Linnaeus' restless system: Translation as textual engineering in eighteenth-century botany

Bettina Dietz
Hong Kong Baptist University, bdietz@hkbu.edu.hk

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Linnaeus’ Restless System: Translation as Textual Engineering
in Eighteenth-Century Botany

BETTINA DIETZ
Hong Kong
Email: bdietz@hkbu.edu.hk

Abstract
In this essay, translations of Linnaeus’ *Systema naturae* into various European languages will be placed into the context of successively expanded editions of Linnaeus’ writings. The ambition and intention of most translators was not only to make the *Systema naturae* accessible for practical botanical use by a wider readership, but also to supplement and correct it, and thus to shape it. By recruiting more users, translations made a significant contribution to keeping the *Systema* up to date and thus maintaining its practical value for decades. The need to incorporate countless additions and corrections into an existing text, to document their provenance, to identify inconsistencies, and to refer to relevant observations, descriptions, and illustrations in the botanical literature all helped to develop and refine techniques of textual montage. This form of textual engineering, becoming increasingly complex with each translation cycle, shaped the external appearance of new editions of the *Systema*, and reflected the modular architecture of a botanical system designed for expansion.

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I. Introduction

A central aspect of Linnaeus’ method of working was to collect information from other botanists and, giving a reference to the source in each case, to integrate it into his own writings.¹ Reviews of Linnaeus’ works in eighteenth-century scholarly journals confirm that, given the size of the task in hand, contemporaries regarded this contributory principle as indispensable and efficient. A review of the thirteenth Latin edition of Linnaeus’ *Systema naturae* (1788–93) in the journal *Allgemeine deutsche Bibliothek* reflected this consensus. It pointed out that many new species had been discovered in the twenty-two years since the publication of the last edition (1766), and that numerous errors had been corrected in this time. All this would now at last, the reviewer said, go into an updated version of the *Systema.*² But as another reviewer commented, while the Linnaean system, despite unavoidable errors and gaps, was undoubtedly the most complete and therefore most widely used: ‘what good does it do enthusiasts who either understand no Latin, or at least no Linnaean Latin. These must stand thirsty at the spring.’³

These “enthusiasts” were the audience – a contribution to the *Berlinische Sammlungen* of 1770 described natural history as ‘the favourite subject of study for the educated and uneducated alike’⁴ – at which the successively published translations of the *Systema naturae* from Latin into various European national languages were addressed. It was translated first, and most frequently by far, into German; other languages followed.

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² Anonymous review of *Carolii a Linné ... Systema naturae per regna tria naturae ... Tom. 1. Editio decima tertia, aucta, reformata: cura Jo. Frid. Gmelin ..., Leipzig 1788,* in *Allgemeine Deutsche Bibliothek* 88/2 (1789), 192–4, at 193: ‘Wer es weiß, was die Naturgeschichte binnen dieser Zeit ... für Riesenschritte gethan; wie viele neue Entdeckungen ... in Europa sowohl als in Afrika und Amerika und in den neuentdeckten Südländern gemacht; wie manche – selbst Linneische Irrthümer – durch richtigere Beobachtungen relegiert, und wie manche Hypothesen durch untrügliche Fakta in wahre Naturgeschichte verwandelt sind: der wird sich freuen, mit einer neuen Ausgabe des Linneischen Natursystems beschenkt zu seyn.’
³ Anonymous review of *Des Ritters Karl von Linne vollständiges Natursystem, nach der 12ten lateinischen Ausgabe ... ausgefertiget von Phil. Ludw. Status Müller ..., Nürnberg 1773–74,* in *Deutscher Merkur* 7 (1774), 380f., at 381: ‘Was half es aber Liebhabern, die entweder gar kein Latein, oder wenigstens kein Linneisches verstanden. Diese mußten vor der Quelle dursten.’
In order to contextualize the questions to be asked below, two reference axes can be drawn. On the one hand, the continuing dominance of object-related studies in the field of natural history will be referenced; on the other, the forms and practices of information management that are attracting increasing attention in both intellectual history and the history of science will be outlined.

While historians of science interested in natural history have long concentrated on intellectual history questions and the oeuvre of well-known scholars, the ‘object turn’ made it possible to do justice to the fact that natural history was the early modern science with possibly the largest inventory of objects, without which its knowledge-making process cannot be adequately described. Natural history collections, cabinets, and museums were explored as a theme, as were the collecting of natural objects on overseas expeditions or in the context of local excursions, and, finally, the essential practices of transporting and exchanging natural objects.


objects within the framework of commercial and epistolary networks. Although the exploration of these themes has undoubtedly lifted research on to a new level, it should be noted that the continuing fascination with the object world of natural history means that questions of scientific textuality, including the so far almost untouched topic of translation, have long been marginalized.

But signs are emerging that this trend is being reversed. There is a growing interest in looking at ways of managing information within various historical and disciplinary contexts. Inspired by such contemporary phenomena as electronic data processing, information overload, and data driven science, this interest applies especially to early modern techniques of collecting, organizing, processing, and sharing data. It stands to reason that natural history, and botany in particular, as the early modern discipline with presumably the greatest need for information, is attracting special interest. After Brian Ogilvie, Staffan Müller-Wille and Isabelle Charmentier address the phenomenon of information overload specifically in relation to Linnaeus’ strategies for dealing with this problem in the context of his own process of writing. They focus on the paper technologies that allowed Linnaeus to organize the huge growth in information on hitherto unknown species. The present author also deals with Linnaeus’

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10 On this see the Introduction to this Special Issue.

information management, but from a different angle. She looks at the whole information system of botany, based on correspondence, at whose centre Linnaeus had established himself, discusses strategies of communicating and sharing botanical information, analyses Linnaeus’ method of working as fundamentally collaborative, and derives from this the iterative nature of Linnaeus’ constantly supplemented and corrected publications.\textsuperscript{12}

In this essay, translations of Linnaeus’ \textit{Systema naturae} into various European languages will be placed into the context of this dynamic of successively expanded editions of Linnaeus’ writings. The ambition and intention of most translators was not only to make the \textit{Systema naturae} accessible for practical botanical use by a wider readership, but also to supplement and correct it, and thus to shape it. Translations of the \textit{Systema} therefore display different information profiles, specific to each target audience.

By recruiting more users, translations also made a significant contribution to keeping the \textit{Systema} up to date and thus maintaining its practical value for decades. The need to incorporate countless additions and corrections into an existing text, to document their provenance, to identify inconsistencies, and to refer to relevant observations, descriptions, and illustrations in the botanical literature all helped to develop and refine techniques of textual montage. This form of textual engineering, becoming increasingly complex with each translation cycle, shaped the external appearance of new editions of the \textit{Systema}, and reflected the modular architecture of a botanical system designed for expansion.

\section*{II. Updating and supplementing}

Linnaeus (1707-1778) and his Fact-Gathering Strategies\textsuperscript{7}, \textit{Working Papers on the Nature of Evidence}, Department of Economic History, London School of Economics, 1-46, \url{http://eprints.lse.ac.uk/47386}.


\textsuperscript{12} See Dietz, ‘Contribution and Co-production’.
Between 1773 and 1775, Philipp Ludwig Statius Müller, a zoologist from Erlangen, published the first six volumes of a German translation of the *Systema naturae* under the title: *Des Ritters Carl von Linné ... vollständiges Natursystem, nach der zwölften lateinischen Ausgabe und nach Anleitung des holländischen Houttuynischen Werks mit einer ausführlichen Erklärung ausgefertigt*. As his model, Müller used a monumental pilot project from the Netherlands, Maarten Houttuyn’s *Natuurlyke Historie*. In it, Houttuyn not only translated Linnaeus’ *Systema*, but also supplemented the descriptions, kept to a minimum in the Latin original, with more detailed passages which, as a rule, were taken from the works of other botanists. Although both works addressed an audience of non-specialists, or not-yet-specialists, the trend they initiated is not adequately described as ‘popularization’. After all, translations of Linnaeus into different national languages recruited new users for the *Systema*, and thus generated further additions and corrections from an extended readership. In this sense, Müller explained that mere translations of Linnaeus’ *Systema* or of Houttuyn’s *Natuurlyke Historie* should not be expected of him. He had adopted Linnaeus’ classificatory criteria but had neither reproduced the original literally – Müller used the twelfth edition (1766–8) as a point of reference – nor retained all the descriptions in it. Rather, ‘we

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13 Published in Nuremberg (Soulsby no. 95). The first translation of Linnaeus’ *Systema naturae* was into German and was based on the first edition of 1735: *Caroli Linnaei ... Systema Naturae, sive regna tria naturae systematice proposita per classes, ordines, genera et species = Caroli Linnaei ... Natur-Systema, oder Die in ordentlichem Zusammenhange vorgetragenen drey Reiche der Natur, nach ihren Classen, Ordnungen, Geschlechtern und Arten, in die deutsche Sprache übersetzt, und mit einer Vorrede herausgegeben von Johann Joachim Langen ...* (Halle, 1740; Soulsby no. 47). In addition, a number of bilingual editions of the *Systema* had already been published at this early stage, with the text in Latin and names translated into the respective national language. In 1740 Linnaeus himself brought out an expanded second edition, in whose zoological and mineralogical part he had added Swedish names.


endeavoured, while freely following his system, to make additions, give explanations, and add German names'. Müller described Houttuyn’s compilatory achievement, the comparisons he drew between countless natural history sources, and his selection and insertion of appropriate passages as the inspiration for his own approach. He had retained all the illustrations from Houttuyn’s work, and added more to increase the practical value of his translation. Müller also inserted his own observations and comments, and made changes and corrections where he was sure of himself.

Like other translators, Müller used the Foreword to justify himself. In it he discussed his strategies and documented the changes he had made in the original. Inevitably, he argued, gaps remained in Linnaeus’ system. Often, varieties were listed as species, or species as varieties, but, he pointed out, Linnaeus was already working on a thirteenth edition, which would undoubtedly contain further corrections and additions. Thus Linnaeus was still the driving force behind the cycles of updating that he himself had initiated, but the continuation of his own works, although he was still working on them and did not die until 1778, was no longer left to him alone. Although Müller retained the whole structure of Linnaeus’ twelfth edition unchanged, he explained in the Foreword that, drawing on the most recent publications, he had expressed doubts about some of the genus and species attributions. A separate supplementary volume was planned for corrections, but it would only be compiled after the publication of Linnaeus’ thirteenth edition, so that it would reflect the most recent state of knowledge. But even without waiting for the publication of the thirteenth edition of

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17 Ibid.

18 See Linnaeus’ definition of ‘variety’ in the Philosophia Botanica: ‘The number of varieties is the number of differing plants that are produced from the seed of the same species. A variety is a plant that is changed by an accidental cause: climate, soil, heat, winds, etc., and likewise is restored by a change of soil. Kinds of varieties are size, fullness, curling, colour, savour, and smell.’ (Translation by Stephen Freer, Oxford 2003, 114). On varieties as a source of error in the determination of species see also Staffan Müller-Wille, Botanik und weltweiter Handel: Zur Begründung eines natürlichen Systems der Pflanzen durch Carl von Linné (1707–78) (Berlin, 1999), 284–97.
Linnaeus’ *Systema*, Müller started adding new material from the current international specialist literature. His main sources were the periodicals of the academies in Paris, St Petersburg, Stockholm, as well as of the German academy of sciences, known as the Leopoldina, from which he extracted a large number of observations; Linnaeus’ *Amoenitates Academicae*; and the ‘best travel accounts’, including the first reports written by Linnaeus’ students about their travels in regions that were hardly known, or still completely unknown, to the world of natural history. In addition, he drew information from:

work by Brisson, Buffon, Daubenton, and other important writings that had been published in England or Germany, and his own observations and detailed inspection of various collections and cabinets of natural objects ... Müller stated that, despite taking the utmost care, errors were unavoidable, and asked his readers to draw his attention to them. He would, he said, gratefully accept well-founded pointers. The cooperative procedure perfected by Linnaeus had become such a self-evident necessity that, as can be seen here, it was also applied in translations which were directed at a non-specialist readership.

As the author of one of the first translations of Linnaeus supplemented on a large scale, Müller underlined the structure of the *Systema*, both the original and translations, as a compilation. After Houttuyn’s *Natuurlyke Historie* was denigrated by a reviewer as a

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19 Two editions of the *Systema naturae* are designated the thirteenth. During Linnaeus’ lifetime, the following was published: Caroli a Linné ... *Systema naturae, per regna tria naturae, secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis ... Editio decima tertia*, ad editionem duodecimam reformatam Holmiensem, 3 vols. (Vienna, 1767–70) (Soulsby no. 116; Soulsby notes that this edition is no different from the twelfth except for the lack of Errata at the end). Ten years after Linnaeus’ death, an edition greatly expanded by Johann Friedrich Gmelin was published: Caroli a Linné ... *Systema naturae, per regna tria naturae, secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis ... Editio decima tertia*, aucta, reformata. Cura Jo. Frid. Gmelin, 3 vols. (Leipzig, 1788–93; Soulsby no. 117).

20 E.g. a report by Pehr Kalm on his travels in north America, published in the Swedish original in 1756 and then in German translation as: *Des Herren Peter Kalms ... Beschreibung der Reise, die er nach dem nördlichen Amerika auf den Befehl gedachter Akademie und öffentliche Kosten unternommen hat: eine Übersetzung*, 3 vols. (Gottingen, 1754–64); or Pehr Osbeck’s report of his journey to south China, which was published in Swedish in 1757, and translated first into German (1765) and then from the German version into English (1771).

21 *Des Ritters Carl von Linné ... vollständiges Natursystem*, vol. 1, ‘Vorbericht’ (unpaginated); ‘den Brisson, Buffon, Daubenton, auch andern wichtigen Schriften, die in Engelland oder Deutschland herausgekommen, deßgleichen aus eigenen Beobachtungen und genauer Besichtigung verschiedener Naturalien-Cabinetter ...’
compilation, Müller feared that his own work might be similarly attacked. To guard against this, he asked the remarkable question: ‘What is a system other than a compilation?’

Given that it is ... too trivial for a writer to bring together in his own work what many others have already written; we ask those who so maliciously call Mr Houttuin a compiler for advice: how does one start such a work? As an example we suggest an elephant and rhinoceros, and ask for a description of these animals which contains nothing that Brisson, Buffon, Klein, Aldrovandus, and Johnston have already said.

Müller stresses the essential dependence of natural history descriptions on many sources, and defines them as aggregates of information. Anyone who discredits a translation of Linnaeus’ *Systema naturae* as a compilation, it must be concluded, has not grasped the construction principles of the original and their value.

Contemporary reviews in the learned journals of the eighteenth century were positive about Müller’s *Natursystem*. They hailed it not only as a welcome German translation of the Latin original, but also as the first version, extended by explanations and detailed descriptions, for German non-specialists. They emphasized the status of natural history as the passion of a generation which, as a result of Linnaeus’ work, ‘has become almost universal in our days, gripping not only the educated, but also the uneducated of all classes’.

And the more practitioners were recruited by Linnaean botany, it was suggested, the more plants could be

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22 Ibid.
23 Ibid: ‘Gesetzt, es wäre ... für einen Schriftsteller zu geringfügig, das, was viele andere schon geschrieben haben, in seinem Werk zusammenzutragen; so fragen wir diejenigen, die den Herrn Houttuin so hämisch einen Compilator nennen, um Rath: Wie es denn bey einem solchen Werke anzufangen sey? Und wir geben zur Probe einmal den Elefanten oder das Rhinoceros auf, und wünschen, daß uns eine Beschreibung von diesen Thieren gegeben werde, darinnen nichts vorkommt, was Brisson, Buffon, Klein, Aldrovandus, oder Johnston bereits haben.’
‘recruited’ into the system. Translations generated new contributors who drove forward the long-term project of completing and correcting the Systema naturae. This stabilized its position as indispensable in the practice of natural history, which, in turn, resulted in further input for the system.

Müller’s translation of the section on the animal kingdom was followed by a translation of the botanical part of the Systema in fourteen volumes under the title Des Ritters Carl von Linné ... vollständiges Pflanzensystem nach der 13. lateinischen Ausg. und nach Anleitung des holländischen Houttuynischen Werks übersetzt und mit einer ausführlichen Erklärung ausgearbeitet. While Müller had used the twelfth edition of the Systema, whose production had still been supervised by Linnaeus himself, the two translators of the botanical section worked from a more recent version, Johan Andreas Murray’s expanded edition of the botanical section dating from 1774. In order to be able to claim relevance, translations of the Systema were under the same pressure as the original to be up-to-date. While they had to take account of the status quo of the global project aiming to record all plants, they also tried to go beyond this and offer their respective target readerships more information.

What information profile did the Vollständige Pflanzensystem present? Although the Systema did not contain any illustrations, the two translators, like Müller before them, integrated illustrations from Houttuyn’s Natuurlyke Historie into their text. Houttuyn, however, had specialized in depicting foreign and rare plants which, for the readership interested in

25 A review of 1783 uses this expression: Supplementum plantarum Systematis vegetabilium editionis decimae tertiae, Generum plantarum editionis sextae, et Specierum plantarum editionis secundae. Editum a Carolo a Linné, Braunschweig 1781, Allgemeine Deutsche Bibliothek 52 / 2 (1783), 419–22, at 421. The author lists the genera in this work that ‘have received the most recruits’, i.e. have received the most additions.
26 Nuremberg, 1777–88 (Soulsby no. 577). The catalogue of the state and university library of Göttingen lists Gottlieb Friedrich Christmann and Georg Wolfgang Franz Panzer as translators.
27 Carl a Linné ... Systema vegetabilium secundum classes, ordines, genera, species, cum characteribus et differentiis. Editio decima tertia accessionibus et emendationibus novissimis manu perillustris auctoris scriptis adornata a Ioanne Andrea Murray (Göttingen and Gotha, 1774; Soulsby no. 573). On the co-existence of two editions, both designated the thirteenth, see n. 19.
practical application to which the German translation was addressed, was attractive but of limited information value. Consequently, a supplementary volume with illustrations of economically and pharmaceutically relevant European plants was put together. The translators also referred to corrections which they had made in Linnaeus’ species attributions:

But when other experienced men, motivated neither by envy nor censoriousness, for good reason either doubted the correctness [of species attributions] or provided corrections of them, we have not omitted to mention this every time in a note especially appended for the purpose.\(^{28}\)

Thus both substantive and ethical–moral criteria were used to decide whose error diagnoses and corrections were incorporated and whose were not. As most translators wanted to advance the *Systema naturae* and help to shape it, they, as co-authors of this collaborative project, were also subject to its quality standards. An expanded translation that was to fulfil its purpose and prove itself in practice had to be not only as complete but also as accurate as possible. New material was accepted only if botanical authorities, after careful consideration, regarded it as correct, and even then, only if their criticism of other botanists was not suspected of deriving from selfish motives. Following these criteria, the two translators gleaned information from ‘recent, good, and complete *Florae*’\(^{29}\) and the eighth edition of Philip Miller’s *Gärtnlexikon*.\(^{30}\)

\(^{28}\) Ibid: ‘Doch wo andere erfahrne und weder von Neid noch Tadelsucht eingemommene Männer die Richtigkeit derselben aus guten Gründen entweder in Zweifel gezogen, oder wirkliche Verbesserungen derselben angegeben haben, so hat man solche jedesmal in einer besonders beygefügten Anmerkung anzuzeigen nicht unterlassen.’

\(^{29}\) Ibid.

\(^{30}\) Ibid.

Thus, for example, under Bidens minima, translated into German as ‘Kleinster Zweyzahn’, it was noted that the Swiss botanist Albrecht von Haller considered it a variety of Bidens cernua, while ‘Hudson, on the other hand, seems more inclined to combine it with the preceding entry.’ The translators left this question open, but in case any readers wanted to try to clear up the problem, updated references were provided. This was precisely the sort of assistance that served to improve the system. Or, with reference to Houttuyn and an older work, Johannes Burman’s Thesaurus Zeylanicus (1737), a species of fern was included and described that Linnaeus did not list:

Because of its similarity with the species named above, Houttuyn here lists a species of fern that, although it is different from that named above, belongs here; although already known to Burmann and others, it was passed over by Linnaeus and his editors. It is pinnulated differently from the previous one.

A detailed description of this fern follows, with a closing reference to Burman’s illustration which, the authors point out, matches samples recently collected by Carl Peter Thunberg in Batavia. The most recent botanical information, in this case, about Thunberg’s journey around the Cape of Good Hope to Japan (1771–8), is drawn upon here in order to validate older observations from Burman’s Thesaurus Zeylanicus (1737) and put forward as a building block towards a possible alternative, against the authority of Linnaeus’ classificatory judgement. Thus a significant part of the contribution made by the two translators was that where they considered it necessary, they re-opened the black box of Linnaeus’ classifications,

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33 See ibid.
making visible the wealth of botanical information stored there which had fed into his definitions of species. Their purpose was not only to make public their own classificatory decisions, but also to provide old and new observations on plants whose classification, given the current state of information, required correction. The re-listing of synonyms and references which Linnaeus had excluded or omitted gave readers easier access to essential information that could contribute to the solution of classificatory problems.

The entry for *Gedornter Tang* (*Fucus aculeatus*) in volume thirteen of the *Vollständiges Pflanzensystem* (1786) allows us to demonstrate how this process worked technically, before repeated cycles of supplementing information made the montage increasingly complex. In the twelfth edition of the *Systema naturae* (the *Regnum vegetabile* was published in 1767), whose publication Linnaeus himself had supervised, *Fucus aculeatus* was only briefly described and a note was appended stating that Johan Ernst Gunnerus reported from Norway that a specimen of this species which he had seen looked like a horse’s tail. The entry in the 1774 edition of the botanical section expanded by Murray was already supplemented by references to a number of synonyms. And the German translation, finally, presented the following long list of synonyms and references:


Fucus (*muscoideos*) fronde tereti ramosissima, ramis sparsis, spinis mobilibus alternis.


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35 *Systema vegetabilium ... editio decima tertia*, 814.
alternis subulatis, adspersis spinis alternis mobilibus. GUNN. norv. 93. Act. nidros. 4. p. 83. t. 7. Fucus foliis ericae similis. RAI. hist. 73. n. 4. b.\textsuperscript{36}

Reference was made to the most recent and to older botanical literature, to the work of two British botanists of the seventeenth century, John Ray and Robert Morison, and to Giovanni Antonio Scopoli’s \textit{Flora carniolica} (Flora of Carniola, 1760; 2nd edn. 1771–2), William Hudson’s \textit{Flora Anglica} (1762), Samuel Gottlieb Gmelin’s \textit{Historia fucorum} (1768), and Peter Simon Pallas’ recently published \textit{Reise durch verschiedene Provinzen des Russischen Reichs} (Journey Through Various Provinces of the Russian Empire, 1771–6). The descriptive passage that followed made a classificatory change. The authors declared that the moss-like seaweed (\textit{Mooßartige Tang}) originally described by Linnaeus as a distinct species was, in fact, a variety of thorny seaweed (\textit{Gedornte Tang}). The list of synonyms appended, including one which they regarded as erroneous, but which they named for the sake of completeness, gave the reader all the information required to follow this step.\textsuperscript{37}

In 1786 another German translation was published in Vienna: \textit{Des Ritters Carl von Linné Pflanzensystem nach seinen Klassen, Ordnungen, Gattungen und Arten mit den Erkennungs- und Unterscheidungszeichen. Vierzehnte nach der vorhergehenden viel vermehrte und verbesserte Auflage von Johann Andreas Murray ... Aus dem Lateinischen mit einigen Zusätzen von Xaver Joseph Lippert.}\textsuperscript{38} Also based on Murray’s fourteenth edition of the botanical part of Linnaeus’ \textit{Systema naturae}, its information profile differed from the older translation of the text. The translator’s achievement lay less in incorporating new plants – Lippert only occasionally made entries going beyond Murray’s version – than in creating an elaborate system for documenting and visualizing the provenance of the now numerous

\textsuperscript{37} See ibid.
\textsuperscript{38} (Soulsby no. 589a).
additions. A cross marked the few plants that Lippert himself had added. Given the difficulty of correctly classifying a new plant within the existing system of genera and species, the translator said, he had exercised the utmost restraint in this matter in order to avoid further errors.  

An asterisk identified the plants that Murray had taken from the most recent botanical publications and added to the fourteenth edition of the *Systema*:

from the travels of Forskål through Egypt and Arabia; of Aublet to French Guinea and the Isle de France [Mauritius]; of Sonnerat to New Guinea and the East Indies; of Banks, Solander, and both Forsters to the Southern Ocean; of Thunberg to part of Africa, Ceylon, Java, Japan; and of Pallas, Georgi and several others through Russia ...  

Plants whose description Murray had improved, or which he had renamed in his edition, were also marked with an asterisk. Lippert’s system of references focused mainly on plants from Carl Thunberg’s *Flora Iaponica* (1784), a spectacular publication containing a wealth of new material, which Murray had already mined for the fourteenth edition of the *Systema* (1784). But as both works went into print at almost the same time, Lippert pointed out, Murray was only able to work with Thunberg’s manuscript. This meant that while Murray could incorporate Thunberg’s Japanese plants into the *Systema*, he was unable to refer to the relevant pages of the printed version of the *Flora Japonica*, where detailed information on the new plants could be found. Although page numbers were not essential for finding plants in Thunberg’s volume – they could be located on the basis of their position in the Linnaean system – having a page number made it

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40 Ibid: ‘aus Forskähls Reisen durch Egypten und Arabien, des Aublets nach dem Französischen Guinea und Isle de France, Sonnerats nach Neuguinea und den Morgenländischen Indien, Banks, Solanders, und beyder Forster in das Mittägige Meer, Thunbergs nach einem Teil von Afrika, Zeylan, Java, Japan, des Pallas, Georgi und mehrer anderer durch Rußland...’ The final entry in the list above, the *Supplement*, refers to the supplementary volume mentioned above, which was published after Linnaeus’ death by his son: Linné, *Supplementum*, 1781.
41 Carl Peter Thunberg, *Flora iaponica sistens plantas insularum iaponicarum secundum systema sexuale emendatum redactas ad XX classes, ordines, genera et species* (Leipzig, 1784).
quicker and easier. And as Linnaeus’ *Systema naturae* contained only very brief descriptions, looking up more detailed descriptions in the works of other authors was an indispensable necessity for all botanists. The more plants the *Systema* absorbed from the publications of various botanists over the decades, the more complicated it was to find descriptions in all of these works. That Lippert, in his German translation, gave the corresponding page numbers for plants from the *Flora Iaponica* made things easier for the reader.

Another service he offered was to provide cross references between Thunberg’s Japanese plants and an older work on Japan’s flora, Engelbert Kaempfer’s *Amoenitatum exoticarum ... fasciculi* (1712). Thunberg’s *Flora Iaponica* contained an appendix listing plants also discussed by Kaempfer, and another one containing plants in Kaempfer which Thunberg was unable to identify unequivocally, or which were unknown to him. Lippert adopted Thunberg’s Latin names and Kaempfer’s Japanese ones, adding the corresponding German names. Thus he created a multi-lingual register which allowed German readers to match up the plants in Kaempfer and Thunberg. As Lippert pointed out, it could not be assumed that every German botanist would have Thunberg’s work to hand. Lippert’s translation, therefore, compensated for the limited availability of a key botanical publication, a problem which was a result of the primarily local and regional distribution of scientific literature in the eighteenth century.

**III. Regionalization and nationalization**

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42 Engelbert Kaempfer, *Amoenitatum exoticarum politico-physico-medicarum fasciculi V, quibus continentur variae relationes, observationes & descriptiones rerum Persicarum & ulterioris Asiae, multa attentione, in peregrinationibus per universum Orientem* (Lemgo, 1712).


The creation of regionally orientated information profiles by adding relevant botanical information proved to be one of the central strategies used in translations of the *Systema naturae*. In this section, one work with a regional focus, and one with a national focus will be discussed: first, another German translation of Linnaeus which aimed to present a Bavarian flora; and secondly, a French translation which aspired to present a French national flora.

*Des Ritters Carl von Linné vollständiges deutsches Pflanzensystem nach der vierzehnten lateinischen Ausgabe zum bequemen Gebrauche der Liebhaber in tabellarische Form gebracht* was published in 1785 in Munich, translated by Georg Anton Weizenbeck. It incorporated new genera from Linnaeus’ first and second *Mantissa plantarum*, from the *Supplementum* edited by Linnaeus’ son, and ‘all the [plants] according to their botanical characteristics ..., which have been discovered, since the death of these meritorious men, by other venerable friends of the science’. Weizenbeck announced further additions for a second part of his translation, one which, in the end, never came about. It was to have contained the species and to have targeted Bavarian *Oeconomen* (economists). For this purpose, it was to be noted against every species – wild, garden plant, and agricultural plant – what sort of soil they thrive on, when they flower and bear seeds, whether and how they can be used for food or medicine, dyeing or tanning, whether or not they are poisonous, and whether they are suitable as animal feed. In contrast to the ‘pure botany’ of the first volume, Weizenbeck envisaged the second volume of his translation as ‘applied botany’, and as making a contribution to a history of Bavarian plants.

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45 The title ends: *Erster Theil, welcher die Gattungen enthält*. Weizenbeck’s translation was based on Murray’s 14th edition of the botanical part of the *Systema naturae*, dating from 1784 (Soulsby no. 586).
46 Linnaeus, *Mantissa* (1767); id., *Mantissa ... altera* (1771).
47 Carl von Linné, *Supplementum plantarum systematis vegetabilium editionis decimae tertiae, generum plantarum editionis sextae, specierum plantarum editionis secundae* (Brunswick, 1781).
49 Ibid. XII.
50 Ibid. XIII.
He planned to assemble the material required for this by collaboration with his readers, using the iterative method typical of the publication of Linnaeus’ works. In this spirit, Weizenbeck finished the Foreword to the first volume by appealing to his readers to send in relevant information. In return, he promised not to steal their glory, but to acknowledge by name each person who submitted information. While the global claim of Linnaeus’ Systema remained untouched, this planned translation also had an economically motivated, regional agenda.

It was a similar story with a French project that engineered a French national flora within the Systema. Translated and compiled by Marie Jacques Philippe Mouton-Fontenille, the Système des plantes, contenant les classes, ordres, genres et espèces ... extrait et traduit des ouvrages de Linné was published in 1804; in 1809 a reprint followed under the title Linné françois, ou Tableau du règne végétal d’après les principes et le texte de cet illustre naturaliste. The main target audience of this translation was medical students. Botany formed part of their course of study, but their knowledge of Latin was not (yet) good enough to allow them to understand Linnaeus’ terminology in the required detail. In addition, the Foreword explained, the original Latin version of Linnaeus’ works could hardly be found in bookshops any more; a translation was therefore doubly desirable and justified. For every species, Mouton-Fontenille referred to relevant illustrations in the botanical literature. He also indicated the places where they grew, and the times when they flowered.

On botanical excursions through the French Alps, Mouton-Fontenille had discovered that the

51 Système des plantes, contenant les classes, ordres, genres et espèces; les caractères naturels et essentiels des genres; les phrases caractéristiques des espèces; la citation des meilleures figures; le climat et le lieu natal des plantes; l’époque de leur floraison; leurs propriétés et leurs usages dans les arts, dans l’économie rurales et la médecine; extrait et traduit des ouvrages de Linné, 5 vols. (Lyons, 1804–5).

52 Here the old problem of eighteenth-century book trade’s inability to make scientific literature available turns up in a new context. A translation of Linnaeus was to replace the Latin originals that were no longer available. Sara Scharf, however, points to the diminishing significance of Linnaeus in France during the second half of the eighteenth century, both as a handbook for instruction in botany and as a field guide for amateur botanists. A number of new and innovative Flora of France had been published, in French, which made the identification of plants easier and more efficient for novices, esp. Lamarck’s Flore françoise, ou description succincte de toutes les plantes qui croissent naturellement en France, disposée selon une nouvelle méthode d’analyse (Paris, 1779). See Sara T. Scharf, ‘Identification Keys, the “Natural Method”, and the Development of Plant Identification Manuals’, Journal of the History of Biology, 42 (2009), 73–117, 96–101.
occurrence of alpine plants was correlated with specific types of rock and thus altitudes. He distinguished between plants that grew on limestone and were never found at altitudes higher than 900 or 1,000 toises (a French unit of measurement; until 1812, 1 toise equalled 1,949 metres) – in his translation he marked these S.-Alp., standing for plantes sous-alpines (sub-alpine plants) – and those that thrived on granite right up to the edge of the glaciers, but no higher than 1,000 toises, which he marked as Alp., standing for plantes alpines (alpine plants).53

The Système des plantes was thus enriched with phytogeographical information that went far beyond what Linnaeus’ original offered in this respect, and was useful in a local, regional, and national context. The aim was to put together a French national flora within Linnaeus’ global system, without taking the relevant plants out of their systematic context. Plants that grew in France were marked as such, allocated to one of three geographical regions – the north, the south, or central France – and references were given to relevant regional flora, for example, to Gouan’s Flora Monspeliaca (on plants from the region around the city of Montpellier),54 where further details and possibly illustrations could be found. Plants growing in other European countries were not localized with the same precision, but described simply as ‘European’.55 The Système des plantes also contained information about the agricultural and pharmaceutical uses of native plants.

The following entries on two species of sage demonstrate Mouton-Fontenille’s method and the resulting textual architecture, which satisfied both the claim to completeness and the national focus by alternating between modules kept as short as possible, and those which were expanded as much as possible. To the entry for Sauge lyrée, which had so far been found only

53 Système des plantes, XI.
54 Antoine Gouan, Flora Monspeliaca, sistens plantas no. 1850 ad sua genera relatas, et hybrida methodo digestas. Adjectis, nominibus specificis, trivialibusque, synonymis selectis, habitationibus plurium in agro Monspeliensi nuper detectarum, et earum quae in usus medicos ventiunt nominibus pharmaceuticis, virtutibusque probatisissimis (Lyons, 1765).
55 Système des plantes, XI.
in Virginia and Carolina, Mouton-Fontenille added only a reference to a single illustration.

The following entry to a species of sage found in the south of France, *Sauge officinale*, names Languedoc and the Provence as locations, refers to seven other authors who have also taken a position on this plant, and lists the various pharmaceutical uses of sage.

**IV. Linguistic reflections: Lost and gained in translation**

The successive publication of expanded translations of the *Systema*, especially its botanical part, continued until around the middle of the nineteenth century. The number and frequency of translations into other European languages, however, noticeably lagged behind developments in the German-speaking world. The first complete translation into English, for example, was not undertaken until 1782, when it appeared under the title *A system of vegetables according to their classes, orders, genera, species, with their characters and differences*.\(^{56}\) Earlier projects had been more like introductions to Linnaeus’ method, and essentially concentrated on translating and explaining key methodological terms: James Lee’s *Introduction to Botany* (1760),\(^{57}\) which gave the Latin equivalents in the Linnaean nomenclature of 2,000 English plant names; John Berkenhout’s *Lexicon* (1764);\(^{58}\) Colin Milne’s *Botanical Dictionary* (1770);\(^{59}\) and William Withering’s *Botanical Arrangement* (1776),\(^{60}\) an English flora which introduced a number of new English generic names.

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\(^{56}\) The full subtitle is as follows: *Translated from the thirteenth edition (as published by Dr. Murray) of the Systema vegetabilium of the late Professor Linneus; and from the Supplementum plantarum of the present Professor Linneus, by a Botanical Society, at Lichfield (Lichfield / London, 1782; Soulsby no. 580).*

\(^{57}\) James Lee, *An introduction to botany, containing an explanation of the theory of that science, and an interpretation of its technical terms, extracted from the works of Linnaeus ... With ... an appendix containing upwards of two thousand English names of plants ...* (London, 1760); further expanded and corrected editions appeared in 1765, 1776, and 1796.

\(^{58}\) John Berkenhout, *Clavis Anglica linguae botanicae; or, A botanical lexicon in which the terms of botany ... are applied, derived, explained, contrasted and exemplified* (London, 1764; 2nd edn. 1789).


\(^{60}\) William Withering, *A botanical arrangement of all the vegetables naturally growing in Great Britain. ... With an easy introduction to the study of botany ...* (London, 1776; further editions 1787, 1792).
Like all earlier translations, the *System of vegetables* also contained additions and corrections. But it went further, reflecting on a fundamental linguistic problem, namely, the extraordinary difficulty of translating Linnaeus literally. The Foreword discussed a dilemma which forced every translator to make a decision with serious consequences, one which touched upon the substance of the Linnaean approach. At stake was the essential question of what to do with Linnaeus’ Latin terms, both his classificatory criteria and the wealth of descriptive terms he used. Should the existing vocabulary of the English language be used wherever possible? Or should account be taken of the fact that Linnaean terms constituted an artificial language which he had created himself, and an attempt be made to reproduce the novelty of the Linnaean method and its terminology by coining new English terms? The translators of the *System of vegetables* decided in favour of the second option. In order to guarantee compatibility between the translation and the original – readers of the translation should be able to orientate themselves in the Latin original and to refer without difficulty to the same plants as those reading the original – the translators also decided to create neologisms by Anglicizing the Latin terms to be translated, or, where appropriate, simply allow to the Latin term to stand in the text as a foreign word. Thus in the case of the term *Calyx*:

Thus Calyx is used by Linneus for the green cup beneath some flowers, for the sheath from which others burst longitudinally, for the leaves beneath the umbels of others, for the husks of grasses ... All this must be explained, whether it is represented by the word *calyx*, or by the word *impalement*; which latter, though used by some of the writers above-mentioned, is as difficult to the English scholar, as the word *calyx*; is not understood by those who are already acquainted with the language of Linneus; and
does not assist the young botanist in his study of the original. … Hence we have
retained the words *calyx* for flower cup; *corol* for blossom … .

The decision of whether to translate terms into English or to Anglicize them, the authors
claimed, represented a balancing act between two extremes, both of which were to be avoided.
On the one hand, using too many neologisms and Latinisms risked alienating English readers;
on the other, avoiding terms which established a direct connection with the Latin original
threatened to devalue the translation for those who knew the original or still wanted to
understand it. To justify their method, the two authors referred to Rousseau’s *Fragments pour
un dictionnaire des termes d’usage en botanique*, in which he advocated the universal
introduction of Linnaean nomenclature and translated the key terms into French, as a rule by
adding a French ending to the original Latin term.

The translators’ commitment to reproducing the new language of botanical description
created by Linnaeus as precisely as possible led on to a detailed discussion of how to translate
central linguistic features of Linnaeus’ Latin. The main focus was on his use of compound
words, in which the translators recognized a generative principle that gave his botanical
language its characteristic brevity and precision. The clear rules governing the combination of
words describing forms allowed Linnaeus to describe concisely and yet precisely, even to
make visible, an unlimited variety of shapes of leaves, flowers, fruits, stems, and seeds:

> He has taken words expressive of well-known figures, as the words oblong and egg,
and by compounding these has given a form between them both; which new form

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61 *System of vegetables*, Preface of the translators, ii–iii. *Corol* is an example of the Anglicizing of a Latin term (*corolla*).
partakes more of the egg, if that word precedes in the compound, as egg-oblong; or more of the oblong, if that word precedes, as oblong-egg’d. Hence these two words are made to represent forms of four kinds very nearly allied; but to these he has added oval and elliptic, and again compounded these with oblong and egg, and has thus, as it were, conjured up before our eyes the outlines of forms as numerous and as accurate by the magic of a few words, as the pencil alone was thought capable of producing.63

The discussion of these questions ended by stating that the English language was ideally suited to reproducing Linnaeus’ descriptions. It was even capable of expressing some things more precisely than Latin, the authors claimed.64

In conclusion, the question arises as to the operational life cycle of the *Systema naturae*, updated over decades in various different national languages. The cyclical process of enlargement and the design of the resulting texts reflected the fact that the users of Linnaeus’ *Systema* were, at the same time, its co-producers. This was not only because the classification and naming of countless new species, and the corrections constantly required could only be achieved by a collaborative process. It also grew out of the dynamic which resulted from the *Systema*’s practical success. Botanists made contributions to Linnaeus’ system because this allowed them to maintain it as a reference work without which practicing botany would have been much more difficult and inefficient. The botanical community thus collectively maintained ‘its’ system, in particular, within the framework of constantly supplemented translations directed to a practical public.

64 Cf. ibid. vii. Thus in relation to roots, for example, *dentata* can be translated as *teethlike*, while in relation to a leaf, as *teethed*. 
The French translation of Linnaeus by Mouton-Fontenille, introduced above, represents a sort of vanishing point for this development as, by means of multiple strategies of supplementing, it achieved a new level of complexity. Mouton-Fontenille engineered a *Système des plantes* into which he wove information from Linnaeus’ *Genera plantarum* and *Species plantarum*, as well as from Caspard Bauhin’s *Pinax theatri botanici*, one of the central texts of pre-Linnaean botany in which around 6,000 plants were classified, described, and named. In order to make it easier to compare his own observations on a plant with those of other botanists, Bauhin had also compiled a list of synonyms for each plant, that is, all the names that the same plant had been given by various authors over time. Largely because of this concordance of synonyms, Bauhin’s *Pinax* had achieved the status of a reference work in the eighteenth century. More than two hundred years after the publication of its last edition, however, it was inevitably outdated. Against this background, the service which Mouton-Fontenille’s translation intended to render his readers becomes clear. By incorporating Bauhin’s synonyms into the Linnaean system, Bauhin’s *Pinax* received the updating that the botanical community had long been waiting for – not in the form of a revised and supplemented new edition, but by the incorporation of synonyms from the *Pinax* into a translation of Linnaeus.

The capacity of the *Systema*, or its botanical section, to be expanded through successive translations, however, was ultimately limited. For decades, additions and corrections had been made in parallel in several languages. As a result, the development of botanical terminology in different countries or language areas began to diverge, which inevitably contributed to undermining the status and efficiency of Linnaeus’ Latin nomenclature as the universal language of a global project. As William Stearn has noted, the proliferation of new botanical

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terms in various languages resulted in the creation of a wealth of glossaries. In the early nineteenth century, botanists complained of a relapse into pre-Linnaean conditions of linguistic confusion in botany, and considered that the time had come for a new general clean up of terminology.\(^\text{66}\) John Lindley stated for example that ‘each nation or community studied for itself, thought for itself, and wrote for itself, and hence half a dozen names were proposed in different places to express the same idea’.\(^\text{67}\)

Linnaeus’ death meant that the highest botanical authority was no more. He had made the final decisions in systematic and terminological questions for decades and, after rigorous evaluation, had entered countless contributions by different individuals into the register of botany. Without this central authority and the discipline which it imposed on botanical language, international botanical efforts began to drift apart. Although they increased the number of people reading the Systema, translations gradually helped to put an end to the dynamic of its constant expansion.\(^\text{68}\)


\(^{67}\) Quoted from Stearn, *Botanical Latin*, 303 f. Stearn indicates that he is quoting Lindley, but does not give the title of the book from which the passage is taken. A full text search in digital versions of the first editions of *An Introduction to Botany* (London, 1832) and *The Elements of Botany* (London, 1841) could not unambiguously identify the passage.

\(^{68}\) Translations were not the only reason for the decline of Linnaeus’ sexual system that, after decades of being supplemented, was increasingly burdened by internal contradictions. To preserve natural species and genera in his classification, Linnaeus put up with considerable inconsistencies, and this was already criticized by contemporaries as a central weakness of his method. Thus, for example, he left all species of the genus *Valeriana* in the class Triandria (plants with three pistils), although it gradually became clear that only a few of them had three pistils – namely, those that he had described first. Others, by contrast, had only one pistil, and according to the logic of the system, should have been assigned to the class Monandria. On this see Scharf, *Identification Keys* (note 51).