known to the British public […] by his exquisite Illustrations of 'The Bird'. Their conception and execution have occupied him for upwards of two years […] The Translator, on his part, may be allowed to say that he has spared no pains to place before the reader a trustworthy, and, he would hope, a not inelegant version of Madame Michelet's work. He has endeavoured to give a faithful idea of the distinctive features of her style, and, for this purpose, he has not scrupled at times to adopt a somewhat literal rendering. And he trusts that he has preserved the spirit, if not the grace, of a very characteristic original.
>
> *(Michelet 1872: v–vi)*

The facts of publication – expressly for the English market; delays by the Franco-Prussian War (of 1870) and Jules Michelet's illness, but before his death in 1874 – situate Davenport Adams's appraisal of Mme (Athénaïs) Michelet's work for its 'delicacy of sentiment' and 'poetry of feeling' over

the 'truth' and 'brilliancy' of her descriptions. The ambiguity as to whether these qualities pertain to her science or to her imaginative rendering is compounded by Davenport Adams's extensive assessment of the illustrator's 'exquisite' work and 'conscientious' efforts to produce the 200 plates in two years. Notably he fails to mention the work of its many engravers, including a 'Madame Rouget'. Clearly a male illustrator had also been intensively involved in this female-authored science publication from at least 1870. Finally, Davenport Adams vouches for his own endeavours: his trustworthiness, faithfulness, and accountability hallmark his handling of 'a very characteristic original'. Rather than evaluate Madame Michelet's merits on potentially gendered qualities like 'delicacy of sentiment', our focus trains instead on the translator's qualitative commitment to translating this text/her work. To assess female-authored science through reading the prefatory text of its male translator is, therefore, different from feminist attention to the modesty topos (Poovey 1984) of female-authored prefaces, whether to their own work or to their translations of male-authored science (and literature). In the case of Madame Michelet's *Nature*, the perspicacious reader will have computed a variety of information from the inside title page before reaching Davenport Adams's preface. First, the translator's name is absent from the former. Second, the publisher clearly commissioned *Nature* from a writer, as well as a quality illustrator and translator of renown, as the latest (fifth) in a new series – 'Nelson's Art Gift Books' – 'of first-class and richly illustrated works on physical science'. In Davenport Adams's preface to *Nature* above he had applauded Giacomelli's illustrations of 'The Bird' (by Jules Michelet), the first title of the Nelson series (commissioned from 'A. E.' as the translator and not Davenport Adams). A. E.'s prefatory description and challenge for the translator of M. (Jules) Michelet's style of scientific writing in *The Bird* is strikingly similar to Davenport Adams's of Madame Michelet's *Nature, or The Poetry of Earth and Sea*. But the third text on the Nelson list, the similarly titled *Earth and Sea* by Louis Figuier, had been translated, edited, and enlarged by Davenport Adams. He therefore had vested, career-enhancing interests as the sole conduit for introducing Madame Michelet's only published work in English, to position his expertise at the forefront of cross-channel and transatlantic dissemination of scientific knowledge for aspiring, educated middle-class audiences. 'Nelson's Art Gift Book for Science' was the further development of the highly successful Gift Book format with illustrations, launched by Rudolph Ackermann's *Forget Me Not* in the 1820s and enlarged by the 1860s into what is called the 'Landscape Annual' (Onslow 2017) for wealthy readerships of both sexes. Gift Book appeal to connoisseurship as well as to knowledge is therefore widened by Nelson to include discerning scientific appreciation of the wonders of nature in text and image for its London, Edinburgh, and New York markets. If Davenport Adams wanted his slice of guaranteed income

as translator-editor and future contributor, the reputational interests of Madame Michelet were also very much at stake, to have her name on the cover of *Nature* for discerning Anglophone audiences.

Athénaïs Michelet's *Nature* is coextensive with her many primary contributions to Jules Michelet's four 'nature' books. In extricating her co-authorship of them for the first time for the history of women in French science (Orr 2022), I further questioned her supposed reputation in nineteenth-century French history, including feminist, as the 'abusive widow'. My incontrovertible and multiple evidence for her many collaborations, indeed her impetus behind the French editions of *L'Oiseau* [The Bird][1] (1856), *L'Insecte* [The Insect] (1857), *La Mer* [The Sea] (1861), and *La Montagne* [The Mountain] (1868), was to look behind Jules's name on their covers at her sole-authored works by comparison, including *Nature, or The Poetry of Earth and Sea* in 1872. But Davenport Adams's role as the scientific translator of both Monsieur and Madame Michelet into English clearly provides further evidence. Athénaïs is demonstrably at work throughout the 1850s at the very least as a *vulgarisatrice* of science, and before Mangin, Flammarion, and Figuier had established their reputations, since her extensive research and co-writing for Jules Michelet's four 'nature books' rebound in her methods for *Nature*. It culminates in 30 pages of 'Illustrative Notes' (Michelet 1872: 391–419), providing references for her many sources that also clarify their inspirations behind the earlier Michelet works. But the style, compositional arrangement and force of her *Nature* of 1872 also further endorse her earlier authorships as integral to their individual, four-part conception. It underpins the even broader ambition and scope of her *Nature*. Its new purview in seven sub-titled 'Books' extends the range of the earlier four by their new focus and reframing through different (Humboldtian) 'plant geographies' in the first three: 'The Garden', 'Pastoral Scenery', and 'Woodland Scenery'. These re-inflect and reintegrate its 'Mountain Scenery', 'River Scenery', 'Lake Scenery', and 'The Sea' (in Books four to seven). This is no genteel, pastoral, or picturesque subject matter in *Nature* as merely 'soft science' by/for women, as the first of Giocomelli's commissioned plates (illustrations) for 'The Garden' might further endorse, because countered by Athénaïs's clear treatment of pictures in words (Michelet 1872: 300). Poetry and science are therefore also coextensive scientific sources for her work, because commonly also in works by men (Tate 2020). This same page also exemplifies Davenport Adams's interventions in her text beyond being (merely) its translator. A translator's note is often in order when foreign quotations in the source text derive from the culture of its target language translation, especially if misquoted by the author or familiar to the target language reader. In this case, Davenport Adams intrudes twice. First, he abbreviates Athénaïs's English quotation from Walter Scott's 'The Lady of the Lake', because well known to Anglophone readers. Second, and more significantly, he corrects the facts

of her assertions concerning the island it mentions in Loch Leven (the prison for Mary Queen of Scots) as devoid of vegetation. Where such interventions might call the larger scientific reputation of Athénaïs to account, it is not possible to check this or other similar scientific inaccuracies of detail in her source text, because *Nature* was never published in a French original, including after the English translation. Madame Michelet's target text in her translator's hands is thus her main authorial source text.

As the science translator with Nelson in 1872 of both 'Mme' and 'M.' Michelet – *The Mountain* is the fourth title of the same Nelson series – Davenport Adams's stated accuracy and accountability in his preface to *Nature* clearly forged his own reputation. Nelson commissioned him again for *The Sea* in 1875. Although its French original appeared in 1861, the death of Michelet in 1874 provided market leverage for Nelson's English translation to commemorate the great (man and his) works. Davenport Adams's preface is then revelatory of how it treats and evaluates 'M./Mr' differently to 'Madame/Mrs' Michelet, despite his intimate knowledge as the translator of their plural 'picturesque and individual style' and 'distinct era' of the(ir) 'admirable treatises on zoological and physical subjects':

> It is with sincere pleasure I find myself entrusted with the task of introducing to the English public another of those admirable treatises on zoological and physical subjects that marked a distinct era in M. Michelet's literary life […] but they are something less and something more. They do not deal with these subjects *as the man of science does; they are wanting systematic arrangement and definiteness of detail*. But […] they exhibit a quickness of insight, a richness of fancy and a felicity of description *for which the reader would look in vain to the manuals of zoologist or physicist*. They open up to *the student* the inner meanings of Nature; they teach *him* that around and about us there is much which no philosopher can explain, which it is the province of the poet or the ardent love of Nature to develop and illustrate. […] And this […] is worked out *by Michelet with all the force of a mature intellect, and all the characteristic vigour of a picturesque and individual style*. So that when the *great writer occasionally 'ventilates' sentiments not in entire accordance with our sober English taste*, we are nevertheless charmed […] and some touch of tender feeling, some vivid gleam of imagination, some indication of profound sympathy, proves to *the reader that he* is under the spell of *a powerful and original genius*.
>
> *(Michelet 1875: v–vi, my emphasis)*

Where Davenport Adams had ascribed the term 'original' to Madame Michelet's *Nature*, 'original genius' here can only be male, despite the similar lack in M. Michelet's writing of 'systematic arrangement and definiteness

of detail' that define work by the 'man of science'. Davenport Adams thus deferentially – that is, stereotypically and prejudicially against the evidence – reinstates M. Michelet automatically as the more serious science writer, presumed never to be female in the added emphasis above. Retrospective reappraisal of female authority in science judged by the lights of the immediacy of her translation can now further be illuminated if her male translator also disseminated male-authored science. Women's science doubled in translation and source text not only shines a main beam on other secondary (and primary) men in their spheres. Women-authored science as non-standard by default also challenges the norms of genre in science, and hence its gendering. In France, women could not publish 'treatises on zoological and physical subjects', because of their exclusion from institutional science training in 'systematic arrangement and definiteness of detail' as quintessential to publishing scientific papers. We return below to the singularities of our women scientific authors' 'individual style'. Their multiple 'worthwhileness' is further revealed by the lights of our other secondary male scientific translators.

Case Study 2. Théodore Lacordaire: The Untranslatable Mme/Mrs as Mr?

The death of M. Michelet epitomizes how important source text authors – in nineteenth-century history, literature and science – establish wider transnational status and biobibliography through commissioned translations. My bracketing of 'man and his' of Michelet above highlights the rarity of treatment commemorating the equivalent 'woman and her' works, especially in science. On the death of Théodore Lacordaire in 1870, Charles Jacques Edouard Morren (1833–86), the eminent Belgian botanist and director of the Jardin Botanique at the University of Liège, immediately published the due *Éloge* (Morren 1870). More than a 'Eulogy', the scientific *Éloge* in France pays expert tribute to eminent men in science, because it is penned by a major scientific successor (m. by default). Its form in France was earlier instituted and perfected by Georges Cuvier. As essential to its commemorative genre, Morren highlights Lacordaire's illustrious mentors, with Cuvier particularly singled out. Indeed, Morren's evidence for Lacordaire's particular debt to Cuvier is the publication in 1833 of the *Mémoires du baron Georges Cuvier*, incorrectly cited as 'Mémoires sur [sic] Georges Cuvier de Mistress Lee' (Morren 1870: 11). The French Wikipedia entry for 'Lacordaire' clearly follows Morren's attribution to him of the *Mémoires*. Yet if Lacordaire is the scientific author, even cursory consultation of the *Mémoires* makes the name 'Mistress Lee' on the spine and covers very hard to explain, except as a clear example of not-so-unconscious bias. In recently correcting this major misidentification (Orr 2020, also reproducing the digitally open access inside title page), I reinstated the female author to her rightful, if unusual, place in French history of science in 1833. The Lacordaire case (and lessons of

Wikipedia citation), however, exemplifies how a woman author of science disappears even when her work is also translated immediately. Such disproof from evidence – the untranslatability of Mme/Mrs/Mistress in the section subtitle – stems from accepted fact. Even a published woman author of science cannot be an eminent authority according to French and British norms in 1833. As exemplified in the Lacordaire case, such anomaly and impossibility in plain sight is writ particularly large by the cover of the target text, as also revelatory of the similar reception of the source text.

Moreover, the publisher of the French *Mémoires* was no minor French editor. In 1829, 'H. Fournier' founded and published the rival *Revue de Paris* [Paris Review] and *Revue des Deux Mondes* [Review of Two Worlds], both journals disseminating the latest French cultural and scientific knowledge. But H. Fournier also authored the *Traité de la typographie* [Treatise on Typography] in 1825, a definitive manual on typesetting and letter presses. Interestingly, the title page of the French *Mémoires* clearly centres the larger-case 'Lacordaire' as more immediately apprehensible 'author' than the smaller-case 'Mistress Lee' tucked beneath the largest-case 'Georges Cuvier' (title subject). Moreover, both Cuvier and Lacordaire have their particularizing first names in print, whereas the equivalent defining first name for 'Mistress Lee' is undisclosed. But the French title page compounds the ambiguities that lead to Morren's misquotation 'mémoires du ['sur'] Baron Georges Cuvier' – of/by [on] Baron Cuvier – and misidentification of authorship. In apposition to Lacordaire's name thanks to the typesetting is the qualification '[…] sur les documens fournis par sa famille' [on documents provided by his, that is Cuvier's, family]. These documents were provided to Mistress Lee, not Lacordaire, for her to publish the *Memoirs/Mémoires*. Nowhere is Lacordaire's status as the translator clarified, on inside title pages or in a separate translator's preface. The French reader thus launches into Lacordaire's translation, mistaking as *his* introduction what is Lee's unsignalled preface (because unsigned at the end). Indeed, she deploys modesty topos conventions in the introduction to the English and American versions, to justify why a British woman foreigner in Paris penned it with authority, by further vouching for it via her named first husband: Mrs (R.) Lee was 'formerly Mrs T. Edward Bowdich' (on the London and New York title pages, also available online open access). When stumbling on the Bowdich names in the preface-introduction, the French reader of the *Mémoires* could only be confused if its authorship was by Lacordaire. Clearly, Morren (and the French Wikipedia author) did not check the basic (counter-)facts of the covers.

Although *Mrs* R. Lee is unambiguously centred as the author on the title pages of the English source text(s) – and doubly as '(formerly Mrs T. Ed. Bowdich)' below her second married name – the history of British as well as French science overlooks the multiple evidence of her authorship as

authority. A male author or translator of science, however major or minor, never encounters similar disadvantage or ambiguity of title: 'Mr' or 'M.' covers lifelong agency and status, whereas a woman author slips even further from view if she changes her married/widowed name in print, including in translation. The problem is especially compounded where she has already published in different genres or, more unusually still, in a number of different science domains. In this case, however, the reputation in scientific publication of 'Mistress Lee' in various domains and genres disqualifies her penning of the *Memoirs* of Cuvier, whereas Lacordaire's extensive scientific expertise in entomology is the assumed reputational basis, and hence attribution of authorship to their French edition. The protocols of the French scientific *Éloge* presuppose the author to be the eminent scientific disciple (assumed m.) lauding a mentor (m. also automatically assumed). No woman in science in France, whether in 1833 or 1870, could therefore qualify as its author, not even as the (scientific) wife, daughter or sister in the man's fields.

But we cannot discredit Lacordaire for any failure to clarify his status as the translator of Lee's *Mémoires* in 1833, and hence for forging his name on her work in 1833. Unusually, his assiduously faithful translation of her text compounds the problem: his non-intervention extends to the complete absence of explanatory translator's notes. The greater critical omission regarding both the author and the translator of the *Memoirs/Mémoires* by Mrs/Mistress Lee is therefore the simultaneous appearance in 1833 in British, American, and French versions of this first official biography of Cuvier immediately upon his death in 1832. Her work is therefore an *Éloge* in transnational guise. Cuvier's uneasy victory in the 1832 'Querelle des Analogues' [Quarrel of the Analogues] over Etienne Geoffroy Saint-Hilaire had further divided opinion among his scientific peers at the *Muséum National d'Histoire Naturelle* [National Natural History Museum] in Paris, meaning that upon Cuvier's unexpected death none stepped up to the task of writing his official *Éloge*. Consequently, Lee's important disquisition-memoir in French and English in lieu remained relegated to the very smallest type of minor footnotes in definitive modern biographies of Cuvier in English and French (Rudwick 1997; Taquet 2006), until my own intervention in French history of science (Orr 2020). Like Morren, these expert scientists and historians of science had registered the existence of 'Mrs/Mistress Lee', only to dismiss her (the work) by modern scientific conventions already firmly ingrained by 1870. For Cuvier in 1832, by contrast, science had neither sex nor nationality. His wife and his stepdaughter Sophie Duvaucel were therefore as instrumental in the hosting of international and French scientific and literary guests at 'his' Saturday salon as in their commissioning of the uniquely-placed Sarah Bowdich Lee to write the *Memoirs* for scientific and public audiences on both sides of the Channel and the Atlantic. Lacordaire's secondary place as the commissioned French-Belgian translator also outside the 1832 'Querelle' can now be

additionally acknowledged here for the first time in his unusual promotion of 'Mistress Lee' in Cuvier's life and works including the *Mémoires*. 'Lee 1833' therefore encapsulates afresh this watershed date in French as well as British history of science. William Whewell's well-known coinage that year of the word 'scientist' arose because no English equivalent existed to the French 'homme scientifique' [man of science]: a 'femme scientifique' [woman of science] equivalent was altogether unthinkable in either nation. Our final case study therefore examines translation of women-authored science before 1830, to establish their longer primary positionings and seminal interventions in nineteenth-century Nature translated.

Case Study 3. Gerson Hesse (n.d.): Cross-Channelling the spectral 'Mrs Mary Trumer' [sic] (1828)

When surveying ichthyology manuals published in early nineteenth-century France (before and after Cuvier's *Règne Animal* [The Animal Kingdom] of 1817, which reclassified fish as vertebrates) some ten years ago at the *Bibliothèque Nationale* (BNF – French National Library), I was pleased to find, consult, and note the *Abrégé d'histoire naturelle* [Synopsis of Natural History] (1828) by Mrs Mary Trumer [sic] as an unusual British woman in science among them. This chapter only now tackles its material rarity as part of widespread critical occlusion of women's work in science, including in translation before 1860. Recent Covid-19 lockdowns and copyright library/archive closures only made more tangible the ideological miss or hit of national text-digitization policies concerning such already buried materials. In 2021, 'Trumer' was now also consultable in the BNF Gallica free online collections, only because I knew what title to put in the 'search' box. I had to wait until late August 2021, however, for Special Collections at the University of St Andrews to reopen, to consult its first edition of 1824 of Mrs Mary Trimmer's *Natural History of the most Remarkable Quadrupeds, Birds, Fishes, Serpents, Reptiles and Insects* (Trimmer 1824: only the second edition of 1825 is available online open access). The paradoxical materiality of Trimmer's tiny (*in octavo*) leather-bound two-volume edition of 1824 set against the specular/virtual target text magnified on my laptop screen only ramifies the importance of the key questions and methodology in the flow chart in Figure 11.1 above. Despite the shadowiness of both figures, the source and target texts configure the larger apprehensible agency of their woman author and her male translator in dialogue. The absence of key biography in both cases directly challenges the norms of standard author entry in national biographies, and importance in copyright library catalogues (and wiki-spheres). Through advanced electronic searching by title, I could also locate Trimmer's English source text as trace mention in Anglophone critical study. Harriet Ritvo (1985) identified it as women's

science writing for children, but in a move redolent of Rudwick and Taquet on 'Mrs Lee', Trimmer is named only to be disambiguated from the prolific Mrs Sarah Trimmer (1741–1810) of the Sunday School movement, who wrote to encourage children in their religious instruction including good animal welfare. Mary Trimmer's very different science instruction through interspersed 'Anecdotes' unusually puts God elsewhere, as 'The Creator'. Such 'unexpected truth about animals' (Cooke 2017) in Trimmer's entry on Vampire Bats newly confirms her work as a still collectable scientific reference. The clear warning in the catalogue for the 1966 exhibition, 'Science in Nineteenth-Century Children's Books' stood in clear contrast: 'This natural history for children, first published in 1825, is a double example of plagiarism. The author borrowed her pseudonym from the most famous of English didactic writers, Sarah Trimmer, and the illustrations and some of the text from Thomas Bewick's natural histories'. The intriguing importance of the work by Trimmer/'Trumer' had also not been illuminated in publisher marketing for specific audiences, either by Thomas Tegg, her British publisher – known for exploiting 'the reprint and remainder trade' (Barnes and Barnes 2000) – or by L. Carez, the publisher of the French translation. As the two-volume title pages convey in Appendix 3, however, their source and target readerships are presumed to have wide interests in and knowledge of (world) natural history in all classes. We only glimpse the potential enormity of Trimmer's work outlining the 'most remarkable' of these in the additional cover information to the second volume, 'embellished with upwards of 300 elegant engravings on wood by Mr S. Williams' (see Appendix 3). Like Giocomelli, Samuel Williams (1788–1853) was known for the quality of his engravings, moving to London in 1819, because his work was in high demand by its many publishers. Trimmer's is therefore no double plagiarism or minor undertaking by author or publisher in text and accompanying image: she describes some 350 different animals, each entry longer than half a page. But the target text further magnifies Trimmer's work. It is first an 'Abrégé' or abridged Natural History, the French title also qualifying the genre through the term 'Description'. Used for factual entries in encyclopaedias, for example, the format offers its educated reader salient information regarding specific identificatory features and details but avoids over-technical terminology and jargon. Such subject matter would then necessitate a translator-*vulgarisateur* with similar specialist knowledge. Hesse's expert 1828 translation is therefore particularly valuable for its four-page translator's preface – the longest of our three examples – as part of *his* larger writing projects that were to make his name in France. Space permits only three points of interest among many, because they also relate to findings above. First, Hesse makes his position as Translator omni-visible from the outset as the principal agent-interpreter for the text's French publics. He clearly lauds the author's 'broad-brush' approach – the 'traits principaux' [main

identifiers] and 'grandes nuances' [main variations] – that distinguish similar species, to make the chief interest of the work the 'moeurs et habitudes' [habits and customs] of animals, not their more technical classification or anatomy (Trumer 1828: v). For Hesse, the (French) reader should therefore appreciate the anecdotal colour of the descriptions, rather than expect the scientific expertise expressly specified as equalling the 'patrie' [patrimony] of 'Buffon, Daubenton, des [sic] Montbeillard et Lacépède' (Trumer 1828: v). If Hesse therefore sets himself up for his enterprise as the discerning arbiter-interpreter and expert historian of late eighteenth- and early nineteenth-century French natural history, he further positions himself as the discerning book historian. The interest of the text by 'Trumer' is almost less for the extensive coverage of her subject matter and more for its quality illustrations. As with Davenport Adams's preface to *Nature*, the main middle section of Hesse's is devoted to the 'art typographique' [image reproduction] of the work, as exemplified in European and recent British engraving (Trumer 1828: vi–vii). Although Samuel Williams is never named, Hesse provides advance notice to his French reader that the engravings by an English 'athlète infatigable' [untiring athlete] have almost been surpassed in their reproductions by M. Carez in the best, that is clearly Germanic, publishing tradition of Gutenberg (Trumer 1828: viii). Finally, Hesse tucks in his justification for 'small infidelities' to the esteemed author's original text. He deliberately changed two or three articles of interest only to British readers, to replace them with more general details drawn from 'sources nationales' [national sources], that is the same French 'patrie' above (Trumer 1828: viii). In short, Hesse presents himself as a translator-*vulgarisateur* of polymathic expertise in his host culture; the author, her text, and its illustrations are his soap-box.

Careful cross-checking of source and target texts reveals that Hesse faithfully covers (almost) all of Trimmer's descriptions to the letter, abbreviating or sometimes reordering paragraphs in some. His new writing is indeed delimited to a couple of entries, concerning fish catches and techniques. He also makes delightful scientific translation slips by placing some animals mistakenly in 'Irlande' [Ireland] rather than 'Islande' [Iceland]. Hesse's translation is then no 'Abrégé', but the textual reproduction of Trimmer's work in its entirety for French audiences. In consequence, it is no small translation undertaking given the very specific challenges of linguistic equivalence in animal, and especially bird naming – birds take up the main space over both volumes – were the authority, accuracy or wide natural history interest of Mary Trimmer's source text to be problematic. For Hesse, as for the other male translators in this study, very primary reasons clearly motivate the high reputational stakes of translating (and publishing) women-authored natural history and science endeavour. Such otherwise occluded source texts by women in science then compel fresh examination, because their contributions are further illuminated by their cross-cultural significance as target

texts. The individuality and potential originality of scientific approach in woman-authored science, as well as her genre choice and style in the source text, are further magnified in the translation.

Athénaïs Michelet's *Nature* was no less political in undertaking its study very strikingly as a work directly responding to the French national defeat in 1870. It also configures what I can only term France's larger 'natural defeat', embodied by French Second Empire industrialization, urbanization, and concomitant provincial and colonial spoliation. In radical, neo-Romantic, advocacy for the world's interconnected natural environments as epitomized in France, particularly its lost tree species in every habitat (for example, Michelet 1872: 123–30), Athénaïs calls out their relentless destructions by humankind for the unseen impacts on the greater schemes of Earth and Sea through the intermediating environments of rivers and lakes for all forms of biological (including human) life. If she is therefore an 'environmentalist' *avant la lettre* in this and other passages advocating the preservation of natural ecological beauty and opposition to human industrial destruction, *Nature* is no manifesto configured by Cartesian argument. Rather, Athénaïs weaves the biography of her life in science endeavour with this biography of Nature, to inspire its greater wonder, poetical as well as scientific. Her mode of viewing is through the intellectual advocacy of her passions, fed by the curiosities of an omnivorous and intelligent autodidact: Athénaïs is a keen empirical observer and informed describer of her natural worlds, for their large and small environmental changes. An indicative passage (Michelet 1872: 23) capturing the unusual non-dualism in her view of Nature is then (mis)represented by Giocomelli's image of women in a meadow at leisure rather than botanizing. But Athénaïs's underlying worldview is panentheistic rather than pantheistic (the term often applied to Michelet's nature books), since the God in and beyond Nature for Athénaïs is of the Universe, of which humans are but very small parts in natural worlds. Trimmer's worldview is interestingly similar (and unusual). Athénaïs's many references to Humboldt in *Nature*, including to his *Kosmos*, therefore elucidate the latter by rediscovering his German 'Naturphilosophie' [Natural Philosophy] in her own optics and terms. In interpreting and rewriting the Prussian's *Kosmos* for reapplication in 1870 to contemporary French non-military contexts – the Franco-Prussian War and defeat of France is even now still etched on the French national psyche – Athénaïs also adapts Humboldt's scientific bilingualism (in German and French) in 'creole' mode, that is multilinguistic interlocution. Although born in France in 1826, Athénaïs Mialaret was of French creole stock, her father being secretary to Toussaint Louverture, leader of the 1801 Haitian Revolution. Paradoxically it takes an English audience steeped in their English and Colonial Gardens, Walter Scott, and Lake poetry to receive her revolutionary work of Nature translated in 1872, in which informed poetic science can look beyond national and natural

destruction and the specialist scientific publication, to their larger biodiverse future and culturally intermixed expression.

In the French, Sarah Bowdich Lee's *Mémoires du baron Georges Cuvier* are limpid, measured, and poised in their (genderless) scientific prose. It better illuminates her model for her English text, Cuvier's style of scientific writing. In thus taking on the *Éloge* of Cuvier in equivalent generic and linguistic terms as an unusual (British woman) outsider and insider to his worlds – the first and second parts of her work seamlessly undertake the requisite survey of the Great Life/Great Works as if she were his French scientific peer – Mistress/Mrs Lee adapts the memoir form fully cognisant of its biographical and scientific meanings in both English and French. Her definitive biography discussing Cuvier's works closes by listing his many scientific treatises, or 'mémoires' in French. But she then surpasses any *Éloge* that Lacordaire (or Cuvier himself) might have penned in part three. In advocating there for Cuvier's many public roles when their accumulation had caused public ire in France, Lee especially targets his wider legacies and services to science education. The entirely new departure from the French *Éloge* and British *Memoir* comprises its fourth and final part, her intimate, yet scientific (participant) observations of Cuvier the family man at home. By thus inserting herself *in cameo* into the insider (female) science circles of Cuvier's biography, Lee overtly also acknowledges the work's commissioning and facilitation by Madame Cuvier and her daughter Sophie Duvaucel. Only they could uniquely gauge the courage and scientific conviction of their informed English woman friend ably prepared to take on the French scientific establishment by knowingly writing the English 'Éloge' expressly in translation for its French contexts and audiences. Mistress/Mrs Lee's work thus creatively expands Cuvier's unchanging formula for the scientific *Éloge* – replicated by Morren in 1870 – by observing and commemorating him distinctively in the very legacy that he had established in genre and style.

Of the 'most remarkable' creatures in Trimmer/'Trumer', the singular, anomalous, and 'Anonymous Animal' (Trumer 1828: I, 103) is immediately striking for the referent of its illustration – the Sloth (Berrens 2020) – as well as for its symbolic and representational force conjuring up the author herself. As a reader for missing women in transnational science, I am alert to identifying their work through image as well as text (Orr 2021b). I knew of such an 'animal anonyme' in the *Natural History* of Georges-Louis Leclerc de Buffon (1797–1788). Had Trimmer read the French, or consulted its translation into English, *Natural History, General and Particular, by the Count de Buffon* by William Smellie? Was Hesse's in fact a back-translation of Buffon? Neither the image nor his text concerning the animal – 'which we shall call anonymous, till we learn its real name, has some similarities to the hare, and others to the squirrel. Mr Bruce gave the following account of it in writing' (Smellie 1785: 283–4) – matched the bear-like creature in Trimmer/'Trumer'.

The depiction/description in Trimmer/'Trumer' then confirms the originals of so many of the others that the engraver, Samuel Williams, copied for the English edition of her *Natural History*. He took them from *A General History of Quadrupeds* by the renowned animal and bird illustrator, and woodcut engraver, Thomas Bewick (1753–1828). Trimmer/Trumer's two-volume work and translation in 1824/1828 are then of particular interest as a portable, and richly illustrated, compendium ('abrégé') – and no 'plagiarism' – of Bewick's works as rivalling Buffon. In comprehensiveness, Trimmer's quadrupeds and birds include recent discoveries such as the Duck-Billed Platypus, according to pre-Cuvierian classification for 'Quadrupeds' and 'Fishes'. Her eminently accessible source and target texts therefore appear in Britain and France on the cusp of a classificatory 'Quarrel of the Analogues' (culminating in the Cuvier: St-Hilaire debacle of that name in 1832). Rival and compatible taxonomies in the 1820s of Linnean, Cuvierian, and other classification systems jostled for onward scientific attention and afterlives (expert and public). The publishers and format of Trimmer/'Trumer' then confirm her pitch and clear style. Her ambitious project was for informed general rather than expert audiences. That her target readerships would automatically include women is a further measure of her understanding of her multi-species corpus and abilities in conveying its salient features in short, clear, encyclopaedia-style articles. The particular dearth in the 1820s of readily accessible, illustrated, pocket editions – including of Buffon – on world natural history then makes Trimmer/'Trumer' a standout author of (trans)national importance, but especially in French history of science and book history. An English woman in French translation filled a major market gap in 1828 by also supplying a model for vulgarization of Nature in text and image in France. Louis Figuier, among others, was still in short trousers, or rather the dresses worn by children of both sexes in the period. The significance of women's work in science therefore co-depends vitally on her material textual productions magnified by their translations. In natural history, the Mistress on title pages proves to be a most able Mistress of the Nature that she surveys. Such evidence in the shadowy Trimmer/'Trumer' indicatively brings women in science out of the shadows, to correct their (non) record in the trajectory of Positivist, Whig, and current (leaky) pipeline models for science production.

Conclusions

Our three case studies therefore amply demonstrate the fruitfulness of studying women's science in the long nineteenth century through the clarifying optics of its translation, to identify hitherto unacknowledged primary women variously contributing to scientific fields in the period. In also turning even the best gender and national history of science research since the

1980s inside out and upside down, scientific translation can now reveal an even larger roster of women in science as primary as well as secondary translators of Nature (Martin 2018): 'Mrs/Mistress Lee' also translated works of French science, to adapt them to her new purposes by intermediating and directly contributing to international endeavour (Orr 2015).

To uncover and better understand women's primary productions in science also in translation is therefore to pay closer attention to texts rather than persons. The lack of portrait or biographical information for two of the three women studied in this chapter proves no excuse for not probing their rich textual legacies, especially in translation, but also in illustration. Indeed, the 'Trumer'-Hesse case in word and image particularly confirmed how the identification of non-standard players and intermediators – because without biography – encourages a larger scoping of comparative history of science. This impels more inclusive, critical, and adventurous reappraisal of post-1980s as well as nineteenth-century grand narratives of scientific discovery. Science in translation therefore spearheads extensive renewal of research in translation studies, history of science, and history of the book.

But this chapter also proposes through its results the urgent need to study women's science translated by secondary men in their fields, to recuperate an even fuller picture of Nature translated that is unbound from national institutional science models and from tunnel vision for professional advances in scientific knowledge. Our methodology equally brought to light occluded secondary men in science endeavour, and as conduits of women penning works of nineteenth-century science and natural history. The key lesson is therefore to take much more seriously a woman author's name on the covers of a science source text also with target version(s). The economic as well as intellectual importance of such woman-authored work illuminates her 'worthwhileness' for scientific publication, because endorsed in at least two cultural contexts. It will additionally be determined by knowledge of who her translator was and, if commissioned, his wider standing alongside commissioned (male) illustrators. The publisher behind such ventures – as we saw with Nelson – has major vested reputational interests when including women in science (in translation) in key lists or series.

But the related lesson is multi-contextual, multi-disciplinary, and multimedial. A woman's work in science that is also translated (and illustrated) provides an invaluable lens for cross-cultural evaluation, and re-evaluation of the reception of science beyond official-popular binary categorizations. In the long nineteenth century, rare were the women who could publish treatises in official transactions. To then condemn their primary contributions as (mere) popularization has proven in this chapter to beg much larger questions of the disseminators of scientific knowledge. We have uncovered expert scientific 'vulgarisation' (in the French sense) at work in other words and language contexts in the persons and forms of primary women, and

their secondary men translators. They now better highlight the (false) exclusiveness and automatically exclusionary genres of the scientific paper and the French *Éloge* that police official forms of (professional) science.

New insights into women-authored science works have additionally come in this chapter through their own and their translator's preface if by a man. More comparative work on translator prefaces of scientific works will follow up on the potential patterns discovered here in those by Davenport Adams and Hesse, and in Lacordaire's striking non-interventions. Hesse also provides a salient example of trilingual scientific translation expertise that neatly returns the chapter to its simple initial question determining our translingual methodology: was the text translated into other languages (plural), and if so by whom? As a first step, this question sets many new agendas for study of (nineteenth-century) Nature translated. They include renewed attention to hybrid genres and allegedly secondary figures and publication forms. It is then not counter-intuitive to engage first with nineteenth-century scientific translation, rather than the source text, or to read the nineteenth century anti-chronologically when it comes to discovering unheralded primary women in science as revelatory also of singular secondary men, perhaps especially for the period before 1860, but thereafter as well. The most productive conclusion that this chapter can advocate is the concerted testing and reapplication of its translingual translation methodology to other scientific cultures and periods. Scholars of similar and different scientific corpora can then better promote the many Mistresses, Mesdames, Signoras etc. in science of the past, who turn into primary contributors thanks to their works in translation, especially when undertaken by important secondary men figure in their fields of endeavour. Researchers of science translation and transnational history of science may then find the answer to this chapter's larger question: what constitutes an 'easy career' for a woman in science, so that she does not constantly have to make her name(s), authority, and contributions to knowledge?

Note

1 All translations are by the author unless otherwise indicated.

References

Abir-Am, Pnina G., and Dorinda Outram (eds). 1987. *Uneasy Careers and Intimate Lives: Women in Science, 1789–1979*. New Brunswick: Rutgers University Press.

Allen, David Elliston. 1976. *The Naturalist in Britain*. London: Allen Lane.

Barnes, James J., and Patience P. Barnes. 2000. 'Reassessing the Reputation of Thomas Tegg, London Publisher, 1776–1846', *Book History* 3: 45–60.

Bensaude-Vincent, Bernadette. 1995. 'A Public for Science. The Rapid Growth of Popularization in Nineteenth Century France', *Réseaux. The French Journal of Communication* 3(1): 75–92. URL: https://www.persee.fr/docAsPDF/reso_0969-9864_1995_num_3_1_3290.pdf (accessed 14 March 2022)

Berrens, Dominik. 2020. 'Naming an Unknown Animal: The Case of the Sloth (Folivora)', *Archives of Natural History* 47(2): 325–43.
Cooke, Lucy. 2017. *The Unexpected Truth about Animals: A Menagerie of the Misunderstood*. New York: Doubleday.
Davenport Adams, W. H. 1883. *Celebrated Women Travellers of the Nineteenth Century*. London: W. S. Sonnenschein.
Lee, Mistress. 1833. *Mémoires du baron Georges Cuvier*. Paris: H. Fournier.
Lightman, Bernard. 2007. *Victorian Popularizers of Science: Designing Nature for New Audiences*. Chicago: Chicago University Press.
Martin, Alison E. 2018. *Nature Translated: Alexander von Humboldt's Works in Nineteenth-Century Britain*. Edinburgh: Edinburgh University Press.
Michelet, Madame (Athénaïs). 1872. *Nature, or The Poetry of Earth and Sea*. Trans. W. H. Davenport Adams. London: T. Nelson & Sons.
Michelet, (Monsieur) Jules. 1875. *The Sea*. Trans. W. H. Davenport Adams. London: T. Nelson & Sons.
Morren, Édouard. 1870. *Éloge de Jean-Théodore Lacordaire*. Liège: J. Desoer.
Onslow, Barbara. 2017. 'Gendered Production: Annuals and Gift Books', in Joanne Shattock (ed.), *Journalism and the Periodical Press in Nineteenth-Century Britain*, pp. 66–83. Cambridge: Cambridge University Press.
Orr, Mary. 2015. 'The Stuff of Translation and Independent Female Scientific Authorship: The Case of *Taxidermy* (1820) by Mrs R. Lee', in Alison E. Martin (ed.), 'Ingenious Minds: British Women as Facilitators of Scientific Knowledge Exchange, 1750–1900', *JLS* 8(1): 27–48.
Orr, Mary. 2020. 'Les *Mémoires du baron Georges Cuvier* (1833) de Mistress Lee: mémoires scientifiques, pacte biographique, ou réécriture des savoirs?', in Thomas Klinkert and Gisèle Séginger (eds), *Littérature française et savoirs biologiques au XIX^e^ Siècle: Traduction, transmission, transposition*, pp. 183–200. Berlin and Boston: de Gruyter Open Access.
Orr, Mary. 2021a. 'Napoleon's Campaigns: Models for French Revolutionary Science Abroad and at Home?', in Seán Allan and Jeffrey L. High (eds), *Inspiration Bonaparte? German Culture and Napoleonic Occupation*, pp. 214–36. Rochester NY: Camden House.
Orr, Mary. 2021b. 'Collecting Women in Geology: Opening the International Case of a Scottish "Cabinétière", Eliza Gordon Cumming (1815–1842)', in Cynthia Burek and Bettie M. Higgs (eds), *Celebrating 100 Years of Female Fellowship of the Geological Society: Discovering Forgotten Histories,* pp. 63–73. London: The Geological Society, Special Publications, 506.
Orr, Mary. 2022. 'Catalysts, Compilers and Expositors: Rethinking Women's Pivotal Contributions in Nineteenth-Century "Physical Sciences"', in Claire G. Jones, Alison E. Martin, and Alexis Wolf (eds), *The Palgrave Handbook of Women and Science since 1660*, pp. 505–28. Cham: Palgrave Macmillan/Springer.
Pell, Alice N. 1996. 'Fixing the Leaky Pipeline: Women Scientists in Academia', *Journal of Animal Science* 74: 2843–8.
Poovey, Mary. 1984. *The Proper Lady and the Woman Writer: Ideology as Style in the Works of Mary Wollstonecraft, Mary Shelley, and Jane Austen*. Chicago: Chicago University Press.
Ritvo, Harriet. 1985. 'Learning from Animals: Natural History for Children in the Eighteenth and Nineteenth Centuries', *Children's Literature* 13: 72–93.
Rudwick, Martin J. S. 1966. 'Science in Nineteenth-Century Children's Books'. *An Exhibition based on the Encyclopaedia Britannica Historical Collection of Books for Children, in the University of Chicago Library held during the Celebration of the University's Seventy-Fifth Anniversary Year*. URL: http://

storage.lib.uchicago.edu/pres/2011/pres2011-0082.pdf (accessed 14 March 2022)

Rudwick, Martin J. S. 1997. *Georges Cuvier, Fossil Bones and Geological Catastrophes: New Translations and Interpretations of Primary Texts*. Chicago: Chicago University Press.

Smellie, William. 1785. Trans. *Natural History, General and Particular, by the Count de Buffon*, second edition, vol. 1. London: W. Strachan and T. Cadell.

Taquet, Philippe. 2006. *Georges Cuvier.* Paris: Odile Jacob.

Tate, Gregory. 2020. *Nineteenth-Century Poetry and the Physical Sciences: Poetical Matter.* Cham: Palgrave Macmillan/Springer.

Trimmer, Mary. 1824. *Natural History of the most Remarkable Quadrupeds, Birds, Fishes, Serpents, Reptiles and Insects*. London: Thomas Tegg, 2 vols.

Trumer [sic], Mary. 1828. *Abrégé d'histoire naturelle, contenant la description des principaux quadrupèdes, oiseaux, poissons, serpents, reptiles et insectes*. Trans. M. Gerson Hesse. Toul: L. Carez, 2 vols.

Ysseldyk, Renate, Katharine H. Greenaway, Elena Hassinger, Sarah Zutrauen, Jana Lintz, Maya P. Bhatia, Margaret Frye, Else Starkenburg, and Vera Tai. 2019. 'A Leak in the Academic Pipeline: Identity and Health among Postdoctoral Women', *Frontiers in Psychology* 10. URL: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01297/full– (accessed 14 March 2022)

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