

Why the Sciences of the Ancient World Matter 1

Florence Bretelle-Establet
Stéphane Schmitt
Editors

Pieces and Parts in Scientific Texts



Springer

Why the Sciences of the Ancient World Matter

Volume 1

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Why the Sciences of the Ancient World Matter

ISBN 978-3-319-78466-3

ISBN 978-3-319-78467-0 (eBook)

<https://doi.org/10.1007/978-3-319-78467-0>

Library of Congress Control Number: 2018935868

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Printed on acid-free paper

This Springer imprint is published by the registered company Springer International Publishing AG
part of Springer Nature

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

*In memory of Jacques Virbel who developed
the textual architecture model and who
spared no effort to share his knowledge of
linguistics*

*We would like this work to be a tribute to
Jacques and particularly for all he did to
enrich the cross-cultural “History of Science,
History of Text” seminar which he organized
between 2002 and 2011 with Karine Chemla
at REHSEIS (later SPHERE)*

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Part I

Introductory Remarks

Chapter 1

Introduction



Florence Bretelle-Establet and Stéphane Schmitt

1.1 Starting Point

This book takes its origin from a first general observation: the ways to frame and convey scientific knowledge in texts are very diverse. The institutionalization and professionalization of science during the nineteenth century did not put an end to the great variety of writings in science. Suffice to read today, for instance, articles on animals, either in a wide-audience scientific journal or in an encyclopedia for children or in a textbook for students or even in an academic journal. According to the audience, the purpose and the conventions, authors strive to make concepts and facts more accessible, more enjoyable or more convincing, and, accordingly, use a wide range of devices which give scientific texts a variety of textures and forms. In these different contexts, indeed, it is likely that one will present arguments in different ways, will not resort to the same kinds of evidence, will not use identical paratextual elements, will choose specific lexico-grammatical resources and will organize the whole text according to different layouts.

The research leading to this volume has received funding from the European Research Council Under the European Union's Seventh Framework Programme (FP7/2007–2013)/ERC Grant Agreement No. 269804. The papers collected here were presented and discussed in the 'History of Science, History of Text' seminar, and in a workshop in July 2013, conducted by the SPHERE research group (CNRS, Université Paris Diderot).

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Undoubtedly, the professionalization and the institutionalization of science have contributed to drawing boundaries between what, today, is an academic or a research text in science and what is not. As has been shown by philosophers and linguists since the 1960s and summarized by the linguist Vijay K. Bhatia, ‘most of the professionals from the same disciplinary culture construct, interpret and use language more or less the same way in specific rhetorical situations’ (Bhatia 2004: 9).¹ While Bhatia opposes the idea that there are static and given writing genres linked to the use of language in professional settings, he shows that sets ‘of mutually accessible conventions which most members of a professional, academic or institutional organization share’ do exist. This is what the linguist calls ‘a generic integrity’ resulting from a combination of ‘text-internal’ and ‘text-external’ factors. While a professional or community’s ‘generic integrity’ is something dynamic, not settled once and for all, it has a recognizable generic character that members of the profession or the community tend to maintain in their discursive and writing practices, as a way of reinforcing their professional identity, nay, corporatism. For Bhatia, the peer review process, editorial intervention, and the use of references and quotations in academic texts today are indications of a generic identity of the professionalized texts in science as well as indications of the ‘power of genre’. The peer review process and editorial intervention are mechanisms that ‘ensure that all accounts of new knowledge conform to the standards of institutionalized behavior that is expected by a community of established peers in a specific discipline’ (Bhatia 2004: 189).² The use of references and quotations is an indication of the power of the genre: ‘In order to become acceptable to the community of fellow researchers, one must relate his or her knowledge claims to the accumulated knowledge of others in the discipline, without which his or her claims in the field are unlikely to find recognition through publication’ (Bhatia 2004: 190).

Thus, while some criteria used in academic or research texts in science today are easy to recognize, particularly by the members of the professionalized scientific community, and allow clear-cut boundaries to be drawn between all the different types of writings in science (research, popularizing, journalistic, encyclopaedic texts) one will easily find variations within these different types of texts. In fact, the professionalization of science has not resulted in the shaping of one single and unified community which would, once and for all, think, write, and communicate in a unified way. As an example, academic or research articles written in the field of

¹In this book written for the *Advances in Applied Linguistics* series, Bhatia offers an overview of the field of written discourse analyzed from a genre-based perspective. Taking discourse as text, as genre, as professional practice, and as social practice, Bhatia provides a clear analysis of genres and variations of genres within and across specific professional domains such as business, law and science. On the question of the rules that, historically, geographically and socially, preside over any discursive practice, one can refer to Foucault (1969) and his seminal notion of discursive formulation, later rethought by Pecheux (1975). One can also refer to Genette and Todorov (1986) and to Schaeffer (1989) for a reflection on genre from the domain of literature.

²On generic integrity and on identifying generic integrity, see pp.112–152; on the power and politics of genre in academic culture notably, see pp. 189–192.

biology are quite different from those in mathematics. Further, research articles written in mathematics display substantial differences according to the mathematical communities their authors belong to.

How can historians and philosophers of science approach this diversity in framing scientific knowledge in texts, and what is at stake in dealing with it? This book aims to offer a contribution to these questions, and to do so, it opts for a specific approach.

First, it focuses on texts which were all written before the professionalization and the institutionalization of science, that is, in a time period where this diversity is perhaps even more manifest. Second, this book considers texts devoted to very different disciplines, such as mathematics, astronomy, medicine and life sciences. Third, the various chapters analyze writings produced in various parts of the globe and in different time periods, that is, in Mesopotamia, ancient Greece, ancient and late imperial China, medieval and premodern India, and in eighteenth-century Europe. Looking at these particular cases, we argue, provides a global perspective on the various ways of conveying scientific knowledge and sheds light on the factors, which, before the professionalization of science, played a part in giving scientific writings their specific form.

Finally, and more importantly, in an effort to shed light on the diversity of organizational patterns and rhetorical strategies in scientific writings, and to question the rationale behind the choices made to present a text in one way rather than another, this book concentrates on the particular issue of text segmentation. The various chapters pay particular attention to how actors, involved in the writing of science at different times and in several parts of the world, divided and structured their texts. We have examined what these pieces, parts, or ‘textual segments’, to borrow from linguistic terminology, consist of and how they were arranged. We have aimed to shed light on why an author may have divided the flow of his/her written discourse in the ways chosen. We have also reflected on the consequences that derive from adopting one way of segmenting or another, and thus marking breaks in the ‘textual continuum’.³

1.2 Some Tools Introduced by Linguistics and Literary Criticism

For this enterprise, the work done in linguistics and literary criticism in the last forty years has provided useful devices. Indeed, the issue of text segmentation has been addressed in linguistics as attention turned to units larger than the sentence, opening the field of discourse analysis and textual linguistics. This new trend in linguistics, which had to take other disciplines and competencies into account, such as poetics, psycho-linguistics, sociology or philosophy, suggests several standpoints from

³We borrow the term ‘*continuum textuel*’ from Michel Charolles (1995).

which to examine discourse or text such as the syntax of discourse, text connectiveness, textual grammar or the textual architecture model.⁴ In these different, and sometimes combined, approaches that have developed since then to analyze discourse or text more deeply, the question of the segmentation and, at the same time, that of the ‘tying’ of the parts resulting from segmentation has been regularly addressed, on at least two levels.⁵

At a micro-level of text or discourse, the different processes that give cohesion to a string of individual sentences and contribute to shaping a well-formed discourse or text (i.e. something consistent semantically) have been analyzed. In this approach to text segmentation and tying, the focus has been on the syntactic processes and on the lexical resources—such as reference, substitution, ellipsis, conjunction and lexical cohesion—allowing the individual sentences to be conflated to shape a larger unit, a consistent discourse or text, in contrast with a collection of unrelated sentences.⁶ On this micro-level of text, a number of literary critics and linguists have also done important work to shed light on the different processes which make it possible to bind together words, ideas and works from different people, and to unify them into a homogeneous discourse.⁷ Beyond this micro-level analysis of segmentation, the issue of segmentation has also been addressed from a macro-level perspective, namely, a perspective that tries to identify the different parts that a whole text is made of and the mechanisms used to bond them so that the resulting text or discourse is unified and structured.

At this macro-level of analysis, the notions of ‘sequence,’ ‘textual structure’ (*plans de texte*, in French), ‘visi-readable textual block’ (*vi-lisible*, in French) or ‘textual architecture’ have been elaborated, which proved useful for our own research. Without entering into too much detail, let us say some words on these notions, elaborated at various times and within different theoretical frameworks, which have guided our reflection on our framework of scientific texts. As Michel Charolles stated, the production of a discourse or a text implies a structuration and an editing process, which relies on what he identifies as the ‘four levels of textual

⁴For an overview of the historical development of discourse analysis and textual linguistics, one can refer to Adam (2008) and (1990), updated several times since then, notably with the correction of his former distinction between discourse and text, to Charolles and Combettes (1999), and Charolles et al. (1986). One can also refer to Bhatia (2004), which, while written within the framework of applied linguistics, provides another view of the chronological development of the field characterized, according to its author, in three main phases, ‘textualization of lexico-grammar’, the ‘organization of discourse’, and the ‘contextualization of discourse’.

⁵Halliday et al. (1976), p.3, decided to use the term ‘tie’ ‘to refer to a single instance of cohesion, a term for one occurrence of a pair of cohesively related items’.

⁶Halliday et al. (1976) have pioneered this sort of analysis, identifying the syntactic processes that bond or tie individual sentences to give a certain continuity to discourse or text.

⁷See notably Authier-Revuz (1997, 2001, 2004) for the different processes one person can use to represent the discourse of others in his/her discourse, and see Vernant (2005) and Compagnon (1979) for an investigation of the citation and quotation processes used by authors to incorporate the words, ideas and work of others in their own discourse or text.

organization' which contribute to structuring a text on its micro- and macro-levels. One of these levels is what he calls 'sequences' and defines as:

...resulting from the dividing up of discursive material. There is the creation of a sequence when the subject, for instance the writer, indicates how s/he segments her/his text. In written texts, these sequences are easy to locate, they correspond notably to segmentation in paragraphs, which are a linguistic mark like any other, and give meaning to the same extent as any relational expression. (Charolles 1988: 9)⁸

In other words, paragraphs and also titles are sequences that can be identified thanks to various markers. These 'sequential markers', together with correlative markers such as 'on one hand... on the other hand', are thus 'indicative of a metadiscursive activity of those who use them. They indicate the explicit work of organizing the enunciation in order to facilitate the task of interpretation' (Charolles 1988: 9).⁹

Jean-Michel Adam refined Michel Charolles' distinction of four levels of textuality into six levels of textual organization, preferring to speak of a 'segment' for what Charolles referred to as a 'sequence'. For Adam, 'segments' are textual blocks that result from the cutting of discursive material and can be immediately perceived through vision and reading. 'A segment is any visi-readable unit that must, in fact, fulfil the task of underlining a text structure.' (Adam 1990: 51).¹⁰ For him, the notion of a 'visi-readable unit' refers to a wide range of pieces, parts, and stretches that are brought out by the writer through different strategies and markers: for example, a change of chapter or paragraph, the insertion of titles and subtitles, the layout when it employs diverse fonts or when it displays a particular spatial distribution of the text, as well as all the signals that indicate a graphical demarcation (Adam 1990: 68). For Adam, on a macro-level, the process of segmentation (and tying) reveals the text structure (Adam 2005: 176),¹¹ which itself plays an essential role in the shaping of the global configuration of a text as a whole. Moreover, appropriating Paul Ricoeur's explanation of what a text is, Adam states that it is the overall configuration of a text that contributes to its general meaning.¹²

⁸All translations from French to English in this book are by the editors. In footnotes, one will find the original text. '*Les séquences résultent du découpage du matériau discursif. Il y a création d'une séquence lorsque le sujet, par exemple écrivain, indique comment il fractionne son texte. A l'écrit, les séquences sont faciles à repérer, elles correspondent notamment au découpage en paragraphes qui est une marque linguistique comme une autre, faisant sens au même titre par exemple qu'une expression relationnelle quelconque.*'

⁹*'Les marques de séquentialité sont l'indice d'une activité métadiscursive chez celui qui les utilise. Elles dénotent un travail explicite d'organisation de l'énonciation visant en particulier à faciliter la tâche de l'interprétation.'*

¹⁰*'toute unité vi-lisible chargée, en fait, de souligner un PLAN de TEXTE'.*

¹¹Corresponding once, in rhetoric, to the '*dispositio*', Adam underlines that there can be a very wide range of text structures: some may appear conventional in that they obey the rules defining the historical state of a genre of discourse but, most of the time, text structures are fortuitous.

¹²Adam (2005: 175–192) addresses the text as a compositional and configurational unit ('*Le texte comme unité compositionnelle et configurationnelle*').

In the overall configuration of a text, Adam illustrates the importance of segmentation via typo-dispositional markers that, in 1990, he compared with punctuation markers. By paying attention to a set of prosaic poems by Rimbaud ‘Phrases’ in *Illuminations*, which, in successive editions, have been segmented and presented in different possible ways, notably thanks to graphical traces, Adam shows that the segmentation of texts not only modifies the reading strategy but also the very meaning of a text (Adam 1990: 70). This leads him to state that ‘punctuation’, in the broad meaning of a set of graphical traces, ‘aims to induce a visual reading, with all the consequences at different levels: lexical, syntactic, and semantic. The “I let you see” presides over the production of meaning.’ (Adam 1990: 70)¹³

Michel Charolles (2002) once noted that linguistic discourse and text analysis had not been very interested in the graphic and visual layout of texts and in the general issue of the visual means used by a writer to structure, that is to say, to segment and bond a text. However, the textual architecture model (abbreviated MAT in French), elaborated in another perspective than that followed by linguists like Charolles, Combettes and Adam, does provide a theoretical background to look precisely at this issue. The textual architecture model considers text as an architecture of textual objects or segments whose arrangement and disposition contributes to the meaning of a text. It thus focuses on the visual properties of written texts and on the particular layout chosen to inscribe text in material supports by ‘textual actors’ (writers, editors, typographers, publishers, etc.). For linguists who developed the textual architecture model,¹⁴ the material layout of a text constitutes in fact traces of a textual metalanguage. Indeed, all the material manipulations that consist of highlighting titles or changes of chapters, with indentations, blank spaces and other typo-dispositional markers are textual acts or performatives that could be expressed by an equivalent discursive formulation employing lexical and syntactic resources. To illustrate this point, and paraphrasing Jacques Virbel, one could start one’s text with the performative speech act: ‘I start the first part of *Parts and Pieces*, with a first chapter devoted to an overview of the field.’ This discursive performative act could be replaced by a set of typo-dispositional markers, such as part and chapter numeration, by a particular layout, with blank spaces and indentations, as in the following:

Parts and Pieces

Part I.

1.1 An overview of the field

The layout chosen to inscribe a text and its constitutive parts into a particular space gives meaning to the parts themselves.¹⁵ This linguistic perspective therefore

¹³‘la mise en “mots graphiques”, avec application des signaux de ponctuation a pour fonction d’induire une lecture visuelle, avec toutes les conséquences aux différents niveaux, lexical, syntaxique, sémantique. “Le donner à voir” ici commande la production de la signification.’

¹⁴See Luc and Virbel (2001), and Virbel (1985). One can also refer to Jacques (2005).

¹⁵Virbel (1985).

invites attention to be paid to the typographic as well as the dispositional properties of the layout chosen to inscribe any text on a material support. The metatextual traces left by textual actors, often translating their intentions, guide the reader in his/her interpretation of the text (putting, for example, chapter titles at the same level of structuration on the basis of the same layout, the same indentation or the same font). According to this linguistic perspective, all these traces left by the writer in his/her text do more than merely embellish; they are truly functional devices for the reader and cannot be taken for granted.¹⁶

Over the last forty years, textual linguistics and discourse analysis have paid a great deal of attention to the question of segmentation and the bonding of textual segments, for the simple reason, widely acknowledged now, that segmentation is at the basis of any effort to structure a text. 'To structure implies to segment, namely, to assemble and to divide at the same time,' writes Marie-Paule Péry-Woodley (2001: 28).¹⁷ It is with this theoretical background, briefly summarized here, and with devices elaborated from these different linguistic approaches that we have reflected on the question of segmentation in our different texts and contexts.

We also took into account the research launched in literary criticism from the 1970s onwards, derived from or inspired by Gérard Genette's work on narratology and on paratext. In this approach, the organization of a narrative, book or discourse is examined by decorticating the various entities making up that narrative (story and narration) or book (paratext and text), and by paying particular attention to the context of production of any discourse. The question of textual segmentation and parts of texts is notably addressed in *Seuils*, where Gérard Genette (1987) analyzes the different parts or pieces a work is always made of, and where he distinguished what he coined the paratext from the text proper. For Genette, the paratext is the sum of peritext and epitext; the former includes all the textual elements surrounding the text proper such as the front cover, the author's name, titles, prefaces and post-faces, and the latter are texts written about the text, like interviews circulating firstly outside the text, but sometimes included in it later, posthumously or in new editions. The paratext is, for Genette, a zone of transition between the text and the extra-text as well as a zone of transaction at the end of which the reader will decide to continue into the book or replace it on the shelf. While appearing marginal at first glance and always subordinate to the text proper, the paratext, in fact, contributes to make the text it surrounds what it is, namely a book which is presented as such to the readership of its time. Showing the importance of the marginal pieces of text that surround any text, Genette challenges, with others, the notion of the '*texte clos*' (closed text)¹⁸ and highlights how these paratextual elements are in fact co(n)textual parts of any text, without which a text, its reception and its transmission, would be completely different.

¹⁶Virbel (1985). One can also read Péry-Woodley (2001).

¹⁷'Structurer implique segmenter, c'est à dire, à la fois rassembler et diviser.'

¹⁸Genette (1987: 413) explains how the consideration of paratext (including allographic prefaces, for instance) contributes to challenging this notion.

Other researchers in literary criticism have worked on the question of segmentation in literature and have been inspirational references for our project. Jean Châtillon (1985), in an edited book, examined the history of segmentation into paragraphs, the markers used for it and the paragraph's status within a broad framework of texts, from the literary texts such as the Gospels or works by Flaubert to philosophical, mathematical or sociological texts. Jacques Dürrenmatt (1998) worked on textual division in French romantic novels from an aesthetic viewpoint. Paying attention to punctuation and chapter division, he studied the functions of such textual divisions, notably highlighting the shift in the function of the chapter, from the pragmatic tool allowing the reader to continue with the reading of a book without having to fold down the corner of a page to mark how far he/she had got, to an authorial device to organize a narrative into semantic units, which themselves were defined by very diverse perceptions of what a semantic unit should be.¹⁹ Ugo Dionne (2008) brought the most systematic analysis of textual division, textual arrangements and textual demarcation into French literature. By exploring a very large corpus of French novels, listing and analyzing, in detail, the different ways authors and/or editors segmented the 'textual surface', from the biggest segments or units (cycle, series) to the smallest (chapter, indent), Ugo Dionne (2008) contributed to a larger understanding of the historical practice of segmentation in this form of literature.

1.3 Segmentation in Texts on Science

The issue of text parts or text segmentation has thus been regularly addressed by linguists and literary critics. Informed by this recent research, mostly carried out in the field of European literature, and inspired by the questions, methods and tools elaborated in this particular framework, we have analyzed scientific texts, namely, texts which *a priori* are far removed from fiction and narratives. While these scientific texts were written in different languages, at different times, and concern different fields of knowledge, they share a more or less similar enunciation context: the writers or, in some contexts, the text producers are those who have a specific piece of knowledge and speak to an audience who does not have that knowledge. Moreover, these texts share the common aim of doing something or making something known. As such, these texts can be characterized as having a common strong directing illocutionary force.²⁰ The issue of how writers or, more loosely, textual actors organize their text, in parts and pieces, to meet the general aim of making something known run through the whole book. Moreover, since the texts under consideration were produced in very diverse contexts—Mesopotamia, ancient Greece, ancient or late imperial China, medieval India or modern

¹⁹See Châtillon (1985), Bessonnat (1988) and Dürrenmatt (1998).

²⁰See Chemla and Virbel (2015).

Europe—the material used as the writing support was an important dimension to be included. Papyrus scrolls, bamboo or wooden slips, clay tablets, palm leaves and paper pages do not offer the same space to the writing and do not submit the writer to the same constraints as regards textual organization.

In this collective effort to describe the textuality of written discourses on science, through the specific issue of text segmentation, contributors to this volume give a description of textual segments they have identified as meaningful and they examine the reasons behind the segmentation of texts and the consequences of such textual divisions. The reader will therefore find some answers to the following questions: Was segmentation used to delimit self-contained units, or to mark breaks in the physical appearance of a text in order to aid reading and memorizing, or to cope with the constraints of the material supports? How, in these different settings and in different texts, were pieces and parts made visible? What did it mean to segment texts into paragraphs, chapters, sections and clusters?

Since any text or discourse is modeled on pre-existing rules, not fixed once and for all, but rules embedded in temporal and social contexts, can we distinguish some rules that preside over textual segmentation? To what extent can different practices of textual segmentation be linked to social milieus? Can textual segmentation inform us on the precise function texts were expected to meet?

While the contributors to this book clearly show that textual segmentation and bonding were done at different levels of a text (at a micro- or macro-level of a text, namely for assuring sentence and text cohesion) and were realized for architectural design as well as because of material constraints, we have divided the contents of this book according to what appeared to us as the most important motives for segmenting a text. After a first introductory part, including Julie Lefebvre's article, which gives a theoretical framework to the whole book, a second part brings together contributions very clearly highlighting segmentation operations linked to material constraints. A third part presents contributions showing textual segmentation processes linked to the inner textual architecture chosen by authors or text producers to organize their text. A fourth part assembles articles dealing with textual segmentation implied by conversational or intertextual practices, which oblige writers to interrupt their own discourse in order to introduce the words, the ideas or the work of others, through the process of overt citation.

While this book brings together contributions on the composition of scientific texts in different times, in different languages, and in different social and cultural milieus, it is neither the exhaustivity of the segmentation processes which is the focus of the book, nor the history of textual segmentation in each of the different geographical, historical and social settings or fields of knowledge. It is not that we are not interested in such historical efforts, but it is mainly because, before exploring the history of such practices, one needs first to identify the writing strategies themselves. Historical aspects, however, will not be absent in each of the contributions.

1.4 Structure of the Book

The opening paper, by Julie Lefebvre, considers the notion of ‘parts of text’ from the standpoint of the linguistics of enunciation. It shows that the question of text segmentation is one of the basic dimensions of written textuality and participates in the linguistic means used to indicate the status of the writer, the genre of the work and the audience targeted. The issue of text segmentation is studied here in connection with a more general reflection on the discursive construction of ‘textual places,’ of which a taxonomy is proposed. Two main kinds of ‘textual places’ are distinguished: (1) ‘parts of text’, which are designated by specific nouns or phrases (e.g. ‘chapter,’ ‘volume,’ ‘section’ etc.); and (2) ‘stretches of text’, which are defined by the use of adverbial linguistic elements such as ‘below’ or ‘here’.

The parts of text in the strict sense comprise two sub-categories. Firstly, ‘material parts of text’, i.e. divisions which are defined according to the material properties of the object on which the text is written (e.g. books, papyrus scrolls, clay tablets, etc.) and have no direct connection to the structure of the discourse: they are just the consequences of the material constraints. In contrast, ‘dispositional parts of text’, i.e. divisions inside the text, depend on the inner structure of the text and are used to connect it to a practice of text division. Some establish a partition between the main text and other textual or paratextual elements such as the preface, epigraphs, bibliography, appendix, table of contents or index; others divide the main text itself into different segments such as chapters or sections. Many kinds of visual tools (layout, font size and type, colors, numbering systems, etc.) are used to mark these segments, which not only divide the discourse but also bring a hierarchical organization (with different levels of parts), make the text clearer, facilitate locating and indexing, make systems of cross-references easier and permit a non-linear consultation of the work. Moreover, dispositional parts of text can be used in connection with intertextuality. All these elements, which are also present in fictional works, are particularly significant in non-fiction and especially in scientific books. The coexistence of these two categories of parts of text is examined, in particular from a historical standpoint, and Julie Lefebvre shows that material constraints can be exploited secondarily, like spandrels in biology, in various ways. She studies quantitatively how these different parts of texts are used and referred to in the text itself, or by other texts, and draws conclusions on the different perceptions of the same text by the author him/herself and by other people, suggesting that the former tends to consider his/her work as an organized architecture whereas the latter considers it rather an object to be manipulated. The use of different kinds of stretches of texts, and the ways they can affect the writing dynamic, is also analyzed.

Even though Lefebvre focuses on examples taken from a Western tradition of printed books, her reasoning can be applied to other textual materials, and the other contributions in this volume show that the study of parts of text brings a key which, in association with other approaches (history of concepts, etc.), helps us to

understand the mechanism of production of scientific texts as well as their circulation and their reception.

The two chapters in Part II are devoted to examples of ‘material parts of text’, i.e. parts of text resulting from material constraints, in the context of scientific writings on clay tablets in ancient Mesopotamia, and they show that paying attention to these features not only throws light on the relationship between scientific content and writing practices, but also helps the historian as philological and archeological guides.

In the first contribution, Christine Proust studies the division of texts into lists of problems in mathematical writings produced during the Old Babylonian period (early second millennium BCE). Her study is devoted to series texts, that is, long lists of statements noted on clusters of numbered tablets. The practices of segmentation of texts in such works are compared with similar operations in other genres of texts composed in scholarly contexts during the same period, for example, super-series (concatenations of series) and catalogs (lists of statements of problems noted on a single tablet without serial numbers). In that respect, Proust shows how the material parts of texts (in this case, the division into different tablets; the obverse and the reverse of the same tablet; on each side, the columns and, in each column, the sections, that is, small boxes in which a text of one or several lines is noted) are connected to textual segmentation, i.e. ‘dispositional parts of texts’ in Lefebvre’s nomenclature (e.g. statements or groups of statements). She suggests that the analysis of the interactions between both aspects, material and dispositional, not only provides a tool for the understanding of the architecture of the texts themselves, but can also be helpful in reconstructing complete series and obtaining evidence on their provenience. This is of particular interest when the tablets of one and a similar series are scattered in different collections, with little information on their origin (which is common, especially in cases of illegal excavation), or if only a portion of the text is preserved.

Mathieu Ossendrijver looks at the practice of textual segmentation in the Babylonian astronomical sciences in a later period (the first millennium BCE). At that time, this field underwent major changes. In particular, different operations such as observation, prediction of events and procedural knowledge, which were previously dealt with in a single textual genre, became more and more separate from each other, which led to the emergence of several distinct genres of works. This separation resulted, among other things, in the emergence of a new kind of specialized procedure texts in mathematical astronomy. Correlatively, this led to a new hierarchical system of text divisions, ranging from tablets to clusters of procedures, procedures, and finally sub-procedures, where each level of segmentation was indicated by different graphical markers as well as rhetorical or operational features. These tools are particularly helpful for the reader, since they enable him/her to get his bearings in the corpus and to select the appropriate procedure or sub-procedure. Using material and dispositional parts of text and adapting them to new scientific knowledge and practices was thus an important aspect of the evolution of astral science in ancient Mesopotamia.

The organizational strategies that underlie the divisions of texts into parts are discussed more specifically in Part III, in different contexts, namely ancient China, ancient Greece and classical India. Karine Chemla and Zou Dahai examine the meaning of one of the segmentations of *The Nine Chapters on Mathematical Procedures*, which is the earliest surviving mathematical treatise transmitted in the Chinese tradition. Its very title emphasizes its architecture, namely, its division into nine parts. Interestingly, this organization is completely absent in mathematical manuscripts found in tombs sealed in the few centuries before the beginning of the Common Era. Further, as Chemla and Zou emphasize, the presence of these manuscripts in tombs seems to indicate that mathematical texts did not fall victim of the first Qin emperor's edict to burn the books. However, *The Nine Chapters* did, if we believe the testimony of the first commentator who in the third century outlines the story of the book. In their attempt to interpret this difference, Chemla and Zou argue that it is precisely the way *The Nine Chapters* was divided, namely with nine chapters, that explains probably why this text was associated with Confucian scripture, and accordingly burnt after the first Qin emperor's edict to burn the books. Far from being just an organizational detail or tool, the internal architectural organization thus raised this mathematical text to the status of a Confucian classic.

Micheline Decorps' paper explores the practice of dispositional parts of text in Apollonius of Perga's treatise on *Conics* (third century BCE). Firstly, it locates the work in the context of its writing since, from the outset, Apollonius attempted, by choosing a certain kind of division, to emphasize the underlying conceptual logic and to connect it to the Euclidian tradition. In that respect, the information given by Apollonius himself in paratextual elements (prefatory letters inserted at the beginning of each book) is particularly significant. He uses the main segmentation into books and the different levels of subdivision not only to fit to the material constraint of writing on papyrus scrolls, but also to organize the mathematical themes as well as the kinds of approach, and to make cross-references to other works easier. Decorps investigates the consequences of these features on the transmission of the text and the alterations it was subjected to in late antiquity. She shows, for example, that the specialization of the parts resulted in the text being dismantled, so that some parts were better transmitted than others and one was lost. On the other hand, later commentators and editors employed divisions in different ways and with different strategies in mind. For instance, the identification of parts of text in Apollonius' treatise is of major importance in the edition produced by Eutocius of Ascalon in the sixth century CE, and it is used for the structuration of the scholarly work and comments in the new context of Hellenistic mathematics.

Karin Preisendanz studies the problem of text segmentation and chapter naming in the context of classical Sanskrit literature. She shows that the oral transmission of texts, which was more favored than writing in classical India, resulted in the early introduction of a variety of tools for the architecture and segmentation within the works, to make the memorization, the study and the recitation of the texts easier. She explores the complex taxonomy of such segments in different genres of Sanskrit literature. Focusing then on two foundational works of the medical and philosophical traditions, the *Carakasamhitā* and the *Nyāyasūtra*, she describes the

materialization of the segments, first in manuscripts and then in printed editions. In particular, she analyses the uses of devices of segmentation at a higher level in manuscripts combining a basic text with its commentary.

The three contributions in Part IV are more specifically devoted to the intersections between intertextuality and practices of writing parts of texts. Firstly, Florence Bretelle-Establet considers the division of a text into parts, not from the viewpoint of the material constraints or the strategies of internal organization, but from the viewpoint of discourse or conversational analysis, that is, when writers interrupt their own discourse to introduce parts of discourse borrowed from others, through the process of overt citation. She analyzes, both quantitatively and qualitatively, the systems of citations and quotations used in Chinese medical texts produced from the beginning of the eighteenth century to the early twentieth century, especially in peripheral parts of the Chinese Empire. These explicitly borrowed parts of text are integrated into the main text, but they are visually distinguished from it in a variety of ways (e.g. the layout, the syntax or the use of specific typographical tools). The diversity of these practices illuminates the editorial strategies, the context of publication and the intended audience, which is particularly interesting in a time when medicine and its associated writing conventions were not fixed by professional rules.

In the next chapter, Stéphane Schmitt focuses on the practice of using very special parts of text, combining features of both paratextuality and intertextuality, namely epigraphs, in the context of eighteenth-century natural history books. Epigraphs (i.e. parts of text set at the beginning of a book or a part of a book) appeared in the seventeenth century and became very widespread in every kind of literature during the Enlightenment. They were mostly (but not always) borrowed from other works, so that they contributed to establishing intertextual links in the same way as other kinds of quotations. But, at the same time, their advantageous position in the layout of the book made them play a significant part in the architecture and the status of the book. As a consequence, they had a diversity of functions, in connection with the content of the book, the other elements of the paratext (e.g. title, front illustrations...) and the context. As such, they can provide helpful tools to historians and reveal the strategies of the authors as well as the publishers. Furthermore, the practice of epigraphs was significantly different in various national contexts, suggesting local specificities for the functions of these parts of text.

The last contribution, by Fabien Simon, describes another kind of part of text used during the early modern period in the western world, namely, collections of languages and the building of 'paper linguistic cabinets of curiosities'. In such works, inventories of languages and alphabets were undertaken, just as animals, plants and stones were collected in natural history cabinets. In that respect, fragments of exogenous texts (e.g. samples of notable texts or tables of alphabets of various languages, from diverse sources, testimonies of travelers and missionaries on exotic idioms, etc.) were not only looked on as architectural elements of the book and as quotations borrowed from other works, but also as illustrations and precious objects to be displayed and even featured. These practices of text

collection and compilation are analyzed in the context of humanist culture and in connection to other genres of works representative of this period, such as commonplace books, in order to understand the intention of the authors as well as the expectations of the readers. Their evolution into the nineteenth century is discussed.

All these case studies give an overview of the various problems regarding the segmentation of scientific texts in different contexts. They show, we argue, that considering works from this angle, in connection with other approaches, can provide helpful keys to understanding the conditions and constraints of their production, the goals of their authors, as well as their uses and their reception.

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Chapter 2

Textual Places: “Parts of Text” and “Stretches of Text”



Julie Lefebvre

Abstract In this contribution, the property a text to be divided into “parts” is considered as one of the basic dimensions of written textuality. As such, the notion of “parts of text” is studied in the frame of a reflection about the discursive construction of “textual places”. The notion of “parts of text” is first clarified through its decomposition in two different categories, linked to a practice of text division: “dispositional parts of text” (e.g. the chapter) that depend on the internal structure of the discourse and “material parts of text” (e.g. the page) which are defined according to the material properties of the object on which the text is written (e.g. the book). The coexistence of these two categories is taken into account to understand the general system to which they belong. Secondly, “parts of text” are distinguished from “stretches of text”, that is to say from another type of textual place defined by the use of linguistic elements such as *ici* (here) or *ci-dessous* (below). These elements “map” the discourse, giving an image of what one can call its dynamic of writing. The whole study is based on the observation of linguistic elements belonging to contemporary printed texts written in the Western world and to various discursive genres.

2.1 Introduction

In this paper, I intend to work on the notion of “parts of text” from the stance of the linguistics of enunciation. This kind of approach aims to describe both how the subjectivity of the author/writer and how the specificity of discursive genres are

The research leading to these results has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007-2013)/ERC Grant Agreement No. 269804.

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shaped through the use of language units, for example through the use of lexical and grammatical items or through the use of syntactic constructions (Benveniste (1974)).¹ I aim to show how “parts of text” can be considered as one of the main dimensions of textuality, with which scientific writings, as much as the other fields of writing are confronted.

The issue of parts of text will thus be broached using obvious linguistic forms belonging to various discursive genres and to diverse fields of writing. These forms are collected in many contemporary printed texts coming from the Western world, and particularly from French authors. I will also give some examples of such forms in other areas, other times and other traditions of writings, based on the contributions gathered in the present volume. These forms are such as:

- (1) je reviens plus loin (VIII.2.2) un peu moins sommairement sur ces questions (I shall come back later (VIII.2.2) to these subjects in greater detail);
l’hypothèse proposée ici (the hypothesis proposed here);
voir supra, chapitre 3, p. 169 (see supra Chapter 3, p. 169);
le lecteur intéressé trouvera au chapitre 21 un complément d’information sur cette question (those interested will find further information on this subject in Chapter 21)

There is no doubt that these utterances organize the communication, giving directions and advice for the reader; sometimes preventing objections too (Borillo 1985). However important these discursive strategies may be, I shall not study them here but I shall focus on some components shared by these utterances that deal with an activity of localization inside the text.

These components can be divided up into two categories according to their linguistic nature. In the first category, there are nominal groups such as *chapitre 3* (chapter 3) or *p. 169*. These nominal groups are specific because each one contains a core noun that belongs to a series of nouns which I shall call “names of parts of text” (*chapitre* [chapter], *partie* [part], *page* [page], *volume* [volume], etc.). A second category brings together adverbial elements such as *ici* (here), *plus haut* (above) or *ci-dessous* (below). Some of these adverbial elements such as *ici* (here) or *plus haut* (above) can be used either in oral or in written discourses but other adverbial elements in this group are specific to written discourses, as this is the case for the French *ci-dessous* (below).

Depending on the nature of these components, different types of localization in the text are at work in the discourse, creating different “textual places” that I shall call, respectively, “parts of text” and “stretches of text”. My contribution to the understanding of the notion of “parts of text” will thus lie in the framework of a larger reflection concerning textual places. The definition of text with which I will work is in relation with the concept of text in the way it has been elaborated by the Western man of letters tradition, linked to the form of the book (Chartier 1991: 5). The book itself is thus seen as ‘an object to be handled’ (un objet qu’on a sous la

¹See Boch and Rinck (2010) for examples of recent works using this kind of approach in the field of scientific writing studies.

main), ‘huddled in a little parallelepiped which encloses it’ (qui se recroqueville [...] en [un] petit parallélépède qui l’enferme) (Foucault 1969: 34), ‘disposition of the progress of the discourse in the three dimensional space in accordance with a double measure: length of the line, height of the page’ (disposition du fil du discours dans l’espace à trois dimensions selon un double module: longueur de la ligne, hauteur de la page) (Butor 1992: 134).

The notion of “part of text” will be first raised with the question of the interpretation of the reference supported by nominal groups such as *chapitre 3* (chapter 3) or *p. 169* that are to be considered in the context of a practice of text division that uses two main types of division. The study of the characteristics of adverbial elements such as *ici* (here) or *ci-dessous* (below) will help highlight the difference between “parts of text” and what I shall call “stretches of text”. In these two parts of my paper, I shall begin with analyses showing how the interpretation of these nominal and adverbial components can be used as elements for characterizing writings.

2.2 “Parts of Text”: Connecting the Discourse to a Practice of Text Division

I shall first mention the notion of “*disposition*” (disposal, layout, device) introduced by Dionne (2008). The *disposition* of a text consists in the way text is organized in various units throughout the book, featuring different places and constituting a territory in which the text’s material is distributed. To begin with, “parts of text” could thus stand for units linked to the *disposition* of a text and receive names such as *chapitre* (chapter) or *partie* (part).

Studying the *disposition*, U. Dionne states:

it is difficult, regarding the disposition, to set measures and *exact* criteria, and [...] the relative proportions of a chapter, of a book and of a part can only be assessed as a *system*, this without any stable scale which would determine, for any type of unit, the number of pages or the number of volumes required (Dionne 2008: 306).²

To characterize units such as the *chapitre* (chapter) or the *partie* (part) would mean to relate these elements with ‘a set of tendencies, of relations, which change and reconfigure themselves from one epoch to another, and which each epoch does not *systematically* and equally respect’ (un ensemble de tendances, de relations, qui se transforment et se reconfigurent d’une époque à l’autre, et que chaque époque ne respecte pas *systématiquement*) (Dionne 2008: 271). Always relative to a given system, these units escape any attempt of absolute characterization. To study the

²Il [est] difficile, en matière dispositive, d’établir des mesures et des critères *exacts*, et [...] les proportions relatives du chapitre, du livre et de la partie ne [peuvent] être appréciables qu’en *système*, sans le recours à une échelle stable qui déterminerait, pour chaque type d’unité, le nombre de pages ou de volumes prescrits.

chapter means thus to study an epoch and frequently a discursive genre, as U. Dionne did in his work on the chapter in the French novelistic discourse of the Classical and Romantic periods (Dionne 2008).

To go on with a definition of “parts of text”, I shall go back to the example mentioned above: “voir *supra*, chapitre 3, p. 169” (see *supra* chapter 3, p. 169). I shall propose here to see a second type of parts of text in nominal groups such as “p. 169”. Parts of texts that relate to the textual *disposition* such as *chapitre 3* (Chapter 3) and parts of text such as *p. 169* that I shall characterize below both result from a practice of text division and together constitute what appears to be different systems of parts of text. In other words, a unit such as a chapter is defined through its relations with other textual units that are involved in the text’s *disposition*, but it has also to be defined through textual units of a different textual order from the one established by the *disposition*.

From a few general observations stemming from the history of reading and writing in the Western world, I shall illustrate the features of these two types of parts of text and how they relate to each other. I shall then show how these elements, once considered, can give an opportunity to explain different parts of text systems.

2.2.1 *Dividing up the Text: One Practice, Two Orders of Division*

What one calls “text division” appears to be an old practice, initially used for reading. Indeed, from the Hellenistic epoch, one observes ‘a series of devices (signs such as *paragraphos*, *coronis* indicating the end of a text) which divide up the text and the sections of each text’ (une série de dispositifs [signes de *paragraphos*, *coronis* marquant la fin d’un texte] qui divisent le texte et les sections de chaque texte) (Cavallo and Chartier 1997: 18). In Latin texts, one might notice the existence of ‘an old Latin tradition which also consists in dividing up some texts—specifically legal texts, for instance—, this being done with the help of “rubrics”, that is to say with subheadings preceded by R and written with red ink—which justifies their name’ (une vieille tradition latine, celle de diviser certains textes, surtout juridiques, à l’aide de “rubriques”, c’est-à-dire de sous-titres précédés de R et copiés à l’encre rouge, d’où leur nom [...]) (Petitmengin 1990: 135).

This practice seems to have increased during the twelfth century with the renewal of the conception of the reading act promoted by the scholastic model. Reading had thus to be ‘fragmented and piecemeal’ (fragmentaire et morcelée) (see Hamesse 1997: 136), the division of one text would be necessary for the set or, at least, for the strengthening of one ‘true technical system supplementing the reading and consultation of the book and designed to quickly identify the passage being sought’ (véritable système de techniques auxiliaires de la lecture et de la

consultation du livre, destinées à identifier rapidement le passage que l’on recherch[ait]) (Cavallo and Chartier 1997: 28).

Rouse (1981: 130) observed three main methods in this practice of dividing up a text in the thirteenth century. One could divide up a text (1) either according to ‘divisions within the text, that means [the] book and [the] chapter’ (divisions dans le texte, c’est-à-dire [le] livre et [le] chapitre), (2) or according to ‘artificial sections of the same length, in writing down alphabetical letters in the margin’ (sections artificielles de même longueur, en inscrivant dans la marge des lettres de l’alphabet), or (3) following the material division of the ‘manuscript according to the “*feuillet*” or to the pages facing each other, with their page, column, line’ (manuscrit d’après les feuillets ou les pages ouvertes face-à-face, avec leur page, colonne, ligne).

As the first and the third of these methods seem to be commonly used today in printed texts, I shall draw on Rouse’s descriptions of these particular methods to highlight the conceptions of a text that derive from these processes of textual division.

Dispositional Parts of Text: the Text as an Edifice

In the first method mentioned, dividing up the text is dependent on “divisions within the text” (Rouse 1981: 130). Dividing up the text means, then, to rely on what one could call the internal architecture of the discourse, characterized by its hierarchical organization. I shall call the parts of text resulting from this way of dividing up “dispositional parts of text” in reference to the notion of *disposition* mentioned above. As this first method acts on two levels, two types of dispositional parts of text are to be distinguished.

In a first case, a partition is made between the “body of text” and what appear to be neighboring textual elements such as the preface, epigraph,³ bibliography, appendix, table of contents or index. As these elements do not belong to the hierarchy that characterizes the body of text but yet depend on it, they can be called “paratextual parts of text”.⁴

In a second case, the body of text itself is divided up into several elements like, for example, parts, chapters or sections. The first characteristic of these units is to reflect the position of the named part of text in the hierarchy of the body of text. I propose to call these units “intratextual parts of text”. These two types of dispositional parts of text are designated by different graphic and linguistic processes that indicate their place in the internal hierarchy of the discourse, and depend on regularities in the discursive genres and epochs. In the following lines, I shall give some examples of the most current of these processes for present times.

Visual processes such as the layout is one, playing with spaces and dealing, for instance, with typefaces, sizes, styles and colors of the letters, and thus ‘giving concrete expression of the structure of the text and of its articulations on different levels’ (rend[ant] sensibles la structure du texte et ses articulations à différents niveaux)

³On epigraphs, see the contribution by S. Schmitt in the present volume.

⁴On the notion of “*paratexte*”, see Genette (1987).

(Vairel 1992: 44).⁵ As the structuration of the discourse and the typography (understood here in a broad sense, as dealing with the layout and the letters) are mixed in this type of textual division, a “part”, a “chapter”, a “bibliography” or an “index” can be defined by their material characteristics, which reproduce, on a visual level, the hierarchical order directing the progress of the discourse. As for intratextual parts of text for instance, one can distinguish, in descending order, the chapter ‘beginning at the top of a page and in most cases, finishing without filling the page’ ([qui] commence en haut d’une page et se termine, sauf exception, par une page incomplètement remplie), the section ‘beginning and finishing in the course of a page, in most cases’ ([qui] commence et se termine, sauf exception, dans le cours d’une page), and the paragraph ‘beginning with a new line [...] and in most cases finishing with a not completely filled line’ ([qui] commence en alinéa [...] et se termine, sauf exception, par une ligne incomplètement remplie) (Vairel 1992: 44). In the same way, one considers that ‘the space between the different divisions has to be proportional to their hierarchical importance: the size of the space depends on the importance of the divisions’ (l’espace laissé entre les diverses divisions doit être proportionnel à leur importance hiérarchique: il est d’autant plus grand que les divisions sont importantes) (Vairel 1992: 44).

Dispositional parts of text can only be “expressed” in a visual way but, at the same time, they can be identified thanks to different numerical and lexical processes that work differently according to whether paratextual or intratextual parts of text are concerned.

One can thus note the existence of different numbering systems which use an ordered combination of numerals: “1.1.2.4”,⁶ for instance, or a combination of different categories of signs like “I A 1 a”.⁷ These systems mark the hierarchical relations between the parts of a same text, and more precisely, as this type of identification does not fit with the paratextual parts of text, between the intratextual parts of the same text. This property allows the first difference to be brought out in the designation of dispositional parts of text depending on their nature—paratextual or intratextual—: while a chapter or a part can be identified only by a numeral, this is impossible, for example, for a bibliography or a table of contents.

Two processes of lexical identification can be distinguished. In the first, a term belonging to a “lexicon of parts of text” (for example: paragraph, chapter, section,

⁵H. Vairel’s book uses the AFNOR and ISO norms current in ‘the presentation of papers in periodicals’, in the ‘presentation of PhD theses and assimilated documents’ and in the ‘presentation of scientific and technical reports’. AFNOR stands for the “Association Française de Normalisation” (French Association of Standardization). ISO: International Organization for Standardization.

⁶This is the case in the ‘international numerical system’, according to the national printing house (see Imprimerie Nationale 1990: 172).

⁷That is the case in the “traditional” numerical system, that ‘uses, in descending order, four categories of signs: roman numerals, capital letters, arabic numerals and letters in lower case’ (Vairel 1992: 50).

bibliography, *index*, appendix) refers to a part of text.⁸ A second process of lexical identification consists in using a title that identifies a part of text—identifies a part of text. This process of identification seems to be specific to intratextual parts of text, at least for the contemporary times on which these observations are based.

The previous observations showed that whatever the nature and the degree of their identification, these parts of text indicate one way of dealing with the text: one has always to go through its “parts”, through the ways they fit together, and though the resulting architecture.

Material Parts of Text: The Text as a Concrete Object

Unlike what I described above, to divide up the text ‘according to the “*feuillet*s” or to the pages facing each other’ (Rouse 1981: 130) does not presuppose a need to reflect the structure of discourse. The text is still divided up, but the divisions resulting from this activity are not linked with the internal construction of the discourse.⁹ They depend on the material and concrete structure of the object on which the text is written.

My research object, here, is the book, meant as an ordered collection of sheets of paper, but it is important to notice that it could have been an object of a totally different nature, as is the case for some of the contributions gathered in the present volume—for example, clay tablets, rolls of thin slices of bamboo stitched together, or papyrus scrolls.¹⁰

The parts of text that are defined by the object defined as a book—lines, pages or volumes, for instance—differ from each other only with their position in the series they make up. I propose to call these type of parts of text “material parts of text”. A continuous numeral system thus allows a part of text to be pointed at in the series it belongs to. This numeral mode, reflecting the organization of the concrete object, does not support gaps, breaks or repetitions: ‘numerals have to follow one another in numerical order, without gaps or double numerals: every sheet added or deleted at the last minute forces the entire pagination to be started again’ (les numéros doivent se succéder dans l’ordre des chiffres, sans qu’il y ait de vide ni de numéro bis: toute feuille supprimée ou ajoutée au dernier moment oblige à reprendre l’ensemble de la pagination) (Vairel 1992: 115). These numerals can also go with a noun belonging to a lexicon of parts of text, for instance, *ligne* (line), *page* (page) or *tome* (volume).¹¹ Unlike what was shown above, the reference to a material part of

⁸It is important to note that this lexicon seems to be developed in the various writing traditions, as many contributions gathered in the present volume show, for example: *zhang* (chapter) and *mu* (section) in the oldest Chinese book devoted to mathematics (see Chemla and Zou), or *im-šu* (section) in Old Babylonian mathematical series texts (see Proust).

⁹On this matter, it is interesting to note that this order, irrelevant to the internal organization of a discourse, is described as “artificial” while units like the chapter or the paragraph appear to be “natural”. See Rouse (1981: 130) and Vairel (1992: 44).

¹⁰See, in the present volume, the contributions by, respectively, Proust, Chemla and Zou, and Decorps-Foulquier.

¹¹This lexicon of material parts of text seems to exist in other traditions of writing: the term *dub* [tablet] is thus to be read in Old Babylonian mathematical texts (see Proust in the present volume).

text being made by one of these lexical units seems nowadays to be different, depending on whether this reference is used in a title of a textual unit or in the framework of an utterance appearing in the development. The noun *tome* (volume) seems thus to be frequent in titles of parts of text, while it is very rare for the nouns *page* (page) and *ligne* (line), one single numeral being generally used in this case.

To conclude this brief presentation of a second type of parts of text, I shall say that each of them, from the *ligne* (line) to the *tome* (volume), attests to a second way of considering the text, dependent on the features of the concrete object on which the text is written.

Modes of Coexistence Between Dispositional and Material Parts of Text

Once two types of parts of text have been defined—parts of text established as being in relation to the architecture of the discourse and parts of text defined as being in relation to the medium supporting the writing—the very nature of their mutual relations has to be examined. A quick return to the modalities of this coexistence (or concerning the early stages of this non-coexistence) in the book's history in the Western world, would give an idea of the possible varieties of relations between dispositional parts of text and material parts of text in various parts of text systems at work at different times.

First of all, one might notice that the related use of both methods of textual division shown earlier is quite recent. Thus, while we can observe text cutting practices subordinate to the internal architecture of the discourse from the Hellenistic period (like the forms of chapters or paragraphs; see Cavallo and Chartier (1997: 18)), practices which become more general and diversified from the twelfth century onwards (see Hamesse 1997: 132), it is later that the division of text taking into account the concrete reality of *codex* seems to have emerged and to have become a shared practice. At least with regard to *foliotation* and pagination (unlike line numbering, for example). In the manuscript culture, it is 'from the twelfth century [that] numbering systems by 'feuille' or column appear' (à partir du XII^e siècle [qu'] apparaissent des systèmes de numérotation par feuillets et par colonnes)¹² (Vezin 1989: 42). Concerning the incunabula, A. Labarre (1989: 237) remarks:

Pagination is one marker which every reader is now used to. Not that such thing existed in the earliest incunabula. Nevertheless, the habit to [foliotate] them has quickly spread, that is to say to number each recto « *feuille* », generally at the right top corner of the page.¹³

Later, during the sixteenth century, their use being normalized, were introduced into printed books: 'stable marking systems around the text: "foliotation",

¹²It is important to remark that that division into material parts might have appeared very early in other ancient writing traditions, such as in Mesopotamia. On the issue of the coexistence between dispositional and material parts of text in other traditions, see the contributions by Proust and Ossendrijver about segmentation in Babylonian texts in the present volume.

¹³Un repère auquel est habitué tout lecteur d'aujourd'hui, c'est la pagination. Rien de tel n'existe dans les premiers incunables. Cependant l'habitude s'est rapidement prise de les folioter, c'est-à-dire de chiffrer chaque feuillet au recto, généralement au coin supérieur droit de la page.

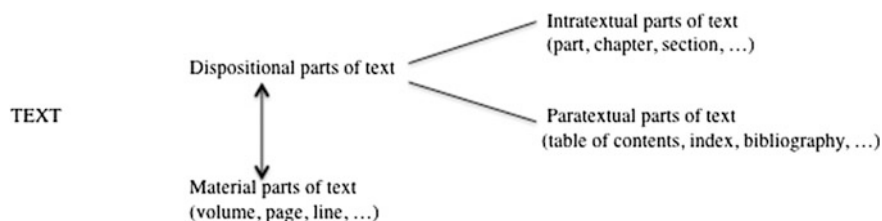


Fig. 2.1 Components of a system of parts of text

pagination, “zonation” (like in the maps of our towns), these systems allow the individual and singular handling of the text’ (systèmes de repérage stables autour du texte: foliotage, pagination, zonage [comme sur nos plans de ville], systèmes qui permettent la manipulation individuelle et indéfiniment renouvelable du texte) (Laufer 1989: 583). These few elements concerning the genealogy of the two modes of textual division show that today’s printed books use one of the possible configurations of text division, which is the one which associates the two orders of textual cutting mentioned above.

2.2.2 *Proposals for the Description and the Interpretation of Parts of Text Systems*

In this first part of my paper, I have made two distinctions concerning the different components of a system of parts of text. First of all, between dispositional parts of text linked to the architecture of a discourse and material parts of text, dependent on the written support. Then, among dispositional parts of text, we find paratextual parts of text constituting the peripheral parts of the body of the text, and intratextual parts of text dividing the inner body of the text. These distinctions are represented in the following diagram¹⁴ illustrated with parts of text relevant for Western writings (Fig. 2.1)

As has been said before, different processes of identification of a part of text are involved in the practice of text division. These processes are used in two modes of identification: one should distinguish between, on one side, an activity of naming a part of text (for example using a title) and, on the other side, an activity of making a reference to a part of text considered as already named. Different aspects of parts of text systems can be illuminated according to the mode of identification that is examined.

¹⁴The double arrow indicates the relations established between the two kinds of parts of text.

Parts of Text Labels and Description of the Structure of Parts of Text Systems

In the first mode of identification, the elements that identify a part of text are present, playing a labeling function rather similar to the function played by a caption associated with a diagram, or to the function played by a title associated with a picture.¹⁵ This is the case for dispositional parts of text in the text's development, when a title shows the beginning of a new part of text, or, for material parts of text, when a number identifies a page in a corner of a sheet of paper belonging to a book. As I do not discuss these types of utterances in the present paper¹⁶ I shall now draw up a brief recapitulation of questions that could be raised while observing the ways in which parts of text are labeled through the use of typographic and/or numerical processes, as through lexical processes such as titles found in the text's development.¹⁷ These questions aim to describe the general structure of one "parts of text" system.

Considering one particular discursive genre (the scientific essay, for example) and/or one specific epoch, the following questions might appear:

- A. Distinction between dispositional parts of text and material parts of text:
 - Are both types of parts of text at work?
 - In that case, what is the precise nature of the relation between the two of them?
- B. Distinction between paratextual parts of text and intratextual parts of text:
 - Are the two levels of text cutting at work?
 - In that case, in which proportions?

To these two main lines of questioning one could add some observations linked to the nature (typographical, numeral, lexical nature) and to the degree of identification of parts of text.

For instance, one could briefly remark that a scientific essay and a novel, in the French-speaking area today, are not the same from the point of view of their respective systems of parts of text. Scientific papers contain a great amount of paratextual parts of text, while these are very rare in novelistic writings. The identification of the intratextual parts of text in novelistic writing is often only typographical and numerical (see Fig. 2.2, extracted from Bergougnieux 1997: 18¹⁸), while it is, at the same time, typographical, numerical and lexical in scientific writings (see Fig. 2.3, extracted from De Certeau (1990: 31)):

It could be interesting also to observe the nature of the "central" part(s) of text in the system under consideration. For instance, in what concerns dispositional parts of text, U. Dionne described the 'chapter trend' (*devenir-chapitre*) of the system of

¹⁵On this issue, see Bosredon (1997).

¹⁶See the examples given above in the Introduction.

¹⁷Unlike titles that would be collected in a table of contents.

¹⁸Bibliographic details of the examples are to be found at the end of the present paper.

II

De six à seize ans, j'ai enduré quatre séances hebdomadaires d'une heure, deux de solfège et deux de piano. Il y a quatre saisons, je le sais, mais c'est toujours aux défilés de novembre, dans la plaine désolée de janvier que m'entraînent un violon qui gémit, une gamme qu'on monte et redescend. On aurait souhaité inspirer à des gosses une irrémédiable aversion pour la musique qu'on ne s'y serait pas pris autrement.

La nuit était tombée lorsque, vers cinq heures, je passais le guichet. On n'y voyait à peu près rien. Une ampoule de vingt-cinq watts pendait à un fil dans la galerie qui menait du guichet à l'entrée du bâtiment, au linteau orné de bucranes. La cour était noyée d'ombre, infranchissable. Les feux des voitures qui passaient sur le boulevard, à l'extrémité opposée, semblaient appartenir à un autre univers. Une inexplicable odeur de caoutchouc brûlé stagnait dans le noir. Elle fut longtemps celle de l'hiver et garde, aujourd'hui encore, un arrière-

Fig. 2.2 Simple identification of a chapter

CHAPITRE II

CULTURES POPULAIRES

Quitter Vienne ou Cambridge, quitter les textes théoriques, ce n'est pas se séparer de Wittgenstein, instituteur de village de 1920 à 1926, mais partir vers la haute mer de l'expérience commune qui enveloppe, pénètre et finit par emporter les discours, si toutefois on ne se contente pas de substituer une maîtrise politique à une appropriation scientifique. Des souvenirs me reviennent, places de ces mutismes dans la mémoire. Ainsi, introduction à un séminaire sur la culture populaire du Nordeste brésilien, une marche dans la nuit alors bruyante de Salvador, vers l'Igreja do Passo. Contrastant avec le théâtre subtil de la Misericórdia, la sombre façade dresse dans sa dignité toute la poussière et la sueur de la ville. Au-dessus des anciens quartiers pleins de rumeurs et de voix, c'en est le secret, monumental et silencieux. Il domine l'étroite Ladeira do Passo. Il se refuse aux chercheurs qui l'ont pourtant là devant eux, comme leur échappe le langage populaire, venu de trop loin et de trop haut quand ils l'approchent. Bien différente de l'église do Rosário, toute bleue et ouverte, cette pierre noire lève la face nocturne de l'humour bahianais. Rocher imprenable bien que (ou parce que) familier, dépouillé de solennité, semblable aux chansons de la *saudade* brésilienne. A revenir de ce pèlerinage, dans les rues les

Fig. 2.3 Multi-identification of a chapter

parts of text at work in the French classic novelistic discourse. He showed how the competition between *chapitre* (chapter), *livre* (book) and *chant* (*canto*) has merged into the only use of *chapitre* (Dionne 2008: 271–362).

Paying attention to these elements, one should be able to describe a “set of trends” being characteristic of a system of parts of text. It would be thus impossible to describe clear distinctions and immutable relations between the different types of parts of text. This impossibility seems to be in relation with two specificities of parts of text. First, it is often difficult to link a part of text to one of the two kinds of text divisions presented above; to take the example of “paragraph”: is it an aspect of the layout or does it belong to the text?¹⁹ Then, the cutting up into dispositional parts of text appears to be a privileged place for the author/writer and for all the persons acting on the book to exercise their personal freedom, which makes the research of standards very problematic:

While in part determined by the discursive genre or by strictly literary considerations, the features of *tome*, *livre* or *chapitre* are still subject to chance, arbitrariness, and ad hoc and inconsistent decisions of authors, booksellers, printers or editors. The frequent double designation of units, like the flagrant contradictions, are no doubt inevitable in such an empirical subject, and also have to be considered as a dimension of the “system” (Dionne 2008: 271).²⁰

References to Parts of Text and Description of the Use of Parts of Text

In the second mode of identification, the elements for identifying a part of text are not necessarily present in the part of text to which they refer (unlike what was the case precedently in Sect. 1.2.1.); they refer to the part of text without labeling it, only referring to it as one object among others. This is the case for the utterances I have chosen to discuss in this paper such as “je reviens plus loin (VIII.2.2) un peu moins sommairement sur ces questions” (I shall come back later (VIII.2.2) to these subjects in greater detail), “voir *supra*, chapitre 3, p. 169” (see *supra*, chapter 3, p. 169) or “le lecteur intéressé trouvera au chapitre 21 un complément d’information sur cette question” (those interested will find further information on this subject in chapter 21). Numerals (VIII.2.2.) and noun phrases (chapitre 3, p. 169, *chapitre 21*) then refer to parts of the text to hand without labeling them.

It is important to note that this mode of identification of a part of a text is also to be seen in utterances that contain what one could call “bibliographic references”. In these utterances, noun phrases refer to parts of a text that are different from the one in which the utterance is written. In other words, they are not localizing a place inside the same text, as it is the case for the utterances we are interested in here. In a footnote

¹⁹See Arabyan (1994). See also Proust in the present volume for a discussion on the nature of the part of text called *im-šu* (section) in Old Babylonian mathematical series texts.

²⁰S’ils sont déterminés en partie par des considérations génériques ou strictement littéraires, les régimes du tome, de la partie, du livre ou du chapitre restent néanmoins soumis au hasard, à l’arbitraire, aux décisions ponctuelles et incohérentes des auteurs, des libraires, des imprimeurs ou des éditeurs. Les doubles désignations d’unités sont fréquentes, comme les flagrants contresens: ils sont sans doute inévitables dans une matière si empirique, et doivent sans doute être considérés, eux aussi, comme partie du ‘système’.

localized in U. Dionne's work (Dionne 2008: 319), the nominal group "p. 417–418" of the utterance "J. Dürrenmatt, "Un problème de division. Ou comment Sterne et Diderot chapitrèrent le roman", Poétique, n°96, 1993, 415–431, p. 417–418", refers to a part of text that belongs to a text other than the one in which this utterance is formulated: here, it refers to a part of a text whose author is J. Dürrenmatt.

In both cases, these nominal groups and numerals refer to the text as being already cut up, its parts having been already named. To study these elements means, then, to study the way he or she who is writing uses the parts either of his/her own text or those of another text.. This kind of study provides information on how the author/writer works with his/her text and other texts, and how he/she imagines the readers working with his/her text or other texts.

In what follows, I shall give some examples of analyses of such references to parts of text. Rather than giving results, I present a method of analysis. The corpus on which I work is composed of utterances containing references to parts of text, collected in footnotes belonging to contemporary books (from the last fifty years) representing various discursive genres.²¹

The attention paid to the kind of text division to which the names of the parts of text refer in these utterances highlights three ways for the authors/writers to refer to parts of their own text, with utterances in which:

- (a) a part of text noun refers to a part of the discourse's hierarchy, for instance *paragraphe* (paragraph), *section* (section), *chapitre* (chapter) and *partie* (part),
- (b) a part of text noun refers to a part of the text considered as a concrete object, for instance with *page* (page) and *tome* (volume),
- (c) the combination of different part of text noun refer both to architected parts of text (Type a) and to material parts of text (Type b).

Each of these three types leads to different ways of considering a text.

One can thus observe Type a in forms like the following, extracted from a lesson about quantum mechanics (Feynman et al. 1979: 159/159²²):

- (2) À cause de ce moment, l'énergie dans un champ électrique ε dépendra de l'orientation moléculaire*.

* Nous sommes désolés d'avoir à introduire une nouvelle notation. Comme nous avons utilisé **p** et *E* pour l'impulsion et l'énergie, nous ne voulons pas les utiliser à nouveau pour le moment dipolaire et pour le champ électrique. Rappelez-vous que dans cette **section** μ est le moment dipolaire *électrique*.

The image of the text is one of an architected writing, a characteristic that is reinforced when several terms referring to dispositional parts of text are mentioned

²¹See Lefebvre (forthcoming).

²²The first number refers to the page on which the body of the text is written, and the second number refers to the page on which the note is written. In the examples, letters in bold type are mine, with the exception of "**p**" in Example (2).

in the utterance, as in the following example, extracted from a scientific biography (Roudinesco 1993: 26/579):

- (3) Et encore: « Quand Emile l’envoyait “au coin” pour le punir, au lieu de l’éduquer paternellement, si c’est ça un père, je le maudis! Cependant, son père immédiat (Alfred) était aimant et aimé⁶. »

6. Lettre de M.-F.L. à E.R. du 3 octobre 1986. Voir aussi *infra* sixième **partie**, **chapitre v**.

One can observe Type b in forms like the following, extracted from a cookery book (Mathiot 1990: 299/299):

- (4) 1 kg de veau¹
1. Voir **p.** 284.

In this case, the text appears only on its material aspect, as an object to be handled and leafed through.

Finally, one can observe the combination of the two previous types in forms like the following, extracted from a history textbook (Bouillon et al. 1980: 184/184):

- (5) Aussi Poincaré s’en tient-il à la stabilisation du franc*.

*Sur cette question, voir les documents **chap. V, p.** 71 et 73.

In the same way, one could analyze how the authors/writers refer to the parts of a text written by someone else, and how they “seize” another text and elaborate images of this activity. Using the same corpus and looking at the different ways writers refer to the parts of texts written by others, I noted the following difference: Type b appears more often (with a frequency of 90%), while Types a and c are very rare (their respective tendencies are 7% and 3%). Here are some examples:

- Type b (extracted from Feynman et al. (1979: 243/243)):

- (6) Cette fréquence a été mesurée expérimentalement et le meilleur résultat, obtenu très récemment*, est $f = \omega/2\pi = (1,420,405,751.800 \pm 0.028)$ cycles par seconde(12.26)

* Crampton, Kleppner et Ramsey; *Physical Review Letters*, **Vol. 11**, **page** 338 (1963).

- Type c (extracted from a sociologic study, Bourdieu 1979: 27/27):

- (7) Preuve supplémentaire: bien qu’elle augmente aussi légèrement en fonction du niveau d’instruction (passant de 13% chez les moins diplômés à 18% pour ceux qui ont fait des études secondaires et à 23% pour les plus diplômés), c’est surtout en fonction du nombre de films vus que varie, et très fortement, la *connaissance des acteurs*, qui, à la façon de la connaissance des moindres événements de la vie des présentateurs et des présentatrices de la télévision, suppose une disposition plus proche de celle que demande l’acquisition des savoirs ordinaires sur les choses et les personnes de la vie quotidienne que de la disposition légitime; et, de fait, les moins diplômés

qui vont souvent au cinéma connaissent autant de noms d'acteurs que les plus diplômés des cinéphiles (18).

18–Parmi ceux qui ont vu au moins quatre des films proposés, 45% de ceux qui n'ont fait que des études primaires peuvent citer le nom de quatre acteurs contre 35% de ceux qui ont fait des études secondaires et 47% de ceux qui ont fait des études supérieures. [...] (Centre d'étude des supports de publicité, *Onzième étude sur les lecteurs de la presse*, 1975, 1ère **partie**, p. 242).

- type *a* (extracted from an essay presenting linguistics questions to a wide audience Hagège 1991: 27/27):

- (8) La thèse innéiste soutient que cette organisation hiérarchique est inscrite dans le code génétique, en vertu de principes comme le cycle transformationnel: selon ce dernier, pour former, par exemple, une phrase complexe, une même suite de transformations s'applique successivement à ce qui sera la proposition subordonnée de dernier degré (dans les langues comme l'anglais ou le français), puis à celle dont elle sera la subordonnée, et ainsi, de suite jusqu'à la principale²².

22. Cf. N. Chomsky, *Language and mind*, New York, Harcourt, Brace and World, 1968, **chap.** 2; *id.*, *Reflections on language*, New York, Pantheon Books, 1975, **chap.** 3.

Taking these remarks into account, one could put forward the hypothesis that it is different to refer to a text whether it is one's own text and to refer to the text of another author: in the first case, the way of referring to parts of text shows that the whole text is conceived of in an architected way, and in the second case, it shows that this other text is approached as an object to be manipulated.²³

2.3 “Stretches of Text”: Enunciation Taking Place in a “Paper Space”

In this second part of my paper, I intend to show how components such as *ici* (here) or *ci-dessous* (below) designate places that I propose to qualify as “stretches of text”. These components are often to be seen in nearby nominal groups supporting references to parts of text (for example: *voir ci-dessus, chapitre 3* [see above, chapter 3]), but they can also be used independently (for example: *l'hypothèse proposée ici* [the hypothesis proposed here]; *voir ci-dessous* [see below]).

To start my presentation, I shall evoke the properties of the adverb *ici* when it is written and when it is used deictically, which means that the reference to a place that it implies depends on the enunciation and on its parameters. A first consequence of

²³It would be interesting to study the way the author/writer refers to one of his/her earlier texts.

this characteristic is that, unlike what happens for nominal groups referring to parts of text,²⁴ this adverb refers exclusively to a place in the text that is “held in the hands” (and not to a place localized in a different text). In the following example (extracted from a synthesis about the biology of human populations (Langaney 1988: 130–131), *ici* (here) refers thus to the space in which the enunciation takes place:

- (9) Nous aurons l’occasion, dans les chapitres qui suivent, de retrouver, à propos des mécanismes de l’évolution humaine, plusieurs exemples de variabilité chimique des protéines. Nous n’en donnerons donc pas d’autres **ici**, nous contentant de rappeler les principales conclusions qui se dégagent de ces études...

In this utterance, reference is made to a space that is not geographic in the sense that this is not the physical place in which the one who is writing is standing to hold his discourse, and that can be characterized as a textual space. Some historical elements shall explain what is at stake in this written use of the adverb *ici* (here).

The *ci* of “textual reference” (Perret 1988) became more widespread in the fourteenth to fifteenth centuries in the first texts written in prose and in vernacular. These texts being not yet organized in units such as chapters, the structuration of text was provided by ‘internal utterances announcing the end of one episode, and the beginning of another’ (des énoncés internes annonçant la fin d’un épisode et le début d’un autre) (Perret 1988: 108) such as *cy commence l’ystoire* (here begins the story) (mentioned in Perret 1988: 119). Tending to replace the adverb *or* (now) in the utterances having a function of structuration in these texts at that time, the *ci* of “textual reference” underlines the move from a temporal to a spatial localization system. This move is the result of a ‘new structuration of the enunciative space’ (restructuration de l’espace énonciatif):

the primary enunciative relation between the speaker and his audience which had been designed to be immediate and was represented as such, becomes delayed—designed to be, and represented as direct, it becomes mediatized by the writing, by the *book*. Through a series of transfers, the initial undefined enunciative space where the speaker was in the presence of his audience, has become the material space of the book (Perret 1982: 181).²⁵

In the continuity of this ancient *ci* of “textual reference”, the adverbs such as *ici* (here) or *ci-dessous* (below) are thus involved in an activity of localization in a space that can be characterized as a “paper space” organized as a book²⁶ in the case I am studying here. I shall use the description of the referenciation mechanism of

²⁴See above.

²⁵La relation énonciative primaire entre le locuteur et son public qui avait été conçue, puis représentée comme immédiate, devient différée—conçue et représentée comme directe, elle devient médiatisée par l’écriture, le *livre*. Par une série de déplacements, l’espace énonciatif des premiers temps, espace indéfini où locuteur et public étaient en présence est devenu l’espace matériel du livre.

²⁶And not as a postcard or as a poster, for example.

these adverbs to present the characteristics of this second type of textual places. I shall then give some examples of analyses paying attention to the use of these adverbs in various writings.

2.3.1 *Referring to the Writing Support, Referring to the Written Line*

For the French language in the fourteenth to fifteenth centuries, the adverb *ci/ici* (here) refers strictly to itself when it is used for text structuration:

the *ci/ici* of textual reference appears in utterances that cannot be made negative, in the present or future tenses; it cannot be replaced by *ci/ici* + adverb: it is a *ci/ici* that is often performative and always refers strictly to itself: it refers only to the place occupied by its graphemes (Perret 1988: 106).²⁷

This strict *sui*-reference of the *ci/ici* of textual reference is abandoned at the end of the fifteenth century. A broader *sui*-reference replaced it, that still characterized the *ci/ici* supporting a function ‘de commentaire ou d’attestation’ (of commentary or of testifying) a century ago:

the *ci/ici* supporting a function ‘of commentary or of testifying’ is seldom at the beginning of an utterance; it can be replaced by *ci* + adverb; it can appear in a negative utterance and in tenses other than the present and the future: it builds a “*sui*-reference” in a broad sense: it both designates the textual space where it occurs, and an antecedent, adjacent, following or including space (Perret 1988: 106).²⁸

Making the hypothesis that this characteristic remains, in the contemporary French language and in its deictic written use, the adverb *ici* (here) does not refer to the ‘place occupied by the graphemes’ (lieu de l’occurrence) of *ici* (here) but to ‘the place where graphemes are written down’ (au lieu où est prononcée [son] occurrence) (Perret 1988: 119).

There are different types of places designated by *ici* (here) according to the extent of the space to which this adverb refers in relation to the place occupied by its graphemes. This extension can either be the result of an expansion of this place being thus included in the place that is designated, or it can be the result of a ‘shifting backwards or forwards’ in relation to the occurrence of *ici* (here) thus not contained in the place that it designates. These two types can be observed in the following utterances (extracted from Feynman et al. (1979: x and 270)):

²⁷[Le *ci/ici* de référence textuelle] apparaît dans des énoncés non négativalbles, au présent et au futur; il n’est pas paraphrasable par *ci/ici* + adverbe: c’est un *ci/ici* souvent performatif et toujours *sui*-référentiel au sens étroit: il ne désigne que la place occupée par ses graphèmes.

²⁸[Le *ci/ici* de ‘commentaire ou d’attestation’] n’est presque jamais en début d’énoncé; est paraphrasable par *ci* + adverbe; il peut appartenir à un énoncé nié, à d’autres temps que le présent et le futur: c’est un *ci/ici* *sui*-référentiel au sens large: il désigne à la fois l’espace du texte où se produit l’occurrence et un espace antécédent, adjacent, suivant ou englobant.

- (10) ... avant tout, c’est Richard Feynman qui nous raconte **ici** la mécanique quantique.
- (11) Comme les coefficients sont différents,

nous écrivons $a_n = ge^{ikxn} + de^{ikxn}$, pour $n \geq 1$.

Ici g est l’amplitude d’une onde allant vers la droite et d celle d’une onde venant de la droite.

In the first example (localized in the introduction of the book), *ici* (here) refers to the space of enunciation as being that of the written support—a book—this space including the one occupied by the occurrence of *ici* (here). In the second example, the space of enunciation attached to the adverb *ici* (here) is the written linearity inscribed in the book and forming a graphic line. In the first example, *ici* (here) can be thus replaced by a commentary such as “in this book”, while a commentary such as “in the previous lines” seems to be more convenient in the second example. In both cases, *ici* (here) designates a boundless “stretch” of text, whose dimensions vary, its length always being to be interpreted in relation to the occurrence of the *ici* (here) that is examined.

2.3.2 *Ci-Dessous (Below), Plus Haut (Above), Plus Loin (Below), Infra*

Like *ici* (here), the adverbial elements *ci-dessous* (below), *plus haut* (above), *plus loin* (below), and *infra* refer deictically to textual places. I shall present here only their main characteristics.

These adverbial elements are first distinguished by their formal diversity. The adverbial phrase *ci-dessous* is built on the association between the adverb *ici* (here) and the adverb *dessous* (below); *plus haut* and *plus loin* are the result of the association between the adverb of comparison *plus* (more) and, respectively, an adjective and an adverb; *infra* is a Latin adverbial form that can be translated as “below”. One can also notice that most of these adverbial elements are made up from a “pair” organizing space in a symmetric way (*ci-dessus–ci-dessous*, *plus haut–plus bas*, *infra–supra*). Lastly, one can remark that *ci-dessous* and *infra* have exclusively a written use, while *plus haut* and *plus loin* have a written and an oral use.

In the present work, I cannot take all these differences into account to describe the mechanism of reference at issue in these adverbial elements. This is the reason why I choose to work only on the description of *ci-dessous* (*ci-dessus*), making the hypothesis that the main characteristics that I shall highlight are shared with the other adverbial elements. Let us consider *ci-dessous* and *ci-dessus* in the following utterances respectively extracted from Langaney (1988: 157) and from a published Ph.D. thesis in linguistics (Jeanneret 1999: 18–19):

- (12) Nous avons essentiellement considéré **ci-dessus** l’adaptation comme un phénomène génétique résultant de la sélection naturelle. En fait, il faut aussi

considérer d'autres phénomènes qui peuvent conduire un individu d'un génotype donné à exprimer différents phénotypes.

- (13) Cette théorie de la signification trouve ses fondements dans la philosophie analytique. Nous en rappelons **ci-dessous** quelques présupposés de base sans la résumer de manière exhaustive.

As they are composed with *ici* (shortened to *ci*) (here), *ci-dessous* and *ci-dessus* share its properties: they designate a place deictically, this place being localized in a paper space organized as a book. Unlike *ici* (here), these adverbial elements have only one interpretation: they refer to the graphic line composed with written signs and, more precisely, they designate a portion of this line. The textual place designated in this way is localized “upwards” (in what concerns *ci-dessus*) or “downwards” (in what concerns *ci-dessous*) in relation to the place where the adverbial element is written. A chronologic order emerges from the textual space being thus oriented, writing appearing as taking place in a “spatial chronology”.

2.3.3 Prospects for Analyses

Various questions can be asked on the basis of the characteristics of the adverbial elements that designate stretches of text. In this contribution, I shall touch on some of these questions that can help to characterize writings in the framework of discourse or text analysis. I shall illustrate this kind of approach with limited analyses carried out on two corpora bringing together various writings belonging to different disciplines and to different discursive genres.

The first corpus has been composed to study utterances including the adverb *ici* (here). It is composed of four texts, where all occurrences of *ici* were collected:

- a lesson about quantum mechanics (first cycle in university): Feynman et al. (1979),
- a linguistic essay about the grammar of written language: Gardes-Tamine (2004),
- conversations with the philosopher René Girard: Girard (2008),
- and an analysis of the work of the psychoanalyst Françoise Dolto: Bami and Delaroche (2014).

The second corpus has been composed to study utterances including adverbial elements like *ci-dessous* (below). It is composed of three texts of different lengths, in which all occurrences of adverbial elements like *ci-dessous* were collected. All of these texts can be considered, in different ways, as “syntheses”:

- a comprehensive survey concerning the recent history in the Middle East: Corm (2002),
- a philosophical essay aiming to characterize ancient philosophy: Hadot (1995),
- and a presentation, by a psychoanalyst, of the main concepts developed by Jacques Lacan: Vanier (1998).

I shall thus propose interpretations that should be confirmed in the frame of a larger corpus than the ones I have chosen, but I shall retain these interpretations here, my first aim in this paper being to provide tools and to present an approach for analyses to come.

As a preliminary, I shall explain that a first shared line could be traced, on one hand, between the discursive genres and the writings that do and do not contain the adverbial elements in which I am interested here, and, on the other hand, between the discursive genres and the writings that use them. In the following lines, only this last case is dealt with.

***Ici* (here): Different Spaces for the Written Enunciation**

Firstly, taking into account the two possible interpretations of *ici* (here), one could ask if the space of written enunciation, shared with the author/writer and the reader, is given as the material object being held in the hands (the book) or as the graphic line made with written signs, with which contact can only be visual. A first distinction could then be established between discursive genres and singular writings according to them using only one of these interpretations or both of them.

From this point of view, in the first corpus, it is possible to associate the lesson about quantum mechanics and the linguistic essay, these two books having recourse to both interpretations of *ici* (here), as I have already shown above with examples extracted from Feynman et al. (1979).²⁹ The same observations can be made in the following examples extracted from Gardes-Tamine (2004: 6, 90, 142, 158 and 191 respectively):

- (14) La grammaire proposée **ici** est avant tout syntaxique...
- (15) Sauf précision contraire, c'est dorénavant dans ce seul sens syntaxique que le terme d'amplification sera utilisé **ici**.
- (16) Il ne s'agit pas **ici** de redire ce que d'autres ont exposé de façon détaillée.
- (17) Je me borne à signaler **ici** ce point qui sera repris plus loin (voir p. 172 à propos de la glose).
- (18) Le rôle des textes sera envisagé dans le chapitre suivant. Ne seront donc évoqués **ici** que quelques cas de fonctionnements locaux destinés à poser les problèmes.

In Utterances (14), (15) and (16), *ici* (here) refers to the space of enunciation as the book, while in the Utterances (17) and (18), the space of enunciation respectively corresponds with the portion of the written line contained in the page on which *ici* (here) occurs, and with the portion of the written line making up the chapter to which

²⁹See above.

the occurrence of *ici* (here) belongs. One should remark that, in this first group of texts where the two interpretations of *ici* (here) are present, the attention given to the way in which these two interpretations coexist would allow the differences between various writings to be detailed. One could then observe if the two interpretations alternate throughout the book (that is the case in Feynman et al. (1979) and in Gardes-Tamine (2004)) or if one of these interpretations definitively replaces the other (my first corpus does not give examples of this configuration).

In a second case, as in the book editing conversations with René Girard and in the book about the work of Françoise Dolto, the occurrences of *ici* (here) only refer to the material support of the writing. They can only be paraphrased with a commentary such as ‘in this book’, as in the following examples ((19) to (22) are extracted from Girard (2008: 10, 14, 15 and 17 respectively); (23) is extracted from Bami and Delaroche (2014: 10)):

- (19) Mais si, dans ses livres précédents, René Girard avait surtout souligné les conséquences négatives d’un désir ainsi conçu, à savoir la dimension d’appropriation antagoniste, il évoque **ici** de façon plus explicite la valeur émancipatrice de l’imitation et...
- (20) En réalité, comme cela apparaît clairement **ici** dans le chapitre « L’homme, un “animal symbolique” », l’apparition « fortuite » du sacré...
- (21) L’approche par hypothèses et vérifications explicitement adoptée par Girard dans ses écrits a **ici** exigé une réflexion plus générale sur la méthodologie...
- (22) Certains ont vu dans l’apologétique chrétienne, proposée par les prolongements religieux de la théorie mimétique, le maillon faible de la « cathédrale girardienne », la dimension qu’il faudrait expulser d’une théorie qui sinon serait compatible avec le scepticisme ambiant. Girard montre **ici** que son discours est plus complexe.
- (23) Afin de restituer le plus fidèlement et le plus simplement la pensée théorique et pratique de la célèbre psychanalyste, nous voulons **ici** donner à entendre ce que fut et demeure sa parole généreuse, sa démarche originale, susciter chez le lecteur la curiosité de retourner à ses textes.

In each of these two cases, two more parameters seem important and should be taken into account. One could thus question the way in which the occurrences of *ici* (here) are distributed over the different moments of the internal structure of the text (foreword, introduction, development, conclusion). It is also interesting to be attentive to the distribution of the occurrences of *ici* (here) between the text and its paratextual elements such as footnotes, preface, postface or back cover.

Each of the four texts examined in the first corpus contains at least one occurrence of *ici* (here) interpreted as ‘in this book’, either in the introduction or in the foreword. These “textual thresholds” appear, then, in comparison with other places inside the text, as places of a high frequency of use of the occurrences of *ici* (here), announcing that the enunciation is being made in a space that is shaped as a book. One can also observe a high frequency of the same interpretation of occurrences of *ici* (here) in paratextual places such as the preface or the back cover. The back cover

is one of the first “meeting points” between the reader and the text produced by the combined work of the author/writer and his/her editor. We find occurrences of *ici* (here), announcing that the enunciation is being made in a space that is shaped as a book, in the following examples, both taken from the back covers of, respectively, Girard (2008), and Brami and Delaroche (2014):

- (24) Sous la forme d’entretiens avec deux universitaires qui l’interrogent sur son parcours, René Girard livre **ici** les principales étapes de son autobiographie intellectuelle.
- (25) Ils [Elisabeth Brami et Patrick Delaroche] abordent **ici** les problèmes quotidiens en vue de soutenir dans leur tâche délicate les adultes trop souvent démunis.

The study of the occurrences of *ici* (here) in the four texts making up the first corpus allows one thus to hypothesize an affinity between the use of *ici* (here) designating the material support for writing, and the discourse held in the inaugural moments and places of scientific writings (introduction, foreword, preface and back cover). This also occurs in Feynman et al. (1979): more than half of the totality of the occurrences of *ici* (here) interpreted as ‘in this book’ are to be found in the eight pages of the preface and the introduction,³⁰ their frequency being often of two occurrences per page, as one can observe in the following complete list of these occurrences (extracted from Feynman et al. (1979: vi, ix, ix and x respectively) to which the occurrences found in the Utterance (10) mentioned above has to be added:

- (26) Les cours qui suivent **ici** ne sont pas considérés comme un survol, mais sont très sérieux.
- (27) La méthode d’approche que vous trouverez **ici** est nouvelle, particulièrement pour le cours de deuxième année, et nous l’avons considérée surtout comme une expérience.
- (28) Ce que vous trouverez **ici**, c’est le compte rendu de la première expérience.
- (29) (...) pour la commodité de ceux qui ne disposent pas de ce volume, ces deux chapitres sont reproduits **ici** en appendice.

Ci-dessous (Below), plus haut (Above), plus loin (Below), Infra: Writing’s Dynamics

The occurrences of the adverbial elements *ci-dessus/ci-dessous*, *plus haut/plus bas*, *infra/supra* and *plus loin* raise the question of the localization of the stretches of text to which they refer in relation with the space where the ongoing enunciation takes place: are the stretches of text located upstream or downstream this space?

I shall show here how the attention given to what appears as a “lateralization” of the text allows the study of representations of different “writing dynamics” that could, once again, contribute to the characterization of writings. The following analyses are the result of the observation of utterances of such adverbial elements in the footnotes of the three texts composing the second corpus presented above.

³⁰This book is composed of 517 pages.

Indeed, in these three texts, the utterances containing such adverbial elements are almost always to be found in footnotes. Only one adverbial element of this kind was found in the body of the text by Corm (2002) (1068 pages), as the body of the text by Vanier (1998) (118 pages) and the body of the text by Hadot (1995) (461 pages) contains none of them.

In Corm (2002), fourteen out of twenty-seven adverbial elements (that is to say 51.8%) refer to a stretch of text belonging to a “spatial before” in relation to the space occupied by the ongoing enunciation and thirteen out of twenty-seven adverbial elements (that is to say 48.2%) refer to a stretch of text placed in a “spatial after” in relation to the space occupied by the ongoing enunciation. That is respectively the case in the two following examples (Corm 2002: 623 and 264 respectively):

- (30) Le Koweït fut un membre très actif de ces deux comités².
2. Voir **ci-dessus**, chapitre 12.
- (31) Il voulut aussi islamiser la législation égyptienne, reniant l’œuvre laïque de ses prédécesseurs depuis Mohammed Ali, en même temps qu’il prônait un retour à la démocratie libérale, aux libertés publiques et au pluralisme des partis².
2. Sur le fondamentalisme religieux d’État, encouragé par les monarchies pétrolières, voir *infra*, chap. 7.

The space of the ongoing enunciation is thus presented in equal relation with the upward and the “downward” of what is just written.

In Hadot (1995), twenty out of thirty adverbial elements (that is to say 66.6%) refer to an upstream stretch of text, while ten out of thirty adverbial elements (that is to say 33.3%) refer to a downstream stretch of text in relation with the space of the ongoing enunciation. This can respectively be observed in the two following examples (Hadot 1995: 36 and 99 respectively):

- (32) On remarquera à ce sujet qu’il semble bien que les présocratiques aient désigné leur démarche intellectuelle comme une *historia*, c’est-à-dire une enquête².
2. Cf. **plus haut**, p. 29; (...).
- (33) Leur fondation correspond seulement à l’utilisation du droit d’association en vigueur à Athènes².
2. Cf. **plus bas**, p. 156–157.

In this case, the space of the ongoing enunciation is shown as having privileged relations with the enunciation that has already been made.

Finally, in Vanier (1998), four out of eleven adverbial elements (that is to say 36.4%) refer to a stretch of text located above the space of the ongoing enunciation, while seven out of eleven adverbial elements (that is to say 63.6%) designate a stretch of text located below it, as, respectively, in the two following examples (Vanier 1998: 56 and 13 respectively):

- (34) Il en retire des traits distinctifs—le trait unaire—qui lui permettent d’assumer cette image en se retournant vers le miroir¹⁶.

16. Voir *supra*, chap. II.

- (35) Notre modernité montre bien l’urgence toujours renouvelée de cette tâche de civilisation qui est celle de la psychanalyse, ses enjeux ne se résumant pas à un « comment guérir? » — ce qui, pour autant, ne rend pas cette dimension subalterne comme en témoignent certaines des dernières interrogations de Lacan².

2. Voir *infra* chap. V.

The space of the ongoing enunciation has a privileged relation with the enunciation to come.

One can thus say that the writing dynamic represented in Hadot (1995) is characterized by a “backward looking trend”, while that represented in Vanier (1998) is characterized by a “forward looking trend”. Lastly, in Corm (2002), this dynamic can be qualified as “balanced”, looking both back and forward.

The observations concerning the nature of this writing dynamic can be explained by the study of the mode in which the two types of dynamic—backward looking and forward looking—coexist. From that perspective, one can see that every place of Hadot (1995)—be it located at the beginning, in the middle or at the end of the written line—can be put in relation with a “before” or an “after” space. In contrast, in Corm (2002), the writing dynamic is shown as organized in relation with what can be qualified as a “tipping point”. In these two texts, the adverbial elements designating stretches of text located below the ongoing enunciation belong to the beginning of the written line, while the adverbial elements referring to stretches of text located above the ongoing enunciation are to be found at the end of the written line. The “tipping point” is set differently, depending on the writing that is observed and it can be defined as the point of the written line from which a change affects the writing dynamic, a backward writing dynamic turning then into a forward dynamic.

2.4 Conclusion

In this paper, I have proposed a general approach to the issue of “parts of text”, considered as forming one of the dimensions of written textuality or, in other words, as being one of the ‘conditions of possibility of the written discourse’ (conditions de possibilité du discours écrit) (Laufer 1989: 583). I have thus considered that writings, whatever the genre they belong to, or the practices they are involved in, always have to deal with this dimension. In this framework, scientific writings, defined here as written ‘discourses produced in the framework of research and aiming to build and to diffuse knowledge’ (discours produit dans le cadre de l’activité de recherche à des fins de construction et de diffusion du savoir) (Boch and Rinck 2010: 5), seem to give a significant and explicit place to this dimension, and to the various ways the authors/writers are dealing with it. The contributions

collected in this volume show this, and, moreover, point out that the property of the text to be divided into parts is shared between different writing traditions and between different times.

I have tried to contribute to the understanding of the notion of “parts of text”, first by their decomposition into many general categories that have to be linked with a practice of textual division—“dispositional (intratextual/paratextual) parts of text”, “material parts of text”— then, by the introduction of the notion of “stretches of text”, opposing the notion of “parts of text” to another way of dividing the text and of referring to “textual places”. All of these categories have to be considered as tools for the analysis and for the interpretation of texts, which should be further discussed in the light of the problems their study, in relation with particular cases, will inevitably raise. Indeed, I have shown many of these problems are inherent to the nature of “parts of text”, whose most important and stable characteristic is to be part of a system resulting from the discourse in the making. “Parts of text” have thus to be studied in the framework of a system, changing with writing traditions and times. This system is composed of three poles—dispositional parts of text, material parts of text and stretches of text—the three of them or only a part of them being performed.

Beside the work of investigation of different parts of text systems, to which the present volume contributes, two important questions have to be discussed that I have put aside in this paper and that could give a deeper understanding of the notion of “parts of text”. One should first study the relations between the notion of “parts of text”, and the notion of “*paratexte*” proposed by G. Genette.³¹ Indeed, it seems that some textual elements that can be considered as paratextual, such as the index, bibliography or table of contents, can also be taken as “parts of text”, while other paratextual elements (titles, for instance) play a role in the definition of parts of text but cannot be considered as parts of text. One should also study the relations between the notion of “parts of text” and what one calls “citations”.³² The mention of discourses of others by the author/writer indeed occupies a special place in writings that can even be highlighted typographically, appearing thus as “pieces of text”: in what way could these textual elements present differences with what I have called here “parts of text”?

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³¹The contribution by Schmitt on epigraphs in the present volume deals with this question.

³²On this issue, see Bretelle-Establet in the present volume.

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Part II

Material Parts of Texts

Chapter 3

Segmentation of Texts in Old Babylonian Mathematics



Christine Proust

Abstract This chapter offers an analysis of the segmentation of texts into lists of mathematical problems written on clay tablets during the Old Babylonian period (early second millennium BCE). The study focuses on mathematical series texts, that is, long lists of statements written on several numbered tablets. Two aspects are considered: material segmentation (sections, columns, tablets...) and textual segmentation (statements, groups of statements), as well as the relationship between these two aspects. It is shown that the analysis of parts of text may be a powerful tool for the reconstruction of the entire series and for detecting the operations on texts which produced the series.

Abbreviations

MCT: Neugebauer, et al. 1945

MKT: Neugebauer 1935–1937

TMB: Thureau-Dangin 1938

3.1 Introduction

The bulk of known Mesopotamian mathematical texts, written on clay tablets in cuneiform script, dates from the Old Babylonian period (ca. 2000–1600 BCE). Among these texts, a large majority are school exercises written by young students in the framework of the elementary education of scribes. By contrast with ‘school

The research leading to these results has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007-2013)/ERC Grant Agreement No. 269804.

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texts', the other mathematical texts can be termed as 'advanced texts', even if the boundary between these two categories is not always clear. The context of production of advanced mathematical texts is uncertain but is probably linked to the activities of scribal schools. The geographical provenance of mathematical tablets is generally unknown because almost all of the tablets housed today in European and American Museums and private collections come from illegal excavations, and were bought by curators and collectors from antiquarians or dealers. As a consequence, many tablets found in the same *locus* have been scattered along the obscure pathways of the antiquities market. The discussion on parts of texts is affected by this history. Indeed, in most cases, we can access only isolated individual tablets, where, often, only a fragment of the text is preserved. Yet, if we examine segments of text at the scale of individual tablets, most of the relevant information is lost. The present discussion on parts of text is conducted from coherent lots, in which the nexus of texts can be grasped. For this reason, I focus on a tablet which belongs to a group that can be identified with a relatively high degree of probability. This tablet is preserved at the Louvre Museum under number AO 9071 and contains a list of problem statements.¹

AO 9071 belongs to a series, that is, a group of several numbered tablets. The serial organization is visible at the end of tablet AO 9071, where a colophon indicates that the tablet is the seventh in a series. With this minimal information, we can already distinguish two embedded parts of text: a portion of series text noted within a single tablet, which belongs to an entire series text noted on several numbered tablets. Other kinds of segmentation appear in this first glance when looking at the material aspects of the tablet (see the copy in the Appendix): the obverse and the reverse; the columns; in each column, the sections, that is, small boxes in which a text of one or several lines is noted; and finally, the lines. Zooming in more closely, many other levels of segmentation appear in the text. Zooming out to the series the tablet belongs to, higher levels of segmentation can also be detected.

In this chapter, I first describe the material and textual segmentation on AO 9071, and the relationship between these two kinds of segmentation. On this basis, I try to detect the textual operations which produced the text noted on this tablet, and more broadly in the series it belongs to. Specificities of practices with parts of text in series texts are highlighted. For this purpose, I compare the textual operations which produced the series texts to other practices developed in scholarly milieus in the Old Babylonian period, for example, the production of super-series (concatenations of series) and catalogues (lists of problem statements noted on a single tablet without serial numbers). It is shown that the examination of parts of text may be a powerful tool for the reconstruction of the entire series and for the detection of the operations on texts which produced the series.

¹I published this text in Proust (2009).

3.2 Tablet AO 9071

3.2.1 General Description

Tablet AO 9071 was bought by the Louvre Museum from a dealer, Elias Gėjou, before 1924, the year of its entry in the inventory (Proust 2009: 169). The provenience and date are unknown, but paleographic evidence shows that it is most likely that the tablet comes from a city in Southern or central Mesopotamia and dates from the Old Babylonian period. Closer examination of AO 9071 suggests that the tablet comes from the same context as other similar mathematical series texts.

The text covers both sides of the tablet, and, on each side, is organized into three columns. As usual on cuneiform tablets, the columns run from left to right on the obverse, and from right to left on the reverse, while, inside a column, the text is written from left to right and from top to bottom. The text on the reverse is the continuation of the text on the obverse when the tablet is rotated around the lower edge. The language is uncertain: the writing uses only Sumerograms (cuneiform signs representing Sumerian words or grammatical particles), but it is not clear if the text was supposed to be uttered in Sumerian or in Akkadian, or if it is a purely graphic artifact which does not represent any spoken language (see discussion in Proust 2009: 229–230). The text contains a list of 95 problem statements dealing with the length, the width and the surface of a rectangle. The solution of the problems is always the same: the length is 30 *ninda* and the width is 20 *ninda*. Most of the known examples of series text are based on rectangles with these same dimensions.

Each statement is inscribed in a box delimited by horizontal lines and by the vertical lines which also mark the columns (see photo and copy in Fig. 3.1).

The text ends at the bottom of the left column on the reverse with a colophon stating: “95 sections, this is the 7th tablet” (1(geš₂) 3(u) 5(diš) im-šu/dub 7-kam-ma)—see Fig. 3.2. Here, specific technical terminology relating to parts of texts can be recognized: the section (im-šu), and the tablet (dub).

3.2.2 The Sections: Boxes or Statements?

What is the entity named ‘im-šu’ in the colophon? Is it a box or a textual segment? At first glance, a section is a box which contains one statement. However, if we count the boxes on AO 9071, only 93 boxes are visible, while, according to the colophon, 95 ‘im-šu’ were counted by the scribe who wrote the tablet. A close reading of the statements makes it clear that horizontal lines were omitted inside the 37th and 50th boxes, and that both boxes actually contain two statements (Proust 2009: 194). Thus, the 95 entities counted in the colophon are the statements, not the boxes. Other examples show similar discrepancies between the number of statements and the number of boxes. For instance, YBC 4713 is the 10th tablet in a series and contains 34 problem statements dealing with the same rectangle as on AO 9071. However, according to the colophon, the tablet contains ‘37 sections’ (3(u) 7(diš) im-šu).

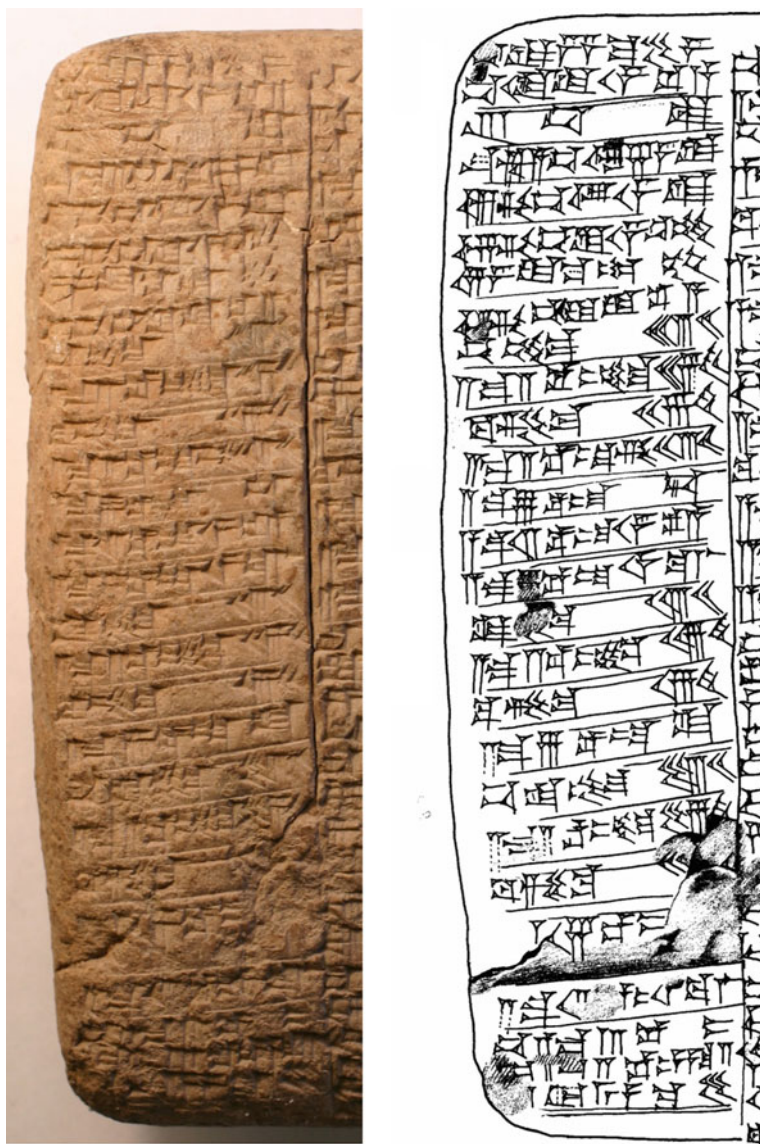


Fig. 3.1 AO 9071, obverse, Column i (photo and copy C. Proust, courtesy of the Louvre Museum)

This discrepancy can be explained by the fact that problem statements #9, #15 and #31 straddle two columns; thus, these statements cover two boxes. The scribe counted the boxes (37), which are more numerous than the statements (34). Another example, tablet YBC 4712 is the 13th in a series and contains 48 problem statements, again dealing with the same rectangle as on AO 9071. However, if we count the boxes, we find 49 boxes, because one of the statements (#8) straddles two columns.

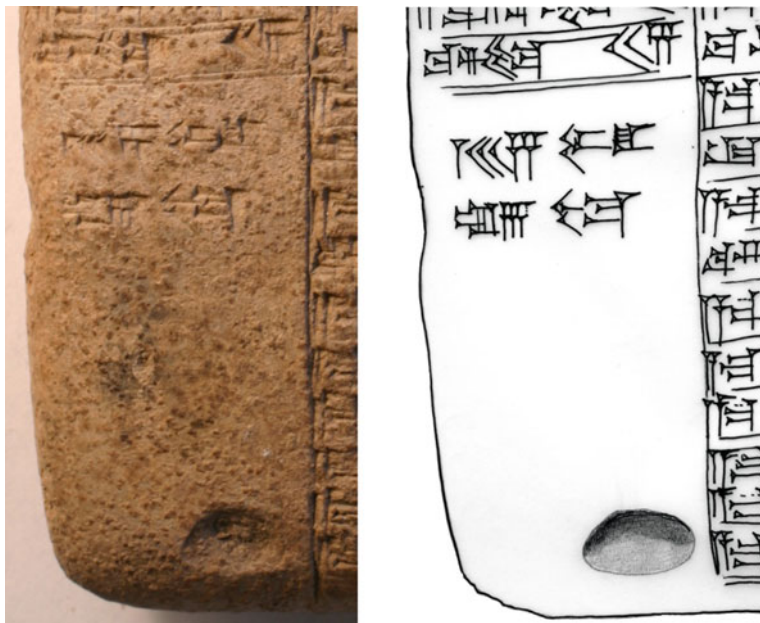


Fig. 3.2 AO 9071, reverse, bottom of Column iii (photo and copy C. Proust, courtesy of the Louvre Museum)

The colophon states that the tablet contains ‘48 sections’ (4(u) 8(diš) im-šu). In this case, the scribe counted the statements and not the boxes.² As we see, in many cases, there is no biunivocal relation between statements and boxes in series texts, and the items counted by the scribes are sometimes the statements and sometimes the boxes.³

These observations raise the problem of the meaning of the Sumerogram ‘im-šu’, which I translate as ‘section’. Word for word, ‘im-šu’ means ‘hand tablet’ (im = clay or tablet; šu = hand). In some literary texts, this term is used to designate a small round or square tablet containing a calculation or a literary school exercise, perhaps to be taken home as homework.⁴ In mathematical texts, the term ‘im-šu’ occurs only in

²Neugebauer already observed this phenomenon (Neugebauer 1935–1937: I, 433, Note 12a).

³As observed by Julie Lefebvre in her commentaries on the present paper (SAW seminar July 2013), ‘It seems that “im-šu” have somewhat the same status as “alinéa” in French: sometimes it only refers to a material phenomenon, a blank space generated by an indentation; sometimes it means the textual content (in legal texts, “alinéa 15”, for example).’

⁴It seems that this is the meaning of ‘im-šu’ in Lines 7 and 10 of the literary text published by Kramer under the title *Schooldays* (Kramer 1949). Kramer translates ‘im-šu’ as ‘hand copy’: ‘(In) the afternoon, my hand copies were prepared for me [...] I spoke to my father of my hand copies’ (kin-sig im-šu-mu ma-an-gub-bu-uš [...] ad-da-mu im-šu-mu KA in-an-dug₄-ma) (Kramer 1949: 201, 205). However, in his commentary, Kramer refers to the translation ‘section’ adopted by Neugebauer and Sachs: ‘In Line 7, ‘im-šu’ is to be rendered as “section” or “paragraph” according to Neugebauer and Sachs’ [*Mathematical Cuneiform Text*] 125.’ (Kramer 1949: 214).

relation to counted sections in the colophons of catalogues and series texts. The examples above show that at one and the same time, ‘im-šu’ means: the container (a box delimited by horizontal and vertical lines) and the content (the statement inscribed inside it). Sometimes, the first meaning dominates, as in YBC 4713, where the boxes are counted, and sometimes the second meaning dominates, as in YBC 4712, where the statements are counted. My translation as ‘section’⁵ designates both the textual segment (statement) and the material segment (box), which generally coincide, even if some exceptions appear on series tablets, as shown above. The word ‘section’ conveys some ambiguity, as does the Sumerian word ‘im-šu’.

Anyway, the facts that the sections are marked by visual elements—horizontal and vertical lines—and that they are counted in the colophon, suggest that for the ancient scribes, the sections are the basic units of text. In the following, other kinds of parts of text are detected through the analysis of how the textual sections are arranged.

3.2.3 Textual Segmentation

Do the sections form groups with some consistency? In other genres of mathematical cuneiform texts, for example, in catalogue texts, the list of statements is clearly organized in several groups, each group presenting high internal consistency. A good example of such coherent groups can be found on catalogue YBC 4657, in which 31 statements deal with the dimensions and the cost of an excavation. Three coherent groups can be detected by analyzing the statements. Moreover, two of the groups correspond to other tablets containing the procedure to be followed for solving the problems of the group: procedure text YBC 4663 contains the solutions of the first group of catalogue YBC 4657, and procedure text YBC 4662 contains the solutions of the third group of catalogue YBC 4657.⁶ (see Table 3.1).

The second group probably corresponds to a procedure text which has not been discovered, or identified. The last three statements do not really form a group and seem to have been added for another and as yet unclear reason. In each group, a given statement is not an isolated item, but shares common features with the other statements in the group, and the meaning of one individual problem comes from the meaning of the other problems in the group. It appears that, in catalogue texts, the groups of problems are delimited according to the nature of the procedures to be used to solve them. The procedures command the consistency of the groups.⁷

⁵I follow Neugebauer (1935–1937) in *Mathematische Keilschrifttexte I–III* (in German: *Abschnitte*), and Neugebauer and Sachs in *Mathematical Cuneiform Text*. Thureau-Dangin tentatively translated ‘im-šu’ as ‘case’ (Thureau-Dangin 1938: 148, Note 1). However, the French word ‘case’ (box in English) refers to material segmentation only.

⁶Tablets YBC 4657, YBC 4663 and YBC 4662 are Old Babylonian mathematical texts from southern Mesopotamia published in Neugebauer and Sachs (1945). For more details on the relationship between these texts, see Neugebauer and Sachs (1945: 73) and Proust (2012: 138).

⁷For a detailed analysis of the procedures in sets of problems, see Proust (forthcoming).

Can we detect such groups on tablet AO 9071? The textual segmentation on AO 9071 can be apprehended by examining the beginning of the text, for example the text noted in the first column of the obverse (see Fig. 3.1). The translation of the obverse, Column i, is the following (the section numbers headed by ‘#’ and the line numbers headed by ‘l.’ are mine).

#	l.	Translation
1	1.	The length and the width I added: 50 <i>ninda</i>
	2.	The length exceeds the width by 10 <i>ninda</i> .
2	3.	$\frac{2}{3}$ of the length: the width.
	4.	Half of the length and 5 <i>ninda</i> : the width.
4	5.	$\frac{1}{3}$ of the length and 10 <i>ninda</i> : the width.
	6.	$\frac{1}{5}$ of the length and the width to 10 <i>ninda</i> and the length I added,
5	7.	15 <i>ninda</i> and the length I added < : 1.25>.
	8.	$\frac{1}{3}$ of that by which the length exceeds the width
	9.	to the length I added: 33.20.
7	10.	2 times I repeated, I added : 36.40.
	11.	I subtracted: 26.40.
9	12.	2 times I repeated, I subtracted: 23.20.
	13.	9 times I repeated: the length.
11	14.	12 times I repeated: excess by 10 <i>ninda</i> .
	15.	6 times I repeated: less by 10 <i>ninda</i> .
13	16.	To the width
		I added: 23.20.
14	17.	2 times I repeated, I added: 26.40.
	18.	I subtracted: 16.40.
16	19.	6 times I repeated : the width
	20.	To the length and the width
17		I added: 53.20.
	21.	2 times I repeated, I added: 56.40.
19	22.	I subtracted: 46.40.
	23.	15 times I repeated:
20	24.	I equalized.
	25.	12 times I repeated: less by 10 <i>ninda</i> .
22	26.	The length 3 times I repeated,
	27.	the width 2 times I repeated, I added: 2.10.
22	28.	[The length] and the width I added: 50.

In the first statement (#1), the sum and the difference of the length and the width (implicitly of a rectangle) are given as, respectively, 50 *ninda* and 10 *ninda*.⁸ Even if no question appears, one guesses that tacitly the length and the width of the rectangle are being sought. This is a quite common problem, well attested in other Old Babylonian sources. A simple calculation leads to the solution, namely, the length is 30 *ninda* and the width is 20 *ninda*.

In the second statement (#2), the relation ‘ $\frac{2}{3}$ of the length is the width’ is given. This information is not sufficient to find the length and the width. Another relation between the length and the width is expected. Where is this other relation? Here, a general principle adopted in series texts is applied: when several successive statements use the same piece of information, this information itself only appears in the first statement; it is implicit in those that follow. According to this principle, the missing relation was already stated in the previous section, namely in the first line: ‘The length and the width I added: 50 *ninda*.’ Similarly, in #2–6, only one relation between the length and the width are given; the other relation necessary to find the length and the width is also that stated in the first line of #1. In short, statements #2–6 cannot be read independently: they depend on the first line of the first statement.

In Statement #7, we read ‘2 times I repeated, I added: 36.40.’ For a modern reader who seeks to solve the problem, something seems to be missing from this statement. What is repeated? What is added to what? Again, the missing information is to be looked for in the previous statement: what is repeated (i.e. doubled) is the expression given in #6, Line 8 ‘ $\frac{1}{3}$ of that by which the length exceeds the width’ (say, *P*). The result of this doubling of *P* is added to something given in #6, Line 9: the length (say, *S*). Thus, the relation given in #7 cannot be apprehended without the information given in #6. But another relation is necessary to find the length and the width: this missing relation is again that given in #1, Line 1. Finally, the statement in #7 depend on Statements #6 and #1. In the same way, Statements #8–12 depend on #6 and #1.

Statement #13 is similar to the previous ones, except for the expression *S*, which is no longer the length, but the width. It is the same for the following statements, #14–16, which thus depend on #13, #6 and #1.

In Statement #17, the expression *S* changes again: it is now the length plus the width. This is the same for the following statements, #18–21, which depend on #17, #6 and #1.

In Statement #22, a new complete statement is given, and the statements that follow, enumerated in Column ii, are generated with the same process as the one just described.

No marks indicate in the cuneiform text the way in which each statement depends on the previous ones, which make the reading of the statements quite difficult. For the modern reader, I introduced indentations which make these dependencies clear. This modern layout indicates the tree structure of the list of statements. The text displayed with such indentations, which does not exist in the original text, is reproduced below. This layout allows the modern reader to reconstruct the full statement represented by each actual elliptic statement noted in the sections.

⁸The *ninda* is a unit of length of about 6 m.

#	<i>l.</i>
1	1. The length and the width I added: 50 <i>ninda</i>
	2. The length exceeds the width by 10 <i>ninda</i> .
2	3. $\frac{2}{3}$ of the length: the width.
3	4. Half of the length and 5 <i>ninda</i> : the width.
4	5. $\frac{1}{3}$ of the length and 10 <i>ninda</i> : the width.
5	6. $\frac{1}{5}$ of the length and the width to 10 <i>ninda</i> and the length I added,
	7. 15 <i>ninda</i> and the length I added < : 1.25>.
6	8. $\frac{1}{3}$ of that by which the length exceeds the width
	9. to the length I added: 33.20.
7	10. 2 times I repeated, I added : 36.40.
8	11. I subtracted: 26.40.
9	12. 2 times I repeated, I subtracted: 23.20.
10	13. 9 times I repeated: the length.
11	14. 12 times I repeated: excess by 10 <i>ninda</i> .
12	15. 6 times I repeated: less by 10 <i>ninda</i> .
13	16. To the width
	I added: 23.20.
14	17. 2 times I repeated, I added: 26.40.
15	18. I subtracted: 16.40.
16	19. 6 times I repeated : the width
17	20. To the length and the width
	I added: 53.20.
18	21. 2 times I repeated, I added: 56.40.
19	22. I subtracted: 46.40.
20	23. 15 times I repeated:
	24. I equalized.
21	25. 12 times I repeated: less by 10 <i>ninda</i> .
22	26. The length 3 times I repeated,
	27. the width 2 times I repeated, I added: 2.10.
	28. [The length] and the width I added: 50.

Table 3.1 Groups in catalogue text YBC 4657

Catalogue text YBC 4657	Procedure texts
Group I (#1–8)	YBC 4663
Group II (#9–18)	
Group III (#19–28)	YBC 4662
#29–31	

Table 3.2 Independent groups (or cycles) on AO 9071

Group I	#1–21	obverse, Column i
Group II	#22–34	obverse, Column i–ii
Group III	#35–60	obverse, Column ii–iii–reverse Column iv
Group IV	#61–71	reverse Column iv–v
Group V	#72–93	reverse Column v–vi

Which parts of text can we detect in this extract of AO 9071? Statements #1–21 depend on the first line and thus form an indivisible group. Inside this group, two other sub-groups appear: the first includes Statements #2–6, which depend only on #1, and the second includes Statements #7–21 which depend on #1 and #6. But this latter sub-group can, in turn, be decomposed into three sub-sub-groups: #7–12, #13–16 and #17–21. A new cycle of interdependent statements begins at the bottom of Column i of the obverse and continues in Column ii (#22–34).

With this first analysis of the structure of the list of statements on tablet AO 9071, we have detected different levels of groups of sections. Considering the entire text noted on AO 9071, five independent groups (or cycles) can be recognized (see Table 3.2). Each of the five independent groups can be decomposed into sub-groups, each of which can be decomposed in turn into sub-sub-groups.

Table 3.2 shows that the textual segmentation into groups, sub-groups and sub-sub-groups on AO 9071 does not always adhere to the typographical segmentation into columns and sides. The second group (or cycle) begins at the bottom of the first column and continues on the second, and, in the same way, the other groups straddle columns. We have seen above (Sect. 3.2.2) that textual segmentation into statements does not always adhere to the material segmentation into boxes: for example, a statement may begin at the bottom of one column and continue at the top of the following column. As observed above, no visual marks such as double lines, a blank space or an indentation, nor typographical marks such as columns could help the ancient user of the tablet to localize the different parts of a full statement, scattered in several dependent sections. The groups, sub-groups and sub-sub-groups can only be identified from textual and mathematical considerations.

Contrasts between catalogues and series texts can be underlined. In series texts, the groups of problems are formed by systematic variations of the statements. Moreover, while the groups in catalogue texts are juxtaposed, the structure is more

complex on tablet AO 9071, as the five groups contain nested sub- and sub-sub-groups. Are these five apparently independent groups (or cycles) juxtaposed, or are they themselves embedded in a larger structure? The entire text must be apprehended at the scale of the series that the tablet belongs to.

3.3 The Series of AO 9071

3.3.1 General Description

Which tablets belonged to the same series as AO 9071? They are difficult to identify because, as pointed out in the introduction, the series tablets were excavated by illegal diggers and were dispersed through the antiquities market to various European and American museums without any archaeological information. Twenty tablets containing mathematical series text are known to date.⁹ Most of these are now housed at the Yale Babylonian Collection and were published by Neugebauer (1935–1937) in a special chapter in *Mathematische Keilschrifttexte I–III* (MKT) (which also includes two samples from the Vorderasiatisches Museum, Berlin); two other tablets containing series text are kept at the Oriental Institute, Chicago (A 24194 and A 24195) and were published by Neugebauer and Sachs (1945) in *Mathematical Cuneiform Text* (MCT), ten years after MKT; and, finally, I recently discovered two new samples at the Louvre Museum, AO 9071 and AO 9072 (Neugebauer 1935–1937: Chap. VII; Neugebauer and Sachs 1945: texts T and U; Proust 2009). Tablets containing series texts, or at least the majority of those identified to date, probably come from the same provenience. They seem to reflect a new mathematical culture that developed toward the end of the Old Babylonian period in ‘peripheral’ regions, to use Høyrup’s expression (Høyrup 2000: 50; Høyrup 2001: 199; Høyrup 2002: 351).¹⁰ This new mathematical culture was nevertheless steeped in ancient Mesopotamian mathematical traditions, as pointed

⁹The complete list is provided in Proust (2012: 150–151, Table C). In this publication, I labeled the tablets containing mathematical series text as S1, S2, ... S20.

¹⁰Neugebauer, in his chapter on ‘*serientexte*’ (Neugebauer 1935–1937: I, 387, Chap. VII), supposed that series tablets come from Kiš: ‘All texts discussed in this chapter come from the antiquities market. The two Berlin tablets (VAT 7528 and 7537) were purchased in Paris from Géjou and were probably inventoried between 1911 and 1912. In this purchase were also texts that, according to indications given by the merchant, came from Kish or localities in the immediate vicinity of Kish.’ (Alle in diesem Kapitel behandelten Texte stammen aus dem Antikenhandel. Die beiden Berliner Tafeln (VAT 7528 und 7537) sind von Gejou in Paris gekauft und vermutlich zwischen 1911 und 1912 inventarisiert worden. In diesem Kauf befinden sich auch Texte, die nach der Angabe des Händlers aus Kiš oder Orten unmittelbar bei Kiš stammen). Friberg considered that the provenience of tablets containing series text is more probably to be located in southern Mesopotamia, more precisely in Ur. He distinguished two different sub-groups among tablets containing series text: a group Sa and a group Sb, the latter only including the two tablets kept at the Oriental Institute of Chicago A 24194 and A 24195 (Friberg 2000: 172).

out by Høyrup, and may have emerged in communities of scholars who settled in northern Babylonia, perhaps in Kiš or Sippar, after the southern cities were destroyed and abandoned around 1740 BCE, and after people of Ur and Uruk, including groups of scholars, fled to the north.¹¹

The known series texts shed some light on the composition of the original entire series that AO 9071 belongs to. Neugebauer suggested that the tablets containing series text published in MKT belong to at least three different series, which he labeled A, B and C (Neugebauer 1935–1937: I, Chap. VII; see last column of Table 3.6). The first task is to identify the common features of tablets belonging to the same series in order to select the tablets which share their features with AO 9071.

3.3.2 *Features of an Entire Series Text*

Are the set of tablets belonging to the same series homogeneous from different points of view, whether thematic, mathematical or textual? Some light on the answers to these questions is provided by known tablets containing series text which belong with certainty to the same series. Two of them have been identified: YBC 4713 (which bears the serial number 10) and YBC 4712 (which bears the serial number 13). Indeed, the content of these two tablets has been found again in a third, YBC 4668, which contains 288 statements and bears the serial number 3. Neugebauer has shown that YBC 4668 belonged to a gigantic series made up of several regular series, each of which included a dozen tablets Neugebauer (1935–1937: I, 385). ‘Super-series’ tablet YBC 4668 contains not only the content of YBC 4713 and 4712, but also three other portions which probably belong to the same series. These five portions of probably the same series are described in Table 3.3.

Considerations on parts of text, whether material or textual, will be essential in the following identification of features of an entire series text. We can already see, at this stage, that we now have a higher level part of text: the super-series, which contains several series, which themselves contain the content of several tablets.

Considering the five portions of probably the same series text noted on YBC 4668, we can observe that they deal with the same topic, namely, our immutable rectangle whose dimensions are 30 *ninda* by 20 *ninda*. Thus, it seems that one entire series text is thematically homogeneous.

Are these five portions of series text homogeneous from a mathematical point of view? The features of the five texts are summarized in Table 3.4. All of the statements on super-series tablet YBC 4668 either begin with the data of the surface of the rectangle or depend on statements which provide this surface. This surface is always the same and is invariably stated as follows: ‘The surface (measures) 1 *eše GAN*’ (in Sumerian: a-ša₃ 1(eše₃) GAN₂).¹² Such an area corresponds to the number

¹¹See the bibliographies in Proust (2009: 169–170; 229) and Proust (2012: 14).

¹²1 *eše GAN* is 6 *GAN*, that is, 6 times the area of a 10 *ninda*-side square, about 3600 m².

Table 3.3 The five portions of series on the super-series tablet YBC 4668

Portions of the super-series text	Tablet	Serial number of the tablet
First	YBC 4713	10
Second	Unknown	(11)
Third	Unknown	(12)
Fourth	YBC 4712	13
Fifth	Unknown	(14)

Table 3.4 Mathematical patterns in YBC 4668

Portion of the super-series text	First equation E1	Other equations	Variations on relations between
First	$u \times s = 10$	E2, E3, E4	u, s , coefficients, auxiliary unknowns
Second	$u \times s = 10$	E2	$u, s, u + s, u - s, u^2, s^2, (u + s)^2, (u - s)^2$
Third	$u \times s = 10$	E2	Damaged; seems similar to the second e
Fourth	$u \times s = 10$	E2	$u, s, u/s, s/u$, auxiliary unknowns
Fifth	$u \times s = 10$	E2, E3, E4	u, s , coefficients, auxiliary unknowns, pairs of reciprocals

10 in sexagesimal place value notation.¹³ This relation is represented in Table 3.4 below by the abbreviation ‘E1: $u \times s = 10$ ’, where E1 represents the first relation, or ‘first equation’, u represents the length (uš in Sumerian) and s represents the width (sag in Sumerian).

The mathematical features of the five portions of series text included in YBC 4668 are not the same:

- In the first portion (which corresponds to the content of series tablet YBC 4713), two unknown coefficients are introduced in addition to the length and the width, and the problems can be described in modern terms as systems of four equations with four unknowns. The list of statements is generated by variations which affect, in the ‘equations’ E2, E3 and E4, the relations between the length, the width, the coefficients and some auxiliary unknowns.
- In the second portion (which does not correspond to the content of a known series tablet), the statements provide only a second equation, E2, and the variations affect the relationships between the following parameters: the length, the width, the difference and the sum of these dimensions, and their squares (these parameters are represented, in Table 3.4, by $u, s, u + s, u - s, u^2, s^2, (u + s)^2, (u - s)^2$).

¹³Indeed, 10 is the product of 30, the length, by 20, the width, in floating sexagesimal place value notation. See Proust (2013) for more explanation on sexagesimal place value notation and floating multiplication.

- The third portion is too damaged to be described in detail but seems to be close to the second. The demarcation between the second and the third single series texts is hypothetical and grounded on the structure of the list.
- In the fourth of the five portions (which corresponds to the content of series tablet YBC 4712), the mathematical structure is also similar to the second, but the quotients u/s and s/u are among the parameters of the E2 equation.
- The fifth portion (which does not correspond to the content of a known series tablet) is similar to the first, with additional sophistications such as unknown pairs of reciprocals.

To sum up, the first equation, which evaluates the surface, is the same for all the statements on super-series tablet YBC 4668, and the variations affect the other equations. The statements on YBC 4668 can be described in modern terms as quadratic systems of two equations with two unknowns (in the second, third and fourth portions of series text) or of four equations with four unknowns (in the first and the fifth portions). The mathematical pattern of the statements differs throughout super-series tablet YBC 4668, as two different models are found, whereas only one mathematical pattern is found in a single portion of series text.

Which parts of text can we recognize on super-series tablet YBC 4668? The portion of super-series it contains includes five portions of probably the same series text. Each of the portions of series text is generated in a similar way to that described for AO 9071 (Sect. 3.2), and thus includes groups (cycles), sub-groups and sub-sub-groups. Does this textual segmentation coincide with material segmentation? First, we observe that no cycle seems to be interrupted at the end of a single portion of series text, which means that each portion of series text contains only complete cycles. Second, if we observe how the text on YBC 4668 is divided into columns, we see that the end of a portion of series text coincides with the end of a column on super-series tablet YBC 4668 (see Table 3.5). In particular, the change of side (from obverse to reverse) seems to occur between the end of the second portion of series text and the beginning of the third portion, insofar as the demarcation between these portions can be guessed. We can conclude that, in the case of tablet YBC 4668, the textual segmentation coincides quite well with the material segmentation.¹⁴

This quick trip into the world of super-series, that is, series of series, provides some light on the possible features of series texts. First, we have seen that the entire series texts are thematically homogeneous. This conclusion is confirmed by the fact that the thematic homogeneity is always respected in the scale of a portion of series text, written on one tablet: some series tablets contain only problems on fields, others only on bricks, others only on canals, another only on economics and so on. Second, several mathematical patterns can be found in the same series, but these mathematical patterns seem to exhibit some common features. Third, at least on super-series tablet YBC 4668, the textual segmentation seems to adhere to the

¹⁴However, the scribe(s) who wrote the other known tablets which probably contain super-series, A 24194 and A 24195, seem not to have attempted to end each single series text exactly at the end of a column, or at the end of the obverse or at the end of the tablet (Proust 2015: 310–311).

Table 3.5 Textual and material parts of text in YBC 4668

Portions of series text on YBC 4668	Tablet	Side of YBC 4668	Columns of YBC 4668
First	YBC 4713	Obverse	i–ii
Second			iii–iv
Third		Reverse	i
Fourth	YBC 4713		ii–iii
Fifth			iv

material segmentation, but this is not always the case. Keeping in mind these results concerning the portion of the series observed on super-series tablet YBC 4668, we can attempt to partially reconstruct the series AO 9071 belongs to.

3.3.3 *The Tablets Which May Belong to the Same Series as AO 9071*

The most conclusive criterion is thematic. As it is highly probable that an entire series consisted of problems dealing with the same topic, we can select the tablets dealing with the rectangle whose dimensions are 30 *ninda* by 20 *ninda* as possible candidates for belonging to the same series as AO 9071. The eleven known series tablets that meet this criterion are listed in Table 3.6.¹⁵

As another criterion, the number of statements can be taken into consideration. From this point of view, two groups can be recognized, as shown in Table 3.6. The tablets containing less than 60 statements, which belong to Neugebauer’s Group A, and the tablets containing between 90 and 170 statements, which include two tablets belonging to Neugebauer’s Group B and the two tablets from the Louvre.¹⁶

Let us consider the mathematical criteria in turn. The most common mathematical pattern found in series texts is a quadratic system of two relations between the length and the width of a rectangle. The first relation (E1) is the surface of the rectangle, as in super-series tablet YBC 4668. The second equation (E2) is a linear relation between the length and the width. This E2 linear relation describes systematic cycles of variations implemented on the expressions *P* and *S* in the same

¹⁵From the twenty known series texts, I excluded the three super-series (see Sect. 3.3.2); YBC 4714, because the type of tablet and the structure of the text are different; YBC 4696, whose colophon does not contain a serial number; YBC 4708 and YBC 4673, which deal with bricks, VAT 7528, which deals with canals; and YBC 4698, which deals with economic topics (see Middeke-Conlin and Proust 2014). Note that in the following, to facilitate the use of Table 3.6, I designate the tablets by the publication numbers S1, ... S14 that I have used in previous articles.

¹⁶The tablets containing more than 200 statements are the three known ‘super-series’ tablets (YBC 4668, A 24194 and A 24195), which do not appear in Table 3.6, even if they deal with fields.

Table 3.6 Series texts dealing with rectangular fields

Museum number	Label	Number of sections	Serial number	Pattern of statements	MKT group
YBC 4710	S2	35	4	Quadratic systems E1: $u \times s = 10$ E2, E3, E4: variations on relations between u , s and other parameters	A
YBC 4713	S5	37	10 (part of super-series tablet YBC 4668)	Quadratic system E1: $u \times s = 10$ E2, E3, E4: variations on relations between u , s , coefficients, and auxiliary unknowns	A
YBC 4712	S6	48	13 (part of super-series tablet YBC 4668)	Quadratic system E1: $u \times s = 10$ E2: variations on u , s , u/s , s/u , and auxiliary unknowns	A
YBC 4715	S8	ca. 60	destroyed	Quadratic systems E1: $u \times s = 10$ E2: variations on relations between u , s , and auxiliary unknowns	A
VAT 7537	S7	ca. 45	destroyed	Quadratic systems E1: $u \times s = 10$ E2: variations on relations between u , s , $u + s$, $u - s$, u^2 , s^2 , $(u + s)^2$, $(u - s)^2$	A
YBC 4697	S9	25	3	Quadratic systems E1: $u \times s = 10$ E2: variations on relations between u , s , $u + s$, $u - s$, u^2 , s^2 , $(u + s)^2$, $(u - s)^2$	A
YBC 4709	S3	56	5, 6, 8 or 9 (9 is the most probable)	Quadratic systems E1: $u \times s = 10$ E2: variations on relations between u , s , $u + s$, $u - s$, u^2 , s^2 , $(u + s)^2$, $(u - s)^2$	A
YBC 4711	S12	131	4, 5 or 6	Quadratic systems E1: $u \times s = 10$ E2: variations on relations between u and s	B
YBC 4695	S11	97	5	Linear and quadratic systems E1: variations on relations between u and s E2: variations on relations between u and s	B
AO 9071	S13	93	7	Linear systems E1: variations on relations between u and s E2: variations on relations between u and s	

(continued)

Table 3.6 (continued)

Museum number	Label	Number of sections	Serial number	Pattern of statements	MKT group
AO 9072	S14	ca. 170	destroyed	Quadratic systems? E1 not stated (probably implicitly $u \times s = 10$) E2: variations on relations between u and s	

process as we have seen for AO 9071. This pattern can be found in texts S3, S7, S9, S12 and probably S14 (see Table 3.6). Among them, tablets S3, S7 and S9 were classified in Group A by Neugebauer, and indeed, present a specific feature: the variable expressions are relations between the square of the length and the width, or a simple combination of them (u^2 , s^2 , $(u + s)^2$, $(u - s)^2$). Another pattern is close to this one, with the difference being that the first equations describe linear or quadratic variations; this is the pattern we have found on AO 9071 and also on YBC 4695 (S11). In both patterns, the solution is always the same: the length is 30 *ninda* and the width is 20 *ninda*.

The patterns we have found in the texts which make up super-series tablet YBC 4668 are different and much more complex: sometimes four unknown values are to be sought; the relations between the unknown parameters include quotients, reciprocals, coefficients and auxiliary lengths. The solutions are nevertheless the immutable 30 *ninda* and 20 *ninda* for the dimensions of the squares, and additional values for other parameters introduced in the statements (coefficients and auxiliary lengths). These complex mathematical patterns are found in series texts classified as Group A by Neugebauer (S2, S5, S6 and S8, which include the two series texts included in super-series tablet YBC 4668).

Tablet YBC 4695 (S11) is similar to AO 9071 according to all of the criteria examined above: theme, number of statements and mathematical pattern. Its colophon indicates that YBC 4695 (S11) is the fifth of a series, while AO 9071 is the seventh tablet of a series. It is highly probable that both belong to the same series. If we consider the other pattern close to that found in the two tablets of this possible series, two other tablets are good candidates to be part of the same series: YBC 4711 (S12) and AO 9072.¹⁷ The fact that tablet AO 9072 was bought from G  jou by the Louvre Museum together with AO 9071 is additional evidence that both may come from the same place and may have belonged to the same series. The serial number of YBC 4711 (S12) is damaged, but we can distinguish two rows of wedges and thus the possible numbers may be 4, 5 or 6, with a slightly better probability for 4. The serial number of AO 9072 is destroyed, but I have shown elsewhere that this tablet probably came after AO 9071 in the series and was not the

¹⁷Neugebauer stresses that YBC 4695 and YBC 4711 probably belong to the same series. (Neugebauer 1935–1937: I, 385).

Table 3.7 Tablets which may belong to the same series as AO 9071

Museum number	Label	Type	Number of sections	Serial number in colophon	Possible serial number	Degree of probability
YBC 4697	S9	M(3, 3)	25	3	3	acceptable
YBC 4711	S12	M(3, 3)	131	4, 5 or 6	4	good
YBC 4695	S11	M(3, 3)	97	5	5	high
AO 9071	S13	M(3, 3)	93	7	7	
YBC 4709	S3	M(3, 3)	56	5, 6, 8 or 9	8	acceptable
AO 9072	S14	M(4, 5)	ca. 170	destroyed	(9?)	good
VAT 7537	S7	M(3, 3)	ca. 45	destroyed		acceptable

direct continuation of AO 9071 because the first statement of AO 9072 relies on missing pieces of information which are not provided on AO 9071.

If we now consider the number of sections as a non-significant criterion, tablets VAT 7537 (S7), YBC 4697 (S9) and YBC 4709 (S3) are also possible candidates to be part of the same series, because the mathematical pattern of the statements they contain are close to that found in YBC 4711 (S12).

Finally, we obtain a set of seven tablets which may have belonged to the same series as AO 9071, with various degrees of probability: high for YBC 4695 (S11), good for YBC 4711 (S12) and AO 9072 (S14), and acceptable for VAT 7537 (S7), YBC 4715 (S8) and YBC 4697 (S9). A possible composition and arrangement of this hypothetical series is illustrated in Table 3.7.

As the series reconstructed in Table 3.7 is lacunar and very hypothetical, we can hardly rely on it to analyze the parts of text at the scale of an entire series. However, some observations on the main groups (or cycles) can be made. The case of tablet AO 9072 is interesting from this point of view. The tablet contains statements providing only one relation between the length and the width, namely, only equation E2. The other equation, E1, is not explicitly stated. This means that all the statements on AO 9072 depend on information given in a previous tablet. Thus, it seems that the list of statements on AO 9072 is part of a cycle which covers more than a single tablet. If we consider the parts of text at the scale of an entire series, it appears that the main groups (cycles) are not always juxtaposed parts but can themselves be embedded in a larger group.

The texture of an entire series text is thus a complex tree structure. The tiniest branches, the sections, are immediately recognizable by the reader. These fundamental units of text are parts of several nested groups. Recognizing these different nested groups is not an easy task, but this textual analysis is necessary for the reader in order to reconstruct the full statement that the content of a box refers to or, in other words, in order to simply understand the mathematical meaning of the problems. Moreover, it is not always possible for us to go back to the tree roots at the scale of a single series tablet because, as shown with the example of tablet AO 9072, the root is sometimes to be found in a previous tablet.

Only portions of series texts are available to us, so we have no vision of the entire structure of any one series text. This partial vision nevertheless allows some considerations on the way in which series texts were composed.

3.4 Operations on Texts

Which kind of operations on texts produced series texts? I have addressed this issue in previous publications, for example in Proust (2012); here, I just wish to underline the importance of the analysis of parts of text in such discussions.

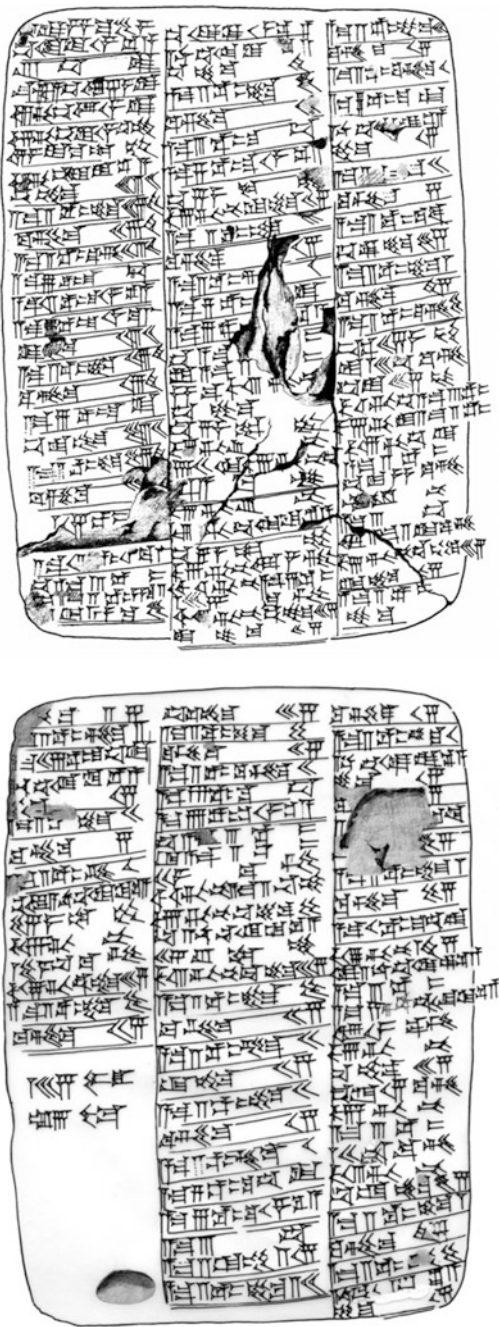
The specificity of the process which produced series texts appears more clearly when we compare it with the process which produced catalogue texts. As pointed out above (Sect. 3.2.3), catalogue texts are lists of problem statements similar to series texts but, unlike the series texts, do not bear serial numbers. Moreover, they are written on single-column tablets, a type usually used in the advanced level of education in southern scribal schools. The process of producing catalogue texts can be reconstructed thanks to two kinds of information: the groups of statements inside a single tablet and comparison with related procedure texts. This information suggests that catalogues are compilations, that is, the juxtaposition of groups of statements collected from different sources. The purpose of such an operation could be explained by the context of teaching, and the function of catalogues may be a kind of inventory of a possible library or the fixation of a curriculum, or both (Proust 2012).

The fact that in series texts the groups are not juxtaposed, but instead are nested, suggests that the process of producing them is different. With the example of tablet AO 9071 (Sect. 3.2), we have observed that each group results from systematic variations of segment of an initial statement (in Sect. 3.2, I labeled these segments E1, *P* and *S*). Thus the process is the reverse of a compilation: from an initial statement, which is quite simple and was well known to the scholars of the time, the statements are generated by combinatorial operations on segments of texts. It can be described as a generative process, like a seed that grows. The super-series seems to be a compilation of series texts and thus to be a combination of generative processes, which produce series texts, and a concatenation of several entire series texts. The generative process which produced series texts acts on statements, while the process which produced catalogue texts deals with procedures. These two processes probably had different goals. The generative process can be viewed as a method for exploring all of the possible statements corresponding to a given pattern, and its goal may be heuristic. With these examples, we see how different ways of segmenting texts, juxtaposed groups or nested groups reflect different operations on texts: compilation or generation. In all of the cases, however, the arrangement of groups reflects a concern for classification, whose goals are varied: archival, curricular or heuristic.

As a conclusion, the texture we have observed for series texts is different from what we are used to observing in modern books. The parts of text are not well-identified entities such as volume, chapter or paragraph, but a continuum of nested groups.

Appendix

AO 9071, copy published in Proust (2009: 177, 179)



Primary Sources

Museum number	CDLI number	Publication
A 24194	P254383	MCT: 107
A 24195	P254384	MCT: 119
AO 9071	P254392	Proust (2009)
AO 9072	P416818	Proust (2009)
VAT 7537	P254933	MKT: I, 466; TMB: 207
YBC 4657P254982	MCT: 66	
YBC 4662	P254983	MCT: 66
YBC 4663	P254984	MCT: 66
YBC 4668	P254986	MKT: I, 420; TMB: 162
YBC 4695	P255007	MKT: I, 501; TMB: 214
YBC 4697	P255009	MKT: I, 485; TMB: 214
YBC 4709	P255016	MKT: I, 412; TMB: 155
YBC 4710	P255017	MKT: I, 402; TMB: 148
YBC 4711	P255018	MKT: I, 503; TMB: 214
YBC 4712	P255019	MKT: I, 420; TMB: 176
YBC 4713	P255020	MKT: I, 421; TMB: 162
YBC 4715	P255022	MKT: I, 478; TMB: 190

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Chapter 4

Textual Segmentation in Babylonian Astral Science



Mathieu Ossendrijver

Abstract During the first millennium BCE, Babylonian astral science experienced several transformations, each accompanied by the emergence of new textual genres. A novel feature of these texts is that different aspects of astral science such as observation, prediction and procedural knowledge were increasingly dealt with in separate texts. This specialization led to the composition of procedure texts, especially in the field of mathematical astronomy. The aim of this contribution is to explore some aspects of specialization and textual segmentation in Babylonian astral science, with a focus on the procedure texts of mathematical astronomy.

4.1 Mesopotamian Celestial Divination

Babylonian astral science developed in the context of a long tradition of celestial divination that is mainly known through thousands of tablets from the late Neo-Assyrian era (seventh century BCE) but can be traced back to the Old Babylonian era (1850–1600 BCE). Before addressing textual segmentation in the later Babylonian corpora of astral science, it is worthwhile exploring some important structural features of the corpus of celestial divination. At its center is the *Enūma Anu Enlil* (EAE) (When Anu and Enlil) omen series, named after the catchline of its first tablet.¹ Along with numerous other compositions, the EAE is part of the so-called ‘stream of tradition’, texts that were compiled before the end of

The research leading to this volume has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007-2013) /ERC Grant Agreement No. 269804.

¹For an introduction to Mesopotamian celestial divination, see (Koch-Westenholz 1995; Rochberg 2004).

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the second millennium BCE, acquired a more or less canonical status and were thenceforth copied, used and commented on by generations of scholars. Nearly all of the roughly seventy EAE tablets consist entirely of omens, which are statements of the kind ‘if X then Y’, where X, the protasis, is a celestial phenomenon, and Y, the apodosis, is a prediction. A characteristic feature of Mesopotamian celestial omens is that the predictions always concern the king and the country. For many centuries, the EAE functioned as the main repository of celestial omens that were consulted by astrologers. Its structure is well suited for identifying omens that apply to the celestial phenomenon that had come to the attention of the astrologers. The tablets are arranged into four main sections, each devoted to one celestial entity or a group of related phenomena, namely the moon (Tablets 1–22), the sun (23–39), weather (40–49), and planets and stars (50–70), respectively.² Some of the main sections are divided into subseries. For instance, the lunar section consists of one subseries entitled ‘Appearances of the Moon’³ (Tablets 1–14) and another one called ‘Eclipses, decisions of eclipses and... of the Moon’⁴ (15–22). Each tablet is identified by a catchline, usually the protasis of its first omen. Each individual omen is graphically marked by an initial vertical wedge representing the first word of the protasis, *šumma*, (if). Finally, omens with similar protases usually follow one another on the same tablet. These hierarchically arranged structural features serve the practical purpose of guiding the diviner to the relevant omens for a given phenomenon in a few steps. Moreover, the catchlines are listed in catalogues (Fincke 2001). An elaborate catalogue from the Seleucid era (330–150 BCE) also lists the number of omens contained on each tablet and, after the final tablet of each subseries, the total number of tablets and the total number of omens, using the phrase ‘In total, x tablets, y is its number’⁵ followed by the title of the subseries (Weidner 1941–1944).

Omen compilations such as the EAE may be characterized as casuistic encyclopedias. Each omen is concerned with one celestial phenomenon or a combination of associated phenomena, for which a terrestrial prediction is provided. The casuistic, encyclopedic approach is not unique to celestial divination, but dominates all traditional Mesopotamian forms of scholarship, including medicine and jurisprudence at least until the beginning of the first millennium BCE. The underlying principles by which predictions were associated with empirical phenomena were rarely written down, but they can be partly reconstructed (Brown 2000). However, these rules were apparently not used as practical procedures that could replace the omen compendia for deriving predictions from celestial

²These tablet numbers are only approximate, since there were different versions of the EAE with slightly different tablet numbers (Fincke 2001).

³Akkadian title: *Tāmarāti*(IGI.DU₈.ME) *ša₂ Šîn*(30). For Tablets 1–6 of this subseries see Verderame (2002).

⁴Akkadian title: *Attalê*(AN.MI.MEŠ) *purussû*(EŠ.BAR) *attalê*(AN.MI) *u* *ḪAR[?].MEŠ ša₂ Šîn* (d30). The meaning of *ḪAR[?].MEŠ* is unclear. For this title see Weidner (1941–1944); for editions of the tablets of this subseries see Rochberg (1988).

⁵In Akkadian: *naphar*(ŠU.NIGIN) *x* *tup-pi*.MEŠ *y* *minûssu*(MU.ŠID.BI).

phenomena. At the practical level, celestial divination did not operate from first principles but on the basis of the complete set of cases that were compiled in the omen series, which accounts for their encyclopedic completeness. It can even be argued that what was observed by a Mesopotamian astrologer was, to some extent, determined by the content of the omen compendia. This is suggested by the fact that the astrological reports they submitted to the Neo-Assyrian kings consist largely of quotations from omen texts that were considered to apply to phenomena that were observed (Hunger 1992). Only rarely do these reports describe observed phenomena in plain words, using statements that are not omen protases.

Another characteristic feature of Mesopotamian celestial divination to be mentioned here concerns the hermeneutical methodology. Celestial phenomena are conceptualized as signs that were produced by the gods in order to communicate with humankind. This “heavenly writing” could be deciphered by consulting omen compendia such as the EAE, which was considered to have been revealed to mankind by the gods for that very purpose. In view of later developments, it is important to note that celestial signs were, by and large, construed as unprovoked, spontaneous phenomena. In particular, their prediction does not appear to play a significant role in traditional celestial divination.⁶ In fact, predictive rules for most of the astronomical phenomena that are mentioned in the omen protases had not yet been discovered by the beginning of the first millennium BCE.

Some exceptions must be noted. EAE Tablet 14 does not contain omens but numerical tables concerning elementary lunar and solar phenomena such as the length of daylight and the duration of visibility of the moon during the night (Al-Rawi and George 1991–1992). From an epistemic point of view, this tablet differs fundamentally from the rest of the EAE in that it contains quantitative, idealized schemes for predicting astronomical phenomena. It is nevertheless an integral part of the EAE, being incorporated as the final tablet of the subseries ‘Appearances of the Moon’ and listed as such in the catalogues. As stressed by Brown (2000), the tables probably functioned as computational tools for the diviner and not as astronomical insertions disconnected from celestial divination, even though their precise function is not clear yet. What is significant for the present investigation is that non-casuistic, quantitative rules, although written on a separate tablet, are embedded among the overwhelmingly casuistic material. A similar conclusion can be drawn for the astral compendium *MUL.APIN* (Plow Star), another handbook for celestial divination dating from about the same time as the EAE (Hunger and Pingree 1989). This composition is characterized by a similarly eclectic mixture of celestial omens, other list-like casuistic material and a smaller number of quantitative general rules and procedures in which the reader is instructed to perform certain computations or actions. This arrangement of the corpora is compatible with the minor role played by astronomical prediction within traditional Mesopotamian celestial divination.

⁶For a detailed analysis of the hermeneutical methods underlying celestial divination see Brown (2000), especially Chap. 3, ‘The *Enūma Anu Ellil* (EAE) paradigm’.

4.2 Babylonian Astronomical Diaries and Related Texts

The first significant Babylonian innovation to be mentioned here concerns a program of astronomical observation that was initiated near 750 BCE and continued until the first century CE. Thousands of tablets and fragments, collectively known as astronomical diaries and related texts, contain observational data for a selection of lunar, planetary and terrestrial phenomena (Sachs and Hunger 1988–1996). Astronomical diaries, the most common type, usually cover half a calendar year, which amounts to six, sometimes seven months.⁷ Only one level of segmentation, which corresponds to the months, is visible on these tablets. Each month is presented as a continuous block of running text that is separated from the next month by a horizontal ruling across the width of the tablet. In each monthly section, the motion of the moon and the planets is reported, often multiple times per month, in terms of their distance from certain reference stars in two directions that are roughly defined parallel and perpendicular to the ecliptic (the orbit of the sun). Also reported are the synodic phenomena of the planets, i.e. their first and last appearances, stations and oppositions, six time intervals between sunset or sunrise and moonset or moonrise, and eclipses. The astronomical data are complemented by weather phenomena, the level of the river Euphrates and the monthly average market price of six commodities. Diaries are end-products of an elaborate data management operation. Preliminary short-term reports written by different scholars were collected, after which the six-monthly diaries were compiled. Some aspects of this operation can be traced through intermediate reports, but few of these have survived, most likely because their clay was recycled after they had been processed. Note that the format and structure of the preliminary reports appear to have left little or no traces in the diaries. They must have been stored in a central location for later reference, since various kinds of excerpts covering selected phenomena for longer periods of time were also compiled from the diaries (Hunger and Sachs 2001).

Astronomical diaries and related texts reflect a new methodology for reporting celestial phenomena. Their technical terminology marks a break with the astrological reports from earlier times and is so strongly abbreviated that it was probably comprehensible only to the astronomers who wrote these texts. Unlike the omen texts and the astrological reports, the diaries do not contain any astrological interpretations alongside the reported phenomena. This reflects a strict separation between observation and prediction, on the one hand, and astrological interpretation on the other. The newly emerging genres of Babylonian astral science were increasingly devoted to only one of these activities, to the exclusion of the others. However, observation and prediction are closely intertwined in the diaries and related texts, since their purpose was to predict the very phenomena that were reported. It is generally assumed that by about 600 BCE, the astronomers who

⁷The data concern the moon, the planets, weather phenomena, river levels and price developments. For translations of the diaries and an overview of their content, see Sachs and Hunger (1988–1996).

produced the diaries had discovered accurate cycles for nearly all of the reported astronomical phenomena. These so-called goal-year periods are expressed as a whole number of years (e.g. eighteen years for the moon, eight years for Venus and fifty-nine years for Saturn).⁸ After one goal-year period, the phenomena repeat near the same celestial position and the same Babylonian calendar date. With this method, planetary and lunar phenomena were predicted by projecting reported past phenomena into the future year by adding the appropriate period. Thus astronomical predictions, presumably obtained in this manner, were incorporated in the diaries whenever an expected phenomenon had not been observed due to bad weather. We know this because these phenomena are recorded but marked as ‘not observed’ (in Akkadian: *ul attašar*, usually rendered logographically as NU PAP; see Sachs and Hunger 1988, p. 21).

Eventually, this method led to three new textual genres now known as goal-year texts, almanacs and normal-star almanacs. It appears that none of these are attested before the third century BCE, but the underlying goal-year method is believed to have been available since about 600 BCE, as mentioned. In all of these genres, astronomical predictions for a future year (*Y*) are compiled from diaries and other texts that precede *Y* by the appropriate goal-year period (*P*), which is different for each planet Hunger (2006, 2014). Like the diaries, all three employ a highly standardized format. For example, a goal-year text comprises eight sections, each containing data for a single planet copied from the diary for year *Y-P*.⁹ The sections are ordered in the fixed sequence Jupiter, Venus, Mercury, Saturn, Mars and the moon. For Jupiter and Mars, there are two sections, because two different values of *P* were used. While Sects. 1–7 were written across the width of the tablet, the final and longest section for the moon was divided into four columns. Each section is separated from the next by a horizontal ruling. With very few exceptions, these texts are anonymous, perhaps because the data were produced by a community of astronomers. A goal-year text always ends with the following standard label near the bottom of the reverse: ‘First days (of the month), (first and last) appearances, passings and eclipses which were established for year *Y*, king NN.’¹⁰ If we assume that tablets for different goal-years were stored together, perhaps on a shelf, then these features obviously made it easier to find the appropriate tablet and section.

All of these texts lack references to astrological prediction, but it is important to note that this does not imply that astronomical observation and prediction were disconnected from astrology and pursued for their own sake. There is considerable evidence that astronomical prediction was mainly pursued in order to predict

⁸That the goal-year method was fully developed by about 600 BCE is suggested by the fact that, from then on, in so-called Lunar Six tablets, observational reports with Lunar Six data, weather related gaps in the observations were completed with predictions that were presumably obtained with that method (Huber and Britton 2007).

⁹For content and layout of the goal-year texts, see Hunger (2006: ix–xiii); for that of the almanacs and normal-star almanacs, see Hunger (2014: ix–xvii).

¹⁰U₄.I.KAM IGI.DU₈.A.MEŠ DIB-qa.MEŠ u AN.MI.MEŠ ša₂ a-na MU.Y.KAM NN LUGAL (Hunger 2006).

terrestrial phenomena by astrological means.¹¹ Some compendia from the late period do, in fact, combine astronomical and astrological procedures, but they are rather exceptional.¹²

4.3 Babylonian Mathematical Astronomy

Further developments in Babylonian astral science are connected to the introduction of the zodiac near 400 BCE. Within a few decades, mathematical astronomy emerged as a second method for predicting astronomical phenomena alongside the goal-year method. The corpus of mathematical astronomy comprises approximately 450 tablets and fragments dating from between about 400 BCE and 50 BCE. In these texts, essentially the same phenomena known from the astronomical diaries and the goal-year method are computed by means of mathematical algorithms that are based on the sexagesimal place-value notation known from Old Babylonian mathematics (1900–1700 BCE). By about 330 BCE, the complex lunar algorithms known as Systems A and B had reached their final state of development, with little evidence of further change. Most of the available tablets were written after 250 BCE and reflect that final stage. About 300 tablets of this corpus are numerical tables with computed predictions. The most common class are the so-called synodic tables, which contain data for the synodic phenomena of the moon (full moon and new moon) or a planet (first appearances, last appearances, stations and oppositions). Another class is formed by about forty daily motion tables, in which the position of the moon, the sun or a planet is tabulated from day to day. The remaining 110 tablets are procedure texts, which consist of verbal instructions mainly concerned with computing or verifying the aforementioned tables. Except for a few planetary tables that include the corresponding procedures at the end of the tablet, the procedure texts usually occupy different tablets.

The corpus of mathematical astronomy stands out in that it is strictly dedicated to astronomical prediction, with no reference to observations or astrological interpretation. Furthermore, while the diaries do indirectly reveal potential astrological applications, as they include reports of terrestrial phenomena, the tablets with mathematical astronomy only contain computed astronomical phenomena.

The separation between computed tables and verbal instructions within this corpus reflects a differentiation between concrete numerical predictions that were produced for specific dates and the underlying procedural knowledge which is generally applicable and not connected to any particular date. It is easy to imagine the pragmatic advantages of such an arrangement, because the procedures were

¹¹For a preliminary assessment of the astrological applications of Babylonian astronomy see Ossendrijver (2011).

¹²One example is AO 6455, a compendium with goal-year procedures and astrological procedures dating from the third century BCE (Brack-Bernsen and Hunger 2002).

meant to be applied again and again with different initial conditions whenever a table had to be computed for a new range of dates. Hence it made perfect sense to preserve these rules on separate tablets and, presumably, store them at a different location in the astronomer's library. The distinct status of the two genres is confirmed by the fact that relatively few tabular texts can be shown to be copies, while the opposite is true for the procedure texts. Several procedure texts preserve instances of the glosses 'break' (Akkadian: *hepi*) or 'new break' (*hepi eššu*), which indicates that they were copied from a damaged original, but none of the extant tabular texts contain such a gloss. A few tabular texts are preserved in multiple duplicates, most likely because they were copied,¹³ but this phenomenon is much more common for the procedure texts. Moreover, many procedure texts that are preserved in a single exemplar turn out to be copies in the sense that they are specific implementations of template procedures that differ only with regard to the numerical parameters of the algorithm. For instance, the numerous tablets that deal with the so-called zigzag function, an algorithm for modeling periodically varying quantities, form a small number of templates (Ossendrijver 2012d: 42–47).

The increased importance of procedure texts is also reflected in certain mathematical innovations that distinguish the procedure texts of mathematical astronomy from other Mesopotamian instructional texts. In particular, they are the first instructional texts to employ a predominantly abstract, general mathematical formalism, in the sense that mathematical operations are performed on named quantities that do not assume a concrete numerical value. This replaces an earlier formalism based on numerical examples that appears to become extinct by the beginning of the Seleucid era (310 BCE).¹⁴ A second difference from earlier procedure texts for astral science concerns the complete absence of any reference to astrological prediction from the corpus of mathematical astronomy. Recall that a separation between operational knowledge and concrete predictions also exists in goal-year astronomy, but some goal-year procedures were mixed with procedures for predicting terrestrial phenomena. This is no longer the case in mathematical astronomy, which is exclusively devoted to the prediction of astronomical phenomena, omitting any reference to terrestrial or even calendric applications. As mentioned earlier, this does not imply that astronomical prediction was pursued for its own sake.

Along with mathematical astronomy, other new forms of Babylonian astral science not discussed here (e.g. astrological methods for predicting market prices and the weather) experienced a similar process of textual differentiation whereby observational data on the one hand and concrete predictions on the other hand were separated from the operational knowledge that underlies the predictions. In different branches of astral science, this operational knowledge was represented to varying

¹³The so-called Text S (Aaboe et al. 1991: 68–71), an early lunar table partly preserved in two copies; ACT 820aa and 821, two synodic tables for Jupiter System A (Aaboe and Sachs 1966); Texts G (+) H and I, two synodic tables for Mars System A.

¹⁴On this topic, see Ossendrijver (2012d: 36).

degrees of abstraction. In the older Mesopotamian compendia and handbooks for astral science written before the eighth century BCE that were discussed earlier, a body of operational knowledge is also implied, but it is usually embedded in omens and other types of specific knowledge.

4.3.1 *Astronomical Procedure Texts*

We shall now zoom in on the procedure texts of mathematical astronomy and explore how this subcorpus is structured at various levels. Since a detailed analysis of the procedure texts is presented elsewhere (Ossendrijver 2012d), it will suffice to summarize the main features that concern us here. Four, perhaps five, distinct levels of segmentation can be identified in these texts: (0) series of tablets, (1) individual tablets, (2) clusters of related procedures on a single tablet, (3) individual procedures and (4) subprocedures. For each of these levels, several different types of markers, be they material, graphical, textual, linguistic or internal, may signify the segmentation of the text. The purpose of this is to help the reader in finding his way in the corpus and choosing the appropriate instructions.

As was mentioned in connection with the EAE, Mesopotamian scholarly compositions were typically written on serialized tablets. Each tablet in the series was identified by a tablet number and by a catchline. At the end of every tablet, there was a colophon mentioning the catchline of the next tablet. As it turns out, only very few procedure texts (see below) preserve a part of such a catchline in their colophon. All in all, there are only very few indications that the procedure texts were serialized.¹⁵ However, their titles are unknown and no other tablets of these series have been identified. As far as is known, procedure texts were usually copied on an individual basis. It therefore appears that the procedural knowledge underlying mathematical astronomy was transmitted in a more fluid manner than by copying serialized tablets. We can therefore proceed to the tablet as the largest material unit of text. While the clay tablet would appear to be a well-defined unit, this is often not the case, due to their frequently bad state of preservation. This makes it difficult to assess how many and which procedures may have been written on the original tablets when they were still intact. Since many of the extant fragments preserve only parts of one or two procedures, they provide little or no information about textual segmentation above the level of the individual procedure. In spite of these limitations, it is nevertheless possible to compile, from the partly preserved tablets, a set of characteristics of the tablet as the largest unit of text. Their sizes and shapes may be divided into several more or less well-defined types. The number of procedures per tablet varies between one and more than thirty for a large tablet. It suffices to mention here some of the most important features.¹⁶

¹⁵See Ossendrijver (2012d: 12).

¹⁶For a detailed discussion of this topic, see Ossendrijver (2012d: 10–12, 58, 122–123).

Most tablets contain only a few procedures for the moon or a single planet, but the largest tablets, which measure about 20 by 20 cm (Size A in the classification of Ossendrijver (2012d)), are true compendia containing up to thirty-two different procedures. The lunar compendia in this class contain rules for computing all of the columns of a lunar table, such that the order of the columns is reflected in the order of the procedures. Since the lunar tables comprise up to eighteen different columns, each representing one lunar quantity, such as the moon's position in the zodiac, its velocity or the time of new moon, these lunar compendia contain about as many procedures. The main representative of this type of lunar compendia is tablet Ossendrijver (2012a) No. 53 (Fig. 4.1), a collection of procedures for lunar System A written in Babylon, probably near 320 BCE, by an astronomer associated with the Esagila, the city's main temple. Size A tablets are always divided into two or three "newspaper-type" columns to be read from left to right on the obverse and from right to left on the reverse, in agreement with a longstanding Mesopotamian convention. Individual procedures are demarked by three types of features: (1) graphical, (2) rhetorical and (3) operational. Ideally, all of these features are consistent in that they demark the same division into procedures. However, it is quite often the case that passages forming a single unit of running text turn out to consist of several distinct algorithms; we shall return to these issues further below. The main text of Ossendrijver (2012a), No 53 is divided into procedures by horizontal rulings, indicated by dashed lines in Fig. 4.1.

Most of the eighteen partly preserved procedures contain instructions for computing one of the successive columns of a synodic table for lunar system A. The usual order of these columns in the tables is Φ , B, C, E, Ψ , F, G, J, K, L, M, NA₁ and KUR, in close agreement with the sequence of the procedures.¹⁷ As usual for scholarly tablets, the main text is followed by a colophon mentioning the filiation of the scribe and, unusually for an astronomical procedure text, an indication that the tablet was part of a series (other tablets of this series have not been identified).

Another group of lunar compendia, usually written on single-column tablets of a smaller size, is concerned with different versions or aspects of a single function, or several closely related functions. The most remarkable example of this kind, preserved in seven duplicates, is a compendium with four highly complex algorithms belonging to lunar System A, each concerning one time interval between sunset or sunrise and moonset or moonrise near full moon, also known as the Lunar Six intervals (Ossendrijver 2012d: 395–420). On most tablets, each Lunar Six module is presented as a single procedure of uninterrupted running text separated from the next procedure by a horizontal ruling. A strict correspondence exists between these procedures and the lunar tables of System A, the final columns of which contain Lunar Six intervals in the same order. The procedures explain how to compute the Lunar Six intervals from the immediately preceding columns of these tables, which contain all the necessary input data for the algorithms.

¹⁷For lunar System A and the meaning of the symbols, see (Ossendrijver 2012d: 121–178).

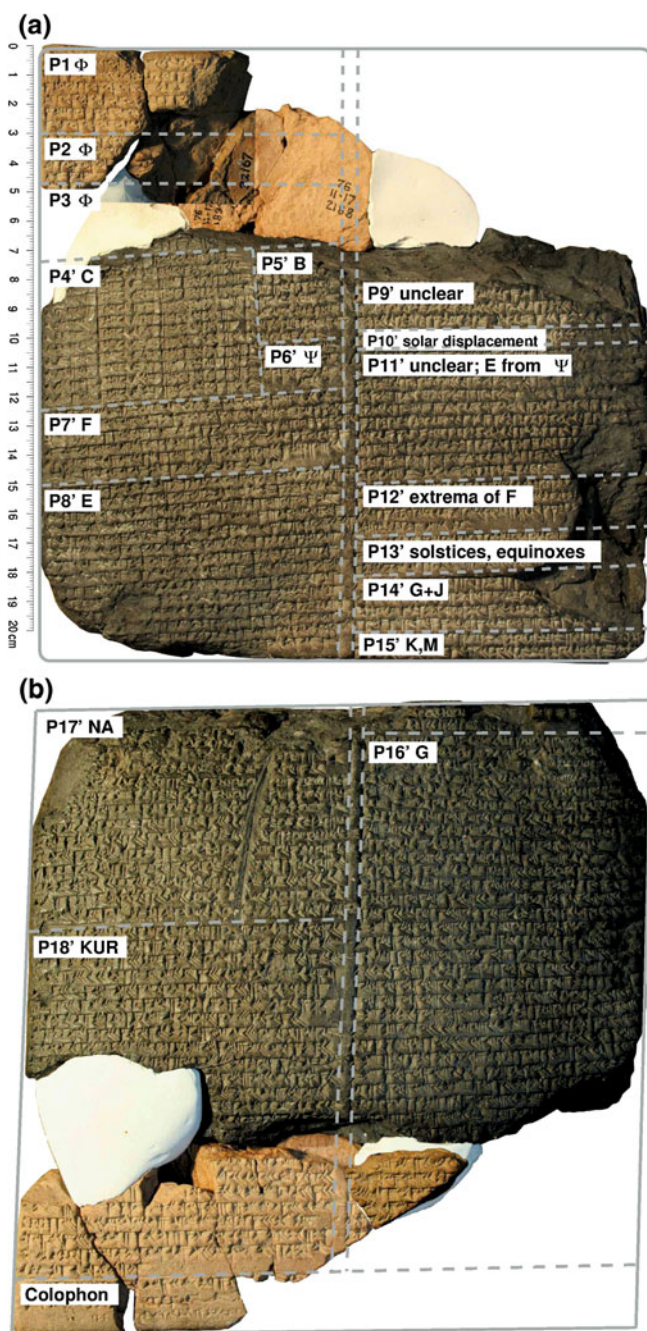


Fig. 4.1 Ossendrijver (2012a) No. 53, a compendium with procedures for lunar System A. The tablet is divided into columns and procedures by rulings, here shown as superimposed dashed lines. Left: obverse with Columns i and ii; right: reverse with Columns iii, iv and a colophon. © M. Ossendrijver. The Trustees of the British Museum are acknowledged for permission to publish the photographs

The planetary compendia differ from the lunar ones in several respects. These differences can be partly traced back to the fact that a synodic table for a planet has at most four columns for each synodic phenomenon: one with the successive zodiacal positions (longitudes) and one with the times of the phenomenon and, sometimes, two further columns with the corresponding line-by-line differences. The greater simplicity of the planetary algorithms is reflected in the composition of the compendia. Unlike the lunar compendia, which are usually dedicated to a single family of algorithms (e.g. lunar System A or B), the planetary compendia usually contain alternative algorithms for a single planet from different systems or even for different planets. Figure 4.2 shows an image of the obverse of the partly preserved tablet Ossendrijver (2012b) No. 18, the largest extant compendium with at least thirty-two procedures for Jupiter. It was written in Babylon, probably in the third century BCE, by an astronomer associated with the Esagila temple. Note that several so-called “firing holes” were impressed into the clay, always near the rulings separating two columns or two procedures. The function of these holes, which are found on numerous cuneiform tablets from all periods, remains unclear. The individual procedures on the obverse, P1–P11, are visually separated by horizontal rulings drawn as uninterrupted straight lines across the width of the column; they are indicated by dashed lines in Fig. 4.2.

The different computational systems represent alternative families of algorithms for computing essentially the same phenomena. As shown in Fig. 4.2, at least five systems (A, A', A'', A''', A₁ and A₂) are represented on this side of the tablet, a feature that is unknown from the lunar compendia. For each system, several procedures dealing with various aspects of Jupiter's motion are arranged together into clusters of related procedures, constituting a level of segmentation between tablet and procedure. Examples of such clusters in Fig. 4.2 are P1–P2 and P9b–P10. Note that this compendium is clearly not arranged as systematically as the lunar compendium shown in Fig. 4.1. The tablet begins with procedures for System A, the most commonly used system for Jupiter, but otherwise, the compiler of the tablet appears to have merely copied all the Jupiter procedures that he or she could find without much effort to arrange them in a systematic manner. Hence this compendium is not as closely correlated with the tabular texts as the lunar compendium discussed previously, and the same can be said for other large or medium-size planetary compendia.

Some smaller compendia with planetary procedures are, in fact, dedicated to a single computational system and exhibit a highly regular structure. Among them are certain compendia for Type A systems in which the following sequence of procedures is rather common: (1) a procedure for updating the zodiacal position of synodic Phenomenon 1, (2) a procedure for updating the time of synodic Phenomenon 1, (3–4) the same for synodic Phenomenon 2, etc., sometimes followed by procedures for the planet's motion in between the synodic phenomena (commonly referred to as the subdivision of the synodic cycle). For Type B systems, the reverse sequence is more common, i.e. (1) updating the time; (2) updating

the zodiacal position. Some but not all of these well-structured clusters of planetary procedures follow a corresponding synodic table on the same tablet.¹⁸

In addition to graphical markers, individual procedures may be identified by rhetorical or operational features. To the former belong the statements of purpose that sometimes introduce a procedure, e.g. ‘Procedure for the displacement of the moon,’ (Akkadian: *epūš*(DU₃-uš) *ša nisiḥ*(ZI) *Sin*) which is the first statement of P7’ on Ossendrijver (2012a) No. 53 (Fig. 4.1). Other common statements of purpose begin with the phrase ‘In order to construct [name of quantity]’([name] *ana epēšika*), or the same with ‘produce’ (*šūšu*) or ‘see’ (*amāru*). Operational features that demark the beginning of a procedure include the introduction of initial data: ‘You put down [name of quantity]’([name] *tašakkan*(GAR-an)) or ‘you hold in your hands [name of quantity]’ ([name] *ina qātē*(ŠU.2) *tašabbat*(DIB)). The end of a procedure is often formed by a statement whereby a name is assigned to the outcome: ‘you call it [name of quantity]’ ([name] *taqabbi*(E-bi)).

This brings us to the fourth and deepest level of segmentation of the procedure texts to be explored here, namely subprocedures and steps within procedures. In the present context, a subprocedure denotes a sequence of operations not graphically delimited by rulings but identified as a coherent unit that is subsumed in a larger procedure. Sometimes they are delimited by operational or rhetorical markers of the kind mentioned earlier. Several examples can be seen in Fig. 4.2, where subprocedures are labeled by small letters (e.g. P1.a’, b’ and P11.a–f). They can begin at any location in a line of text. Some subprocedures thus identified are confirmed by tablets on which the same sequence of operations forms a distinct procedure separated by horizontal rulings. The term step is used when a subalgorithm is part of a single complex algorithm. For instance, the Lunar Six modules mentioned earlier can be subdivided into thirteen steps forming a single section of running text corresponding to one procedure.

In some procedure texts, subprocedures are formatted as a list, such that each subprocedure begins on a new line. In a formal sense, these lists are not unlike the casuistic omen compendia discussed earlier. However, the similarity only concerns the layout, since the subprocedures are not exemplary cases but, mathematically speaking, algorithms for subintervals of the interpolation domain that employ a fully general and abstract formulation. One illustration of a list of similarly structured subprocedures is P4’ of Ossendrijver (2012a) No. 53 (Fig. 4.1), which contains twelve interpolation rules for computing Function C, which represents the duration of daylight, from the moon’s position in the zodiac. These twelve subprocedures also occupy twelve lines of text, one for each zodiacal sign. If the subprocedures do not fit on a single line, the text may continue into the next lines, which are then often indented. This phenomenon can be observed in Ossendrijver (2012c) No. 69, a fragment of an interpolation scheme for computing G from Φ , two functions of lunar system A (Fig. 4.3).¹⁹

¹⁸For more details on these procedures, see Ossendrijver (2012a,b,c: 58).

¹⁹Numerous tablets preserve different portions of the full scheme, which comprises thirty-five interpolation rules; for details, see Ossendrijver (2012d: 146–150).



Fig. 4.3 Obverse of Ossendrijver (2012c) No. 69, a list of interpolation rules for lunar System A

The translation of this fragment, with line numbers in raised position and reconstructed text enclosed by square brackets, is as follows (for a transliteration of the cuneiform text see Appendix 1):

⁰At the command of Bēl [and Bēltija] may it succeed.

¹In order for you to construct the durations. Opposite 2,13;20, decreasing, [you] put 2,40. [That which is less than 2,13;20, decreasing, you deduct from 2,13;20]; ²what remains you multiply by 3;22,30; while it fills up [you accumulate 0;17,46,40, and you add it with 2,40, and you put it down.]

³Opposite 2,10;40, decreasing, you put 2,53;20. That which [is less than 2,10;40, decreasing, you deduct from 1,10;40;] ⁴what remains you multiply by 9;20, [add] with 2,5 [3;20, and put down.]

⁵Opposite 1,58;31,6,40, decreasing, you put 4,[46;42,57,46,40. That which is less than 1,58;31,6,40, you deduct from 1,58;31,6,40, what remains] ⁶you multiply by 8;20, [add] with 4,46;[42,57,46,40, and put down.]

⁷Opposite 1,58;13,[20, decreasing, you put 4,49;11,6,40. That which is less than 1,58;13,20, decreasing, you deduct from 1,58;13,20, what remains] ⁸[you multiply] by [7;20, add with 4,49;11,6,40, and put down.]

The tablet begins with the standard invocation to Bēl (Marduk) and Bēltija (his spouse), deities of the Esagila, the main temple in Babylon, which signifies that it was written by astronomers associated with that temple, probably in the third century BCE. The first subprocedure is preceded by the statement ‘In order for you to construct the durations’ (Akkadian: *si-man.MEŠ ana DU₃-ka*), which explains the purpose of the procedure as a whole, ‘durations’ (*si-man.MEŠ*) being the

technical term for Function G, which represents the duration of the month. Each subsequent interpolation rule begins with a vertical wedge, to be read *ana*, which belongs to the Akkadian term for ‘opposite’ (*ana tarša*). With the exception of the first subprocedure, this initial vertical wedge is written twice as big as the other signs, clearly a deliberate graphical marker.

4.4 Conclusions

A comparison between the Mesopotamian corpus of celestial divination and the later Babylonian corpora of astral science reveals an increasing tendency towards specialization and textual segmentation. Different aspects of astral science that were previously dealt with in a single composition are increasingly represented by distinct textual genres. The main distinctions that can be identified in the new corpora are those between observation and prediction, and between concrete predictions and the underlying generally applicable operational knowledge. The latter distinction led to the composition of numerous procedure texts, especially in the field of mathematical astronomy. Within that corpus, textual segmentation expresses itself as a hierarchy ranging from tablets, clusters of procedures and procedures to subprocedures, each level of segmentation being marked by various graphical and internal features. Each of these markers serves the purpose of aiding the reader in orienting him- or herself in the corpus and choosing the appropriate procedure or subprocedure.

Transliteration of Ossendrijver (2012c) no. 69, Obv. 0–8

Obverse

- 0 *ina a-mat* ^dEN [*u GAŠAN-ia₂*] *liš-lim*
- 1 *si-man*.MEŠ *ana DU₃-ka ana tar-ša* 2.13.20 LA₂ 2.40 GAR-[*an ša₂ al* 2.13.20 LA₂ LA₂ *ina* 2.13.20 NIM]
- 2 *ša₂ TAG₄ A.RA₂ 3.22.30 DU ma-lu-uš-šu₂* [17.46.40 GAR-*an* GAR.GAR-*ma* KI 2.40 TAB-*ma* GAR-*an*]
- 3 *ana tar-ša* 2.10.40 LA₂ 2.53.20 GAR-*an* *ša₂ al* [2.10.40 LA₂ LA₂ *ina* 2.10.40 NIM]
- 4 *ša₂ TAG₄ GAM 9.20 DU KI 2.5[3.20 TAB-*ma* GAR-*an*]*
- 5 *ana tar-ša* 1.58.31.6.40 LA₂ 4.[46.42.57.46.40 GAR-*an* *ša₂ al* 1.58.31.6.40 LA₂ LA₂ *ina* 1.58.31.6.40 NIM *ša₂ TAG₄*]
- 6 A.RA₂ 8.20 DU KI 4.46.[42.57.46.40 TAB-*ma* GAR-*an*]
- 7 *ana tar-ša* 1.58.13.[20 LA₂ 4.49.11.6.40 GAR-*an* *ša₂ al* 1.58.13.20 LA₂ LA₂ *ina* 1.58.13.20 NIM *ša₂ TAG₄*]
- 8 A.R[A₂ 7.20 DU KI 4.49.11.6.40 TAB-*ma* GAR-*an*]

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Part III
Organizational Strategies and Internal
Architecture of Texts

Chapter 5

Parts in Chinese Mathematical Texts. Interpreting the Chapter Form of *The Nine Chapters on Mathematical Procedures*



Karine Chemla and Dahai Zou

Abstract This article starts with an observation. The chapters that compose the earliest extant mathematical book handed down through the written tradition in China, *The Nine Chapters on Mathematical Procedures*, and that are mentioned in the title of the book, are a key feature distinguishing this book from the manuscripts excavated from tombs sealed in China during, roughly speaking, the Qin and early Western Han dynasties. We argue that as early as the Eastern Han dynasty, the names of these chapters were related to an interpretation of an expression (‘the nine parts of mathematics’) occurring in a text essential for Confucian scholars, *Zhou Rites*. We thus suggest that these facts allow us to make sense of both the third century commentator Liu Hui’s account of the history of *The Nine Chapters*, and the difference between *The Nine Chapters* and the newly discovered manuscripts with respect to the textual parts composing them. We argue that in Liu Hui’s view, the fact that *The Nine Chapters* was organized into such chapters was a feature manifesting the adherence of this mathematical book to a set of texts to which the

The research leading to these results has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007–2013)/ERC Grant Agreement No. 269804 ‘Mathematical Sciences in the Ancient World (SAW)’. The results presented in this article were obtained through a discussion between the two authors that started in the spring of 2012. The results expounded here were presented on 10 May 2012 within the framework of the SAW project’s ‘History of Science, History of Text’ seminar. We thank the audience for their questions, which helped us improve our argument, and, in particular, Florence Bretelle-Establet and Micheline Decorps, for their exacting reading. Professors Guo Shirong (郭世荣) and Dai Qin (代钦) provided help for the reference Li Di (2000). We are happy to extend our thanks to them.

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first Qin emperor had gone to great lengths to control the access. This hypothesis allows us to interpret Liu Hui's assertion that the transmission of *The Nine Chapters* was badly affected by the first Qin emperor's book burning policy, at the same time as it accounts for why the newly excavated documents are not divided into chapters of this kind. These conclusions suggest that the chapters, and their names, might have played a key role in *The Nine Chapters*, these textual parts constituting an essential feature distinguishing this Classic from other mathematical writings. In the second part of our argument, we discuss a mathematical interpretation of the meaning of these chapters and the chapterization.

5.1 Introduction

The oldest Chinese book devoted to mathematics that has been handed down through the written tradition is entitled *The Nine Chapters on Mathematical Procedures* (*Jiu zhang suanshu* 九章算術).¹ The earliest known mention of this title occurs in the inscription carved on a measuring vessel commissioned by the Chamberlain for the National Treasury (*Dasinong* 大司農) in 179.² Clearly, the title places emphasis on the fact that the book is composed of 'chapters' (*zhang* 章). This feature will be the focal point of our discussion here. Are these chapters simple book divisions or do they convey deeper meanings? This is the issue we address.

Historians still disagree on exactly when *The Nine Chapters* in its received version was completed. Some believe the book was compiled in the first century CE. Others follow the oldest extant opinion on the issue, offered by Liu Hui in 263 CE, in the preface of his commentary on *The Nine Chapters*. Here, Liu Hui writes the following passage on the history of the book:

周公制禮而有九數,九數之流,則《九章》是矣。往者暴秦焚書,經術散壞。自時厥後,漢北平侯張蒼、大司農中丞耿壽昌皆以善算命世。蒼等因舊文之遺殘,各稱刪補。故校其目則與古或異,而所論者多近語也。

It is only when the Duke of Zhou established the Rites that [we know that] the **nine parts of mathematics** [*jiu shu*] existed.³ The **development** [*liu*] of these nine parts, **this is precisely**

¹Hereafter, we abbreviate the title as *The Nine Chapters*. For a critical edition and a French translation of *The Nine Chapters*, see Chemla and Guo Shuchun (2004).

²See Guo Shuchun, Chap. B, in Chemla and Guo Shuchun (2004: 57). On the Chamberlain, whose title we translate according to Hucker (1985), and the administration he supervised, compare Bielenstein (1980: 43): Bielenstein translates the same official title as 'Grand Minister of Agriculture'.

³The Duke of Zhou (Zhou Gong 周公, fl. mid-eleventh century BCE) played a key part in the establishment of the Zhou dynasty in the eleventh century BCE. Liu Hui refers here to the classic *The Offices of the Zhou* [Dynasty] (*Zhou guan* 周官), a book whose authorship has been traditionally credited to the Duke of Zhou, but whose date of completion is unclear. The title of the latter book was changed into *Zhou Rites* (*Zhou li* 周禮) while Wang Mang 王莽 (43 BCE–23 CE) acted as regent (his regency lasted between 1 CE and 9 CE; in 9 CE, he overturned the Western Han Dynasty [206 BCE–9

what *The Nine Chapters* is. Formerly, the cruel Qin⁴ burnt the books. The procedures of the Canons [OR the Canons and procedures OR the procedures of the Canon] got scattered and damaged. After that time, the Bei Ping Marquis Zhang Cang⁵ and the Assistant of the Grand Minister of Agriculture, Geng Shouchang,⁶ both acquired a universal reputation for their excellence in mathematics. On the basis of **scraps** of the old text (*wen*) that were handed down, Zhang Cang and the other [OR the others] made both excisions and completions. This is why, when one examines its **sections** (*mu*),⁷ in places, they differ from the ancient ones and what is discussed is largely in modern terms. [our emphasis]

As we have stressed, by offering different translations for some of Liu Hui's expressions, some passages of the preface can be interpreted in different ways. However, other points are clear.

Liu Hui attributes the interruption in the transmission of a work written in nine chapters to the book burning the first Emperor ordered in 213 BCE.⁸ For Liu Hui, this episode accounts for the fact that the book was not transmitted smoothly and

CE] during the time of an interregnum that lasted between 9 CE and 23 CE; the Han dynasty was then reestablished as the Eastern Han dynasty [25–220 CE]). Wang Mang greatly emphasized the importance of *Zhou Rites*, which then belonged to the set of ritual texts associated with Confucian Canons. Modern scholars published different opinions on the date and author/authors of *Zhou Rites*. Most scholars now believe it was completed before the establishment of the Qin Empire in 221 BCE (Liu Qiyu 1991; Boltz 1993). Kern (2010a) examines the functions and competences of scribes to which *Zhou Rites* attests, and shows that parallels with excavated artifacts and other early texts suggest parts of the text do refer to Western Zhou administrative organization. His main emphasis is on literacy. Here, we suggest that a similar argument could be made for numeracy. For greater detail on ritual texts, see Nylan (2001), Chapter 4, 'The Three *Rites* Canons', and Boltz (1993). On Liu Hui's reference to this text, see Chemla, Footnote 13, in Chemla and Guo Shuchun (2004: 752), and see below. Here, Liu Hui refers more precisely to the mention of 'nine parts of mathematics' (*jiu shu* 九數) in *Zhou Rites*. To begin with, we translate the expression *jiu shu* loosely and we return below to our interpretation of its meaning.

⁴Liu Hui refers here to China's first emperor, Qin Shihuang (秦始皇, 259–210 BCE). Qin Shihuang, who reigned between 247 and 210 BCE, was the first emperor to unify the Chinese Empire, in 221 BCE, under the rule of the Qin dynasty (221–206 BCE). In 213 BCE, Qin Shihuang ordered that certain types of books be burnt. We discuss the edict and some of its possible effects below.

⁵Zhang Cang (?252–152 BCE) was a civil servant who held quite important positions in the administration of the Han Empire from the beginning of the dynasty onwards. He is said to have lived more than a hundred years, which explains the year 252 and the fact that it is only approximate. See Guo Shuchun, Chap. B, in Chemla and Guo Shuchun (2004: 54–55).

⁶Like Zhang Cang but later (in the mid-first century BCE), Geng Shouchang was an official who contributed to the administration of finance, the management of public works and to settling astronomical questions. See Guo Shuchun, Chap. B, in Chemla and Guo Shuchun (2004: 54–55). Related documents are found in Ban Gu (1964, vol. XXIV: 1141; vol. LXX: 3023–3024).

⁷Liu Hui uses here another term referring to a section of text. We shall return to it in another publication. In this chapter, we concentrate on the division of the book into 'nine chapters'.

⁸On this episode, and various interpretations to which it lent itself; see Petersen (1995), Neinger (1983), Nylan (2001: 29–30) and Kern (2010b: 111–112). In this chapter, we try to make sense of how Liu Hui ties this episode with the history of *The Nine Chapters*, and we attempt to assess the reliability of his testimony.

that it was through editorial work carried out much later, by Zhang Cang in the second century BCE, and then Geng Shouchang in the first century BCE, that the book, then called *The Nine Chapters*, could be restored.⁹

Further, for Liu Hui this book in nine chapters resulted from a ‘development’—a term to be interpreted below—of the ‘Nine parts of mathematics’ (*jiu shu* 九數). Even though this latter expression also awaits interpretation, clearly, Liu Hui’s account associates it with *Zhou Rites*, or, according to the title of the book with which Liu Hui refers to it, *The Offices of the Zhou [Dynasty]*. In other words, through connecting the mathematical writing to the ‘nine parts of mathematics’, Liu Hui relates the use of ‘nine chapters’ to a book essential for Confucian scholars. In the view of Han scholars, books of this type belonged to a set of writings that the first Qin emperor sought to destroy (Boltz 1993: 26). We return to this issue.

This set of facts will prove important below. They define the two perspectives from which we shall discuss the organization of *The Nine Chapters* into chapters.

First, if we believe Liu Hui, the ‘development’ from the ‘nine parts of mathematics’ to a book in ‘nine chapters’ took place in pre-imperial times. This assertion indicates that in his view, both the ‘nine parts of mathematics’ and a book having such a structure existed before the Empire was established. Secondly, this statement of Liu Hui’s connects an organization of mathematical knowledge—the ‘nine parts of mathematics’—with this book and, as we will see, more precisely with its chapters. Interpreting the meaning of the ‘nine parts of mathematics’, and of the ‘development’ to which Liu Hui alludes thus offers a key to interpreting the possible meaning of these ‘chapters’ as textual parts.

The first part of Liu Hui’s assertion seems to be contradicted by newly discovered documents. Since the 1980s, archeological excavations have brought to light manuscripts buried with other artifacts in tombs sealed in the few centuries around the beginning of the Common Era to accompany the occupant of the tomb in the afterworld. Among these documents, mathematical writings were found. They seem to have been completed and copied in China between the time of the Warring States period (the earliest so far known being from *ca.* 300 BCE) up until the Western Han (in that case, second century BCE). Note that none of these manuscripts is organized into nine chapters. How can we account for the fact that Liu Hui states the mathematical book he mentions suffered from the ‘book burning’, whereas, clearly, other mathematical manuscripts were kept? This question will be addressed in Sect. 5.2 of our chapter. We account for the fact that the manuscripts might have survived the ‘book burning’, whereas the book whose nine chapters Liu Hui mentions did not, by suggesting that the status of these two types of books was different. Textual parts (that is, here, chapters) play a key role in the argument, since we suggest the organization of a mathematical text into nine chapters of this kind, and the related connection with writings prized by Confucian scholars, was essential to the definition of its status.

⁹On the editorial act as a writing act and Liu Hui’s assessment of its result, see Chemla (2008a).

In fact, more precisely, none of the Chinese mathematical manuscripts found so far displays such chapters. They have sections, which, in some cases are marked by a heading and whose end is, in general, indicated by a space at the end of the last column. Section 5.2 of our chapter suggests this difference is fundamental. This, in turn, raises several questions: how, from a scholarly viewpoint, should we interpret the difference between the excavated manuscripts and *The Nine Chapters* with respect to their textual parts? What, in this context, do the chapters of the Classic mean? These are the specific questions that we attempt to answer in Sect. 5.3 of our chapter.¹⁰

In conclusion, we explain why we suggest that these two heterogeneous features—the connection with Confucian writings and the deep meanings conveyed by chapters in *The Nine Chapters*—are, in fact, related to one another.

5.2 The Inner Structure of *the Nine Chapters* in Chapters as a Heritage from Earlier Classics

5.2.1 The Nine Chapters and the ‘Nine Parts of Mathematics’

The earliest known occurrence of the expression ‘the nine parts of mathematics’ mentioned above is found in the ‘Guardian’ (*Bao shi* 保氏)¹¹ section of *Zhou Rites*:

保氏掌諫王惡而養國子以道，乃教之六藝。一曰五禮，二曰六樂，三曰五射，四曰五馭，五曰六書，六曰九數。

The Guardian is in charge of censuring the ruler’s excesses. In this capacity he nurtures the scions of noble families with the Way by teaching them the Six Arts of Conduct and the Six Manners of Appearance. The Six Arts consist of five suites of rites and six tunes of music, five tricks of archery and five gambits of chariot combat, six principles of writing and nine parts of mathematics.¹²

The detailed content of the ‘nine parts of mathematics’ is first made explicit by Zheng Zhong (鄭眾, ?–83) and known through a quotation by Zheng Xuan (鄭玄, 127–200) in his commentary on *Zhou Rites*:

九數：方田、粟米、差分、少廣、商功、均輸、方程、贏不足、旁要。今有重差、夕桀、句股也。

¹⁰The two authors discussed the two sections; however Zou Dahai is the main author of Sect. 5.2, whereas Karine Chemla is the main author of Sect. 5.3.

¹¹The ‘Guardian’ was an official (or the administrative department for which this official was responsible) that dealt with the management of national education and guarding the rulers against wrongdoing while carrying out rites.

¹²(Sun Yirang 1987: 1010). We adopt the translation published in Vihan (2012: 1). Vihan translates *liu yi* as ‘Six Arts of Conduct and the Six Manners of Appearance’. We do not discuss this translation here, adopting below the simplified expression of ‘six arts’ to refer to this list.

The nine parts of mathematics were: Rectangular field, Unhusked and husked grains, Sharing according to the rank, Reducing the width, Discussing works, Fair tax paying according to transportation, Measures in square, Excess and deficit, Indirectly surveying.¹³ In modern times, there are Reiterated differences, *xi jie* [?], and Base and height as well.¹⁴

A few words about the history of *Zhou Rites* will be useful for the argument. The book surfaced in the Han dynasty through an edition written in ‘ancient script’ (*guwen* 古文),¹⁵ which the King of Hejian (Hejian Wang 河間王)¹⁶ first obtained and later presented to the court (Ban Gu 1964: 2410). It seems that *Zhou Rites* was overlooked for more than one hundred years, and only received more attention in the context of Liu Xin’s (劉歆, ?–23 CE) work on some of the Confucian documents in their ‘ancient script’ (*guwen*) editions. Liu Xin promoted these versions to the status of official classics, after Wang Mang had seized power at the court (Ban Gu 1964: 1967, 4069). At the time, *Zhou Rites* was considered as the record of the governmental system of the Zhou dynasty, and Wang Mang copied it in establishing a new rule (Boltz 1993). When Wang Mang was overturned, the learning on *Zhou Rites* was still handed down. Zheng Xing (鄭興, latter half of the first century BCE to the first half of the first century CE), Zheng Zhong’s father, studied the Classics in the ‘ancient script’ (*guwen*), and especially mastered *Zhou Rites*. He was an expert in calendrical matters and mathematics (Fan Ye 1973: 1217–1223). Zheng Zhong learned from his father and also from Du Zichun (杜子春, ca. 30 BCE–ca. 58 CE), who had studied *Zhou Rites* under Liu Xin (Jia Gongyan 1987).

In the first century CE, there was a very vigorous struggle between the scholars of the ‘modern script’ and the ‘ancient script’ traditions. Zheng Zhong belonged to the ‘ancient script’ (*guwen*) group, which descended from Liu Xin and held the view that *Zhou Rites* was a book from the Zhou Dynasty. Thus Zheng Zhong’s gloss can be interpreted as showing that he thought the nine branches of mathematics, from ‘Rectangular field’ to ‘Indirectly surveying’, dated from the Zhou

¹³We do not know the exact meaning of *pang yao*. It probably means surveying by indirect methods. Thus we temporarily translate it as ‘indirectly surveying’. For various explanations about this term, see Zou Dahai (2001a: 157–161).

¹⁴(Sun Yirang 1987: 1010). ‘Base and height’ (*gou gu* 勾股) refers more precisely to the base and height of a right-angled triangle. In this article, we use this abbreviation.

¹⁵The term *guwen* literally means ‘ancient script’. For scholars of the Han Dynasty, this expression designated styles of characters used before the unification of the Qin Dynasty and thus quite different and ancient. *Guwen* was used as an opposite to *jinwen* (今文), literally ‘modern script’, the current style of characters in Han times. The two expressions were also used to designate two corresponding schools in Han times. Recent scholarship on the history and the historiography of this opposition includes Nylan (1994) and Van Ess (1994).

¹⁶The King of Hejian’s name was Liu De (劉德, ?–129 BCE) and he was the third son of Emperor Jing (景帝). His father conferred this title to him in 155 BCE.

Dynasty, while the three other branches, ‘Reiterated differences’, ‘*xi jie*’ (?) and ‘Base and height’ took shape in Han times.¹⁷

To understand Liu Hui’s view on the relationship between the ‘nine parts of mathematics’ and *The Nine Chapters*, let us compare the items in Zheng Zhong’s list with the names of the actual chapters of the received book entitled *The Nine Chapters*. These titles read as follows:

- Rectangular field,
- Unhusked and husked grains,
- Sharing according to the degree [*cui fen* 衰分],
- Reducing the width,
- Discussing works,
- Fair tax paying according to transportation,
- Excess and deficit [*ying bu zu* 盈不足],
- Measures in square,
- Base and height.

Comparison shows that there are very few differences between the ‘nine parts of mathematics’ and the ‘nine chapters’. In addition to changes of characters for synonyms,¹⁸ the part entitled ‘Indirectly surveying’ was changed into ‘Base and height’. Moreover, the seventh and eighth terms were swapped.

According to Liu Hui’s preface quoted above, *The Nine Chapters* is a classical book of mathematics having its origin in a distant past, and which since then had gone through a long, convoluted history. His preface states that at the time of the Duke of Zhou, mathematics was a subject taught in the education system for the offspring of the elite. Moreover, Liu Hui specifies that the mathematics taught in this context took the form of ‘nine parts of mathematics’.¹⁹ For him, a book in nine chapters, deriving from the ‘nine parts of mathematics’, existed before the establishment of the Empire in 221 BCE. In his view, this book was dismantled because of the ‘book burning’ policy that the Qin dynasty implemented—we return to this event below. Liu Hui further mentions two Han dynasty scholars—Zhang Cang and Geng Shouchang—who, in his view, attempted to re-assemble and revise its text, hence composing the book entitled *The Nine Chapters*, on which he comments. Further, Liu Hui describes their editing procedures. He specifies the sources they

¹⁷Qian Baocong (1964: 31–32) thought the ‘nine parts of mathematics’ mentioned in Zheng Zhong’s gloss represented the branches of mathematics at the end of the Western Han dynasty. In our view, he diverges from Zheng Zhong’s own stand (Zou Dahai 2008). The point is important for our argument, since it supports our view on the date of the formation of the ‘nine parts of mathematics’.

¹⁸‘*ci*’ (差, rank) and ‘*ying*’ (贏, excess) were, respectively, changed into ‘*cui*’ (衰) and ‘*ying*’ (盈).

¹⁹In addition to the statement about *Zhou Rites* quoted above, Liu Hui’s preface to his commentary on *The Nine Chapters* further claims the following about *Zhou Rites*: ‘Furthermore, mathematics belongs to the Six Arts (*liu yi*) and in the past, [the government] selected virtuous and talented persons, who were treated as guests, to teach and train the scions of noble families [in these topics].’ (且算在六藝, 古者以賓典賢能, 教習國子) (Chemla and Guo 2004: 126).

used and how they dealt with them, expurgating and supplementing the text, modifying the organization of the topics of the old book and reformulating it with expressions from their times.

5.2.2 *Liu Hui's Testimony and the Newly Discovered Manuscripts*

We can derive two conclusions from Liu Hui's testimony on the topic:

- (1) Most of the mathematical methods that we find in the extant *The Nine Chapters* existed in earlier times.
- (2) The structure in chapters of *The Nine Chapters* comes mainly from its earlier pre-Qin period edition.

Historians of mathematics have not uniformly considered Liu Hui's testimony as wholly faithful to the facts. Nor have they all accepted the conclusions deriving from it.²⁰ In recent decades, archaeological discoveries have allowed historians to assess Liu Hui's assertions. Among these discoveries, we count several mathematical documents, two of which have been entirely published to this day. They provide the most important evidence for a direct re-examination of Liu Hui's preface from a new perspective. The first document bears the title of *Writings on Mathematics* (*Suanshu shu* 算數書).²¹ This book was written on bamboo strips and

²⁰Li Yan (李儼, 1892–1963) accepted Liu Hui's statement that before the establishment of the Empire, an old version of *The Nine Chapters* existed. He further accepted the view that Zhang Cang and Geng Shouchang edited documents to produce *The Nine Chapters* of the Han dynasty. This was, for him, the book bearing this title that many scholars studied. They included Xu Shang (許商, fl. latter half of the first century BCE), Du Zhong (杜忠, fl. latter half of the first century BCE), Liu Xin, Ma Xu (馬續, fl. latter half of the first century CE to first half of the second century CE), Zheng Xuan, Kan Ze (闕澤, fl. of the third century CE), Liu Hui, etc. Li Yan thought that *The Nine Chapters* was fixed only after Liu Hui wrote his commentary (Li Yan 1955: 11–12, 16–17; Li Yan 1958: 24). Qian Baocong (錢寶琮, 1892–1974) did not accept the validity of Liu Hui's testimony with respect to the fact that *The Nine Chapters*, as we see it, was completed by Geng Shouchang in the first century BCE. He was nevertheless convinced that undoubtedly most of Chapters 1–5 dated from before the Qin Dynasty. He further considered as reliable Liu Hui's statement that *The Nine Chapters* was primarily based on the 'nine parts of mathematics'. However, unlike Liu Hui, he dated the 'nine parts of mathematics' and *The Nine Chapters*, respectively, from the end of Western Han Dynasty and the early Eastern Han (Qian 1964: 14, 28–33). Similarly, Guo Shuchun (郭書春) accepted Liu Hui's interpretation that *The Nine Chapters* derived from the 'nine parts of mathematics'. Furthermore, like Liu Hui, he dated the two, respectively, from the Western Han Dynasty and the pre-Qin period (Guo Shuchun 1992: 98–102; 1997). Zou Dahai holds opinions similar to Li Yan's and Guo Shuchun's, adding more detailed arguments (Zou Dahai 2001a: 451, 497–498; 2001b; 2008).

²¹The title means literally 'Writing on calculations of numbers/quantities' or 'Writing on procedures with counting rods'. However, we believe that its actual meaning refers to mathematics, through the fact that mathematics is conceived of as being constituted of mathematical procedures.

was unearthed from a tomb sealed in *ca.* 186 BCE, at Jiangling 江陵 county (Hubei 湖北 province) (Zhangjiashan ersiqi hao hanmu zhujian zhengli xiaozu 2001, Peng 2001b). The second book bears the title *Mathematics* (*Shu* 数).²² It was written in the Qin Dynasty on bamboo strips that are now kept at Yuelu Academy (Hunan University 湖南大學嶽麓書院). Because these strips were part of a set of strips bought from the Hong Kong antiquities market, we do not know their exact provenience. Some strips from the same set record events on a calendar, the latest year of which is the thirty-fifth year of the First Qin Emperor (212 BCE).²³

These newly discovered documents allow us to date different procedures recorded in the Han version of *The Nine Chapters* with a higher accuracy than was possible before. Indeed, *Writings on Mathematics* and *Mathematics* contain many basic mathematical methods that are similar to procedures included in *The Nine Chapters*. These include procedures from the chapters entitled ‘Rectangular field’, ‘Unhusked and husked grains’, ‘Sharing according to the degree’, ‘Reducing the width’, ‘Discussing works’, ‘Excess and deficit’ (Peng Hao 2001b, 2005; Zou Dahai 2001b, 2003, 2005, 2007, 2009; Xiao Can 2010). Moreover, the two documents deal with some simple situations comparable with those addressed in the chapter ‘Fair tax paying according to transportation’ (Zou Dahai 2001b, 2005, 2008, 2010a; Xiao Can 2010: 15). Fragments of a book written on bamboo strips that the collators entitled *Mathematical Procedures* (*Suanshu* 算術)²⁴ were also unearthed from a tomb at Fuyang 阜陽 (Anhui 安徽 province). They show that at least one key problem in the chapter ‘Fair tax paying according to transportation’ also existed earlier than was previously thought (Hu Pingsheng 1998; Chemla and Guo 2004: 318, 477; Zou Dahai 2001a: 146–152, 2008, 2010b).

Moreover, *Mathematics* contains a problem that is very similar to the ninth problem in the ‘Base and height’ chapter. This suggests that the problem is solved by an application of “Pythagoras’ theorem”, which is recorded in ‘procedure’ form in that chapter (Xiao and Zhu 2010). Up to now, documents written on bamboo strips do not seem to contain any direct evidence that methods like those in ‘Measures in square’ existed in the pre-Qin period. However, indirect evidence

²²The title of the book means literally ‘Numbers/Quantities’ or ‘Procedures’; however, we believe that in the title, this term has a wider meaning, which is also attested to.

²³Chen Songchang (2009) doubted whether the set of strips was unearthed from the same tomb. However, the preface of Zhu Hanmin and Chen Songchang (2011) asserts *Mathematics* was completed no later than the thirty-fifth year of the First Emperor of Qin (212 BCE). This seems to indicate that the collators of *Mathematics* thought at least these strips were unearthed from the same tomb as the strip recording the thirty-fifth year of the First Emperor. On 6 April 2013, one of two authors of this chapter, Zou Dahai, had an electronic exchange with Xiao Can, the main collator of *Mathematics*. Xiao and Zou noticed that selling strips from different tombs as one set would earn less money for the antiquarian than selling them separately. It is thus probable that the set of strips was unearthed from the same tomb. This question is still open to further discussion.

²⁴This book was written not later than 165 BCE (Hu Pingsheng 1998).

suggests that such methods probably existed before the Qin Dynasty.²⁵ Furthermore, the very strict laws recorded on bamboo strips excavated from Tomb 11, sealed in *ca.* 217 BCE at Shuihudi (睡虎地, Yunmeng County, Hubei Province), show that the enactment and implementation of laws was based on highly developed mathematical knowledge. This includes methods of surveying similar to those of the ‘Base and height’ chapter in *The Nine Chapters* (Zou Dahai 2005).

In conclusion, the unearthed documents prove that many methods included in the Han version of *The Nine Chapters* were known in earlier times. They were probably recorded in the book in nine chapters mentioned by Liu Hui as the pre-Qin predecessor of *The Nine Chapters*. In this sense, the first conclusion that Liu Hui’s preface allows us to derive has been proved correct to a great extent.

The second conclusion that we derived from Liu Hui’s preface held that the structure in nine chapters derives from the earlier Qin version of *The Nine Chapters*. This conclusion seems to be contradicted by the fact that although excavated manuscripts have many procedures in common with *The Nine Chapters*, and hence could be its predecessors (Li Di 2000; Peng Hao 2001a: 25–32; 2005; Cullen 2004), none of them contains chapters of this kind. Instead, *Writings on Mathematics* consists of nearly seventy sections.²⁶ Roughly speaking, each section contains a problem, a method or a standard used in calculation. Moreover, each of these sections has a title. The book *Mathematics* (*Shu*) consists of about a hundred sections, most of which have no title. However, these sections have nothing in common with chapters. Their structure thus appears to be very different from the construction of *The Nine Chapters*.

As we have seen, for Liu Hui, *The Nine Chapters* had been completed by Geng Shouchang in the middle of the first century BCE. He thus dates the completion from a date posterior by many decades to the date when *Writings on Mathematics*, or *Mathematics* were written. Some scholars thus drew the conclusion that before *The Nine Chapters*, no Chinese mathematical documents had been organized into a similar system of nine chapters, which offered a reasoned organization of their content. Moreover, they considered that the compilers of *The Nine Chapters* relied on earlier mathematical materials like *Writings on Mathematics* to improve

²⁵Indeed, it is highly probable that in ancient China, notions of positive and negative numbers were first introduced in relation to the operations of ‘Measures in square’. ‘Measures in square’ should thus occur before the notions of positive and negative numbers. *Writings on Mathematics* records a legal standard (*cheng* 程) for examining effects of doctors’ treatments. In it, concepts of positive and negative numbers similar to those in the chapter ‘Measures in square’ occur. Such a legal standard is probably a quotation from the laws enforced by the Qin State during the Warring States period or perhaps—even though this is less probable—during the Qin Dynasty. Thus *Writings on Mathematics* provides indirect evidence that ‘Measures in square’ of *The Nine Chapters* had its origin in pre-Qin times (Zou Dahai 2010b, c).

²⁶Note that here like below, what we call ‘sections’ derives from the material organization of the manuscript. But the text has no term for it.

mathematical knowledge and organize it into such a system.²⁷ The recent publication of *Mathematics* seems to have reinforced such a conclusion. This conclusion contradicts Liu Hui's interpretation of the history of *The Nine Chapters*. We return to this point in the final part of this section.

Another point of Liu Hui's description of the history of *The Nine Chapters* seems to be contradicted by all the available evidence. The text of the decree ordering the 'book burning' did not mention mathematical books—we quote and analyze the decree below. However, the decree explicitly mentioned that books on medicine, pharmacy, divination, agriculture and arboriculture could be kept. The discovery of mathematical books on bamboo strips in tombs dating from the end of the Qin Dynasty to the beginning of the Han Dynasty seems to prove that such books could also be kept. This remark would suggest Liu Hui was wrong when he mentions a book in nine chapters existed before the unification of the Qin, and claimed it suffered from the Qin policy of 'book burning'. Is Liu Hui's account of the history of *The Nine Chapters* only storytelling contradicted by facts?²⁸

In this section of our chapter, we put forward a new interpretation, suggesting that Liu Hui's account of the compilation of *The Nine Chapters* does not conflict with the excavated documents.

5.2.3 *The Qin Decree on Book Burning*

For this, we need first to examine the evidence we have about the 'book burning', mentioned by Liu Hui. This evidence can be found in Sima Qian's (司馬遷, ca. 140 BCE–ca. 90 BCE) *Historical Records* (*Shi ji* 史記), a historical book which was completed in the first century BCE and served as a model for future official historical writing. In a context in which the ministers of the First Emperor of the Qin Dynasty were discussing the political institutions of the newly established Qin Empire, Sima Qian reports, Li Si (李斯, ?–208 BCE), the prime minister, advocated the policy of prohibiting discussions about the affairs of the court and eliminating heterodox opinions throughout the country. He then suggested a decree should be issued to order the 'book burning':

臣請勅史官非《秦記》,皆燒之。非博士官所職,天下敢有藏《詩》、《書》、百家語者,悉詣守、尉雜燒之。有敢偶語《詩》、《書》者,棄市。以古非今者,族。吏見知不舉者,與同罪。令下三十日不燒,黥爲城旦。所不去者,醫藥、卜筮、種樹之書。若欲有學法令,以吏爲師。

²⁷Peng Hao (2001b: 25–32) and Li Di (2000) expressed such viewpoints on the basis of *Writings on Mathematics*.

²⁸Before *Writings on Mathematics* was unearthed, many scholars (for example, Qian Baocong 1964: 28–33) expressed distrust with respect to Liu Hui's statement on the history of *The Nine Chapters*. After the book was unearthed, scholars like Li Di (1997: 89–95; 2000), Peng Hao (2001b, 2005) and Cullen (2007) continued to hold such views.

Your servant humbly suggests that all books, except the records of the Qin state, in the official archives be burned. Aside from the offices of the Erudites²⁹ of the Imperial Academy, all persons under Heaven who dare to possess the *Book of Odes* [*Shi* 詩], the *Book of Documents* [*Shu* 書] and sayings of the hundred philosophical schools [*baijia yu* 百家語]³⁰ must submit them to the local magistrates and have them indiscriminately burned. Those who dare to discuss among themselves the *Book of Odes* and the *Book of Documents* will be executed and their bodies exposed in the market place. Those who criticize the present by referring to the past should be executed along with members of their families. Officials who know of such cases but fail to denounce them will be guilty of the same crime. Thirty days after the issuing of this command, anyone who fails to burn these books should be arrested and tattooed as a convict laborer for building the city walls. Books not to be destroyed are those of medicine, pharmacopeia, divination, agriculture and arboriculture. Those who want to study the laws and edicts will take the (corresponding) officials as their teachers.³¹

Evidence suggests that the First Qin Emperor accepted Li Si's suggestion and issued a decree clarifying which types of books should be burnt and which could be kept. In relation to its purpose, the decree was called the *Statute for Keeping Books* (*Xie shu lü* 挾書律). This statute was enforced until the early years of the Han Dynasty, when Emperor Hui (惠帝) abolished it in 191 BCE.³² The actual text of the decree was not kept. We can only read the text of the declaration *Historical Records* attributes to Li Si. In what follows, we rely on the text attributed to Li Si to discuss the content of the decree, while keeping in mind there might be a difference between the two texts.

The above text is quoted from the 'Biography of the First Qin Emperor' (*Qinshihuang benji* 秦始皇本紀) chapter of *Historical Records*. In 'Li Si's Biography' (*Li Si liezhuan* 李斯列傳), also part of *Historical Records*, a similar quotation is given. However, it does not mention that the government offices were

²⁹Erudites (*boshi* 博士) were officials of the central government, each of whom mastered the teachings of one classic and was expected to answer the Emperor's questions.

³⁰The *Book of Odes* (*Shi* 詩), sometimes called the *Classic of Poetry* (*Shi jing* 詩經), is a collection of poetry from the Western Zhou Dynasty (from the middle of eleventh century to 771 BCE) to the mid-Spring and Autumn Period (770–476 BCE). It is said to have been compiled before Confucius. The *Book of Documents* (*Shu* 書), sometimes called the *Classic of Documents* (*Shu jing* 書經), is a collection of historical documents ascribed to the Shang (商, ca. sixteenth century BCE to mid-eleventh century BCE) and Zhou dynasties. A few passages deal with the Xia Dynasty (夏, ca. twenty-first to seventeenth centuries BCE). Documents claim that Confucius studied these books and revised them (Sima Qian 1963: 3115; Liu Shipei 2006: 3–4; Meng Wentong 1933: 1–3). The 'sayings of the hundred philosophical schools' refer to the writings produced in the context of the struggles between many thinkers during the Warring States (475 BCE–221 BCE). Petersen (1995) discusses the meaning of this expression. For lack of space, we do not enter into these details here.

³¹(Sima Qian 1963: 254–255). Translation modified from (Fu Zhengyuan 1996: 116).

³²(Ban Gu 1964: 90). From early on, some scholars have expressed doubts with respect to whether this policy was actually enforced, and how it was applied. We do not want to enter this debate here. First, our aim is to interpret Liu Hui's preface, in particular in relation to the goal of our chapter, namely, the discussion of textual parts in mathematical writings. Second, in the conclusion to this section, we return to this debate, only to suggest that the evidence of mathematical writings could be used in discussing this issue.

allowed to keep the *Book of Odes*, the *Book of Documents (Shu)* or ‘sayings of the hundred philosophical schools’ for their duties (Sima Qian 1963: 2546). On the basis of these two sources and other documents, some scholars have suggested that even these copies of the books kept by government offices had been burned as well (Li Xueqin 1998). Ma Feibai (馬非百) has argued that the expression *bo shi guan* (博士官) used in Li Si’s suggestion for the decree should be understood as the offices headed by Erudites, while the expression *bo shi* (博士) should be interpreted as the officials on duty in these offices. He held that the Erudites (*bo shi*) could not keep their private copies of the books, while the offices could keep them. This interpretation is in agreement with the fact that Fu Sheng (伏生), a Qin Dynasty Erudite, is known to have furtively hidden the *Book of Documents* in a wall, when the ‘book burning’ campaign took place (Ma Feibai 1982: 896; Li Rui 2010). We return to this episode below.

From the above evidence on the *Statute for Keeping Books*, we will note the following points of importance for our argument:

- (1) The *Book of Odes* and the *Book of Documents* were to be burnt. Only government offices could preserve them.
- (2) Writings on laws were kept.
- (3) Books on medicine, pharmacopeia, divination of various kinds, agriculture and arboriculture could be preserved.

A remark will prove of crucial importance for the argument that this section of our chapter is making. Indeed, among the first set of documents enumerated in Li Si’s declaration that led to the ‘book burning’ decree, literally speaking, only the *Book of Odes* and the *Book of Documents* are mentioned as texts to be burnt. However, in this context, as these two books were canons prized by Confucian traditions, their inclusion has in general been interpreted as standing for all writings attached to Confucian teachings (Chen Zhenghong and Tan Beifang 2004: 11–13).

It seems that the *Statute for Keeping Books* was quite strictly enforced. Only a few scholars hid forbidden books in very secret places. We mentioned above the example of Fu Sheng. A few years after the policy was implemented, violent wars arose and Fu Sheng had to go into exile. When the Han Dynasty restored peace, according to *Historical Records*, he returned home to fetch the book. However, dozens of articles in it were already lost and he could only retrieve twenty-nine of them (Sima Qian 1963: 3124–3125). This piece of evidence shows the effect the ‘book burning’ policy had on such writings.

The documents unearthed from tombs sealed during the period when the *Statute for Keeping Books* was enforced belong to the kinds of texts authorized by the edict (Li Xueqin 1998; Pian and Duan 2006: 182–183). For example, in June 1993, archeologists excavated Tomb 30 at Zhoujiatai (周家臺, Shashi, 沙市, Hubei Province). They dated the tomb from the end of the Qin Dynasty, several years after the promulgation of the *Statute for Keeping Books*. In the tomb, 381 bamboo strips (once joints between fragments were made) and one wooden strip were discovered. These documents can be classified into three kinds. The first is *lipu* (曆譜), which

can be regarded as calendars with records of events. The second is *rishu* (日書, literally ‘book of days’), which instructs people about auspicious and inauspicious activities. It can be identified as the category of divination mentioned in the decree. The third kind of document deals with medicine, pharmacopeia, divination and agriculture (Hubei sheng Jingzhou shi Zhouliangyuqiao yizhi bowuguan 2001: 1, 91–137, 145–160). These are, in fact, the three kinds of document the statute authorized.

5.2.4 Mathematical Writings and the Qin Decree

The record of the *Statute for Keeping Books* quoted above does not mention whether books on mathematics were to be burnt or could be kept. However, its formulation implies that books for action (pragmatic writings) could be preserved. Hence, some scholars have argued that mathematical books could also be kept. They suggested these books included materials from which *The Nine Chapters* originated.³³ If we assimilated *The Nine Chapters* to an ordinary book of mathematics, this could be correct. This conclusion would contradict Liu Hui’s preface when he argues that this book was burnt. However, Liu Hui refers to the ‘book in nine chapters’ that, in his view, existed in the pre-Qin period as ‘*jing shu*’. Determining whether this book can be considered an ordinary work depends on the interpretation of this expression. Let us thus turn to investigating the meaning of ‘*jing shu*’ (經術) in the context of his preface.

The expression ‘*jing shu*’ (經術) consists of two characters ‘*jing*’ (經) and ‘*shu*’ (術). The term ‘*jing*’ (經) designates ‘Classics’ or ‘canons’, in particular the Confucian Classics. Depending on the context, the term ‘*shu*’ (術) can be used to refer to methods, procedures, skills, strategies or political trickery. This term emphasizes the dimension of knowledge related to action. We have therefore translated it as ‘procedures’. As a whole, the expression ‘*jing shu*’ (經術) can be understood in different ways. Some scholars have interpreted it as simply referring to ‘Classics’. In our context, this does not seem plausible and hence we will not discuss this hypothesis any further. Two other interpretations can be offered. First, ‘*jing shu*’ (經術) can be understood as ‘*jing* (經) and *shu* (術)’, namely ‘Classics and procedures’. Secondly, ‘*jing shu*’ (經術) can be understood as ‘the *shu* (術) of *jing* (經)’, namely ‘the procedures of the Classics’.

If we understood the expression ‘*jing shu*’ (經術) as ‘Classics and procedures’, then Liu Hui’s statement in his preface would mean that he thought the books that

³³Li Di (1997: 89–106) thought many bamboo strips on mathematics were preserved in government offices and were not destroyed during the book prohibition. Such documents (which he called ‘*guan jian*’ [官簡], official bamboo strips) were gradually assembled and Liu Xin (劉歆) relied on them to eventually compose *The Nine Chapters* in the early years of the first century CE. Cullen (2007) holds similar views, since he thinks the discovery of *Writings on Mathematics* cast further doubt on Liu Hui’s viewpoint.

should be burnt included not only the Confucian Classics, but also books on medicine, pharmacopeia, divination, agriculture and arboriculture, which contain procedures. This statement would contradict what we know of the decree from the first Qin emperor or would suggest that Liu Hui was not aware of its content. Such a hypothesis would stand in contradiction to the evidence we have about Liu Hui's broad knowledge of ancient books and history (Guo Shuchun 1992: 321–368). Or, this hypothesis would attribute to Liu Hui an implausible interpretation of the first Emperor's decree.

We think the 'procedures of the Classics' interpretation of '*jing shu*' (經術) would make perfect sense of all the documents we have, including Liu Hui's preface. Before we discuss our interpretation of Liu Hui's account of the history of *The Nine Chapters*, as a preliminary to the discussion, we need to add a few points about the use of the terms '*jing*' (Classics) and '*shu*' (procedures) before the enforcement of the decree in 213 BCE.

Writings of the Warring States period attest to the belief that, before Confucius was active at the turn of the sixth and the fifth centuries BCE, the *Book of Odes*, the *Book of Documents*, the *Rites* (Li 禮), the *Music* (Yue 樂) and the *Spring and Autumn* (Chun qiu 春秋, Historical Annals), the *Change* (Yi 易) had already become very important books, and were quoted as evidence in discussions (Liu Shippei 2006: 2–4; Meng Wentong 1933: 3–4; Zhang Qicheng 2000). Several pieces of evidence from the late Warring States period (475 BCE–221 BCE) indicate that these books were perceived as 'canons' or 'Classics' (*jing*).³⁴ The titles of the six books above also appear as forming a set of key writings in the texts on bamboo strips unearthed from a tomb sealed in ca. 300 BCE in the Chu State, though the character '*jing*' for classics is not used.³⁵

As for '*shu*' (procedures), it is impossible in the context of our chapter to discuss the term with full generality. However, the books highly prized by Confucian scholars included *Zhou Rites*. We have seen above that this book listed basic subjects to be taught to the children of the elite in the form of 'six arts' (*liu yi* 六藝). Among these subjects, *Zhou Rites* includes 'nine parts of mathematics'. On the basis of *The Nine Chapters*, we know that mathematical documents of this type granted pride of place to 'procedures'. We can thus suggest that among the procedures that Liu Hui refers to using the expression '*jing shu*', there were procedures such as those contained in *The Nine Chapters*.

³⁴For instance, *Zhuang Zi* (莊子, *Master Zhuang*), whose title refers to Zhuang Zhou (莊周, ca. 369 – ca. 286 BCE), is a collection of texts by Zhuang Zhou and his followers in the pre-Qin period (Liu Xiaogan 1988: 1–101). In the chapter 'Movement of the Heaven' (*Tian yun* 天運), which is one of the external ones (*wai pian*) of the *Zhuang Zi*, the expression 六經 (Six Classics) is used to refer to these six books (Guo Qingfan 1985: 331–332. See an English translation in Watson 1968: 165–166). Similarly, the philosopher Xun Zi (荀子) of the third century BCE also uses the term '經' (classic) in relation to these books (Nylan 2001: 10–11).

³⁵See, for example, Strips 13–14 of '*liu de*' (六德 Six virtues); Strips 36–44 of '*Yu cong yi*' (語叢 – Collection of Aphorisms. Part 1) (Jingzhou shi bowuguan 2005: 188, 194–195).

Moreover, according to Liu Hui's preface, *The Nine Chapters* represented a development of the 'nine parts of mathematics' (*jiu shu*). In his view, such a book, organized into nine chapters, was thus closely related to the Confucian Classics in the pre-Qin period. It is thus reasonable to assume that, for him, the content of the book could be part of the 'procedures of the Classics' (*jing shu*). The connection between these Classics and mathematics in *nine chapters* can further be perceived, on account of the fact that many experts of Classics studies in Han times, such as Ma Xu (latter half of the first century to the early second century CE) and Zheng Xuan (鄭玄, 127–200 CE), were very familiar with *The Nine Chapters* (Fan Ye 1973: 862, 1207–1213). In other words, when mathematics is mentioned in this context, it is *always* in relation to an organization in 'nine chapters' such as the one to which *Zhou Rites* refers.³⁶

5.2.5 Conclusion on the Fate of Mathematical Books in Relation to Their Organization in Nine Chapters

Liu Hui's idea that there was a close relationship between a certain type of knowledge in the form of procedures (in particular, mathematical procedures in nine parts) and the Confucian Classics can help us understand the destiny of *The Nine Chapters*.

One can argue that in Liu Hui's view, at the time when the Qin decree was enforced, mathematics organized according to 'nine parts' was perceived as being very closely related to those Classics whose possession was forbidden. The decree of the first Qin emperor ordered the destruction of private copies of these books. We can thus suggest that when Liu Hui refers to the destruction of 'the procedures of the Classics', he means that not only Confucian Classics but also procedures perceived to be attached to them were meant to be burnt. The writings targeted thus included mathematical books in nine chapters of this kind but *not all* mathematical books. Such an interpretation accounts for many facts.

First, it helps explain why to this day no mathematical book in nine chapters of the type of the 'nine parts of mathematics' has been found in any archeological excavation. Indeed, in the context of this hypothesis, books in nine chapters of this type, like writings prized by Confucian scholars, were probably targets of the book burning and they suffered damage, when the 'book burning' policy was enforced.

³⁶Other pieces of evidence document the relationship between Confucian Classics and 'procedures'. For instance, see 'The world' (*tianxia* 天下) chapter, in *Zhuangzi* (Guo Qingfan 1985: 1067, and the English translation in Watson 1968: 362–363). Another piece of evidence on the importance of mathematical procedures in relation to the study of Confucian Classics is given by the fact that Zhen Luan (甄鸞, fl. middle of the sixth century CE) compiled a book *Mathematical Procedures on Five Classics* (*Wujing Suanshu* 五經算術), as a commentary on parts of classical texts.

Interestingly, if this holds true, the extant mathematical documents seem to support the interpretation that the first Qin Emperor did in fact carry out the ‘book burning’ policy.

Secondly, since we might assume that a mathematical book in nine chapters was a long and complicated text for most scholars of the time, one can surmise that the secretly preserved copies might be incomplete. This could explain why, according to Liu Hui, when Zhang Cang and then Geng Shouchang started to look for the mathematical Classic, they could not find a complete copy. This observation calls for further remarks. All the complete mathematical manuscripts that have been found thus far date from the end of the third century BCE to *ca.* 157 BCE. They were probably documents of a type Zhang Cang could see. However, he seems to have believed that another type of mathematical book existed—one organized into nine chapters—but he could not find a complete copy. He thus does not seem to have considered the documents he did have access to, those similar to ones yielded by present-day excavations, as predecessors of *The Nine Chapters*. This supports the hypothesis that, at that time, actors believed such a book existed but it could not be found.

In conclusion, this interpretation suggests a way of making sense of all the available evidence regarding mathematical writings in ancient China. It allows us to interpret every detail of Liu Hui’s recounting of the history of *The Nine Chapters*. At the same time, it makes sense of the form of mathematical writings found in tombs. By contrast, those who rely on the excavated evidence to contradict Liu Hui’s testimony on the topic and claim that no book in nine chapters existed before the establishment of the Qin dynasty must ignore some of the available evidence.

To summarize, there is a key difference between *The Nine Chapters* and the known mathematical documents excavated from tombs sealed in China during, roughly speaking, the Qin and early Western Han dynasties. It is one of organization: *The Nine Chapters* consists of a certain type of chapters, while most of the manuscripts are composed in sections. We have argued that this difference implies the two kinds of writings belong to two different traditions. *The Nine Chapters* and its predecessors relate to a tradition³⁷ tied to Classics, and contribute to the establishment of a “tradition of mathematical classics”. It is important for the topic

³⁷Liu Hui’s preface, and excavated documents, evidence several writings that might have belonged to this tradition. To begin with, the original ‘nine parts of mathematics’; then what Liu Hui refers to as the ‘nine parts of mathematics’ in development, which led to the composition of a book in nine chapters before the Qin dynasty; then the various stages that this book underwent (we return to this point below); the damaged parts of this book in nine chapters used by Zhang Cang and later Geng Shouchang; the ‘*Nine Chapters*’ they restored and finally, *The Nine Chapters* handed down to us. A preliminary treatment of this issue was given in Zou Dahai (2004, 2008). Strictly speaking, Liu Hui does not refer to the various stages of the pre-Qin book in nine chapters. However, such a process is evidenced in excavated documents, a typical example being the *Lao zi*, which was found in two tombs. The copies unearthed from the Han tomb at Mawangdui (馬王堆, Hunan Province) are different from the earlier copies unearthed from the Chu tomb of the Warring States period at Guodian (Hubei Province). Further, the two copies from Tomb 3 at Mawangdui also present differences from each other. In addition, all the unearthed copies are different from the

of this chapter that this status is manifested by the textual parts. Let us now focus on these chapters.

5.3 The Meaning of a Chapter, or Why Are There Chapters in *the Nine Chapters*?

We have seen above that the titles of the chapters making up *The Nine Chapters* and constituting a distinctive feature of the book were, as early as the Eastern Han Dynasty, related to an interpretation of an expression ('the nine parts of mathematics') occurring in *Zhou Rites*. The previous section argued how this fact could help us account for Liu Hui's history of the book. We will now rely on the same fact to interpret the meaning of these chapters—the issue to which this section is devoted.

Let us begin with a description of the opening page of Chapter 3 of *The Nine Chapters* in the earliest edition of the book available, namely, the printing that Bao Huanzhi (鮑澣之) carried out at the beginning of the thirteenth century, during the Southern Song dynasty (see Fig. 5.1).³⁸ We see both the title of the book (*The Nine Chapters on Mathematical Procedures*), followed by the number of the chapter designated by means of the material entity embodying it ('third roll' [*juan di san* 卷第三]), recorded in the first column.³⁹ In the next two columns, information is given about the commentators on *The Nine Chapters* whose commentaries have been included in the edition. These commentators include Liu Hui, whose name we have already mentioned and whose commentary sources associate with the year 263. They also include Li Chunfeng (李淳風) and those working under his supervision, whose subcommentary was presented to the throne in 656.

Thereafter, on the opening page of Chapter 3, the title of the chapter follows, namely, 'SHARING IN FUNCTION OF THE DEGREE'. A commentary attributed to Liu Hui is attached to the title. Alone in the next column comes the name of the operation that the first procedure executes, that is, 'SHARING IN FUNCTION OF THE DEGREE'. The

copies handed down to us. Peng Hao (2001a) compared six important editions of *Lao zi* and discussed their differences.

³⁸Bao Huanzhi signed his postface to *The Nine Chapters* in 1200. The printing was carried out in the context of an edition of the *Ten Canons of Mathematics*, which only partly survived (Qian 1963). Bao Huanzhi seems to have composed a postface for each of the books included. Among the extant postfaces, the latest date recorded is 1213. The remaining portions of this edition were reproduced in Shanghai Tushuguan and Beijing Daxue Tushuguan (1980). In Fig. 5.1, we give a partial translation of the document, using lowercase letters and small capitals to mark the difference between the commentaries and the canon. This convention will be used throughout our chapter.

³⁹The readers are reminded of the fact that at the time Chinese books were read from right to left and top to bottom. This feature is essential to understand our description of the ancient editions in this chapter. To be more precise, in this edition, the title of the classic has been modified into *Mathematical Classic with the Nine Chapters*.

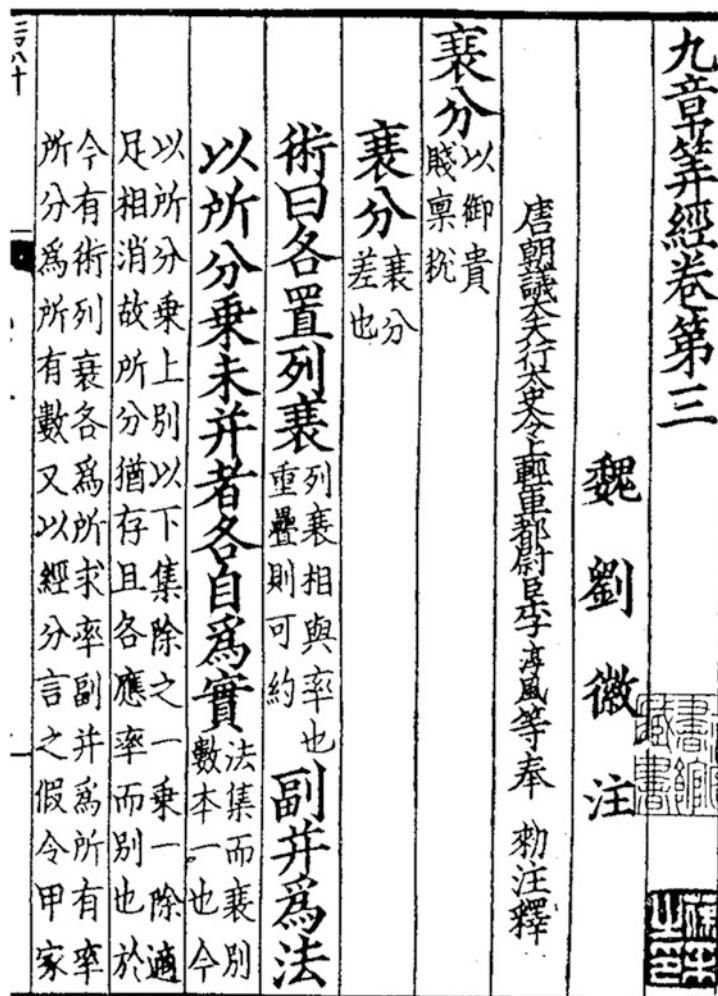


Fig. 5.1 First page of Chapter 3 in Bao Huanzhi's (鮑澣之) early thirteenth-century printing of *The Nine Chapters*. The translation of the structure of the page, with the text of *The Nine Chapters* in small capitals and that of the commentaries in lowercase letters, reads as follows (note that a change of paragraph corresponds to a change of column in the thirteenth-century layout): THE NINE CHAPTERS ON MATHEMATICAL PROCEDURES. THIRD ROLL

Commentary by Liu Hui of the Wei [Dynasty]

Imperially commissioned Commentary respectfully submitted by your servant Li Chunfeng, Grand Master of Court Discussion of the Tang [Dynasty], (The clarification of Li Chunfeng's official title is due to Zhu Yiwen. We thank him for having communicated the results to us.) acting as Director of the Astrological Service and Senior Commandant of Light Chariot, and his associates

SHARING IN FUNCTION OF THE DEGREE To deal with the expensive and the cheap, the remunerations in grain and the payment of taxes

SHARING IN FUNCTION OF THE DEGREE Sharing in function of the degree is (sharing) in function of the rank
PROCEDURE: ONE PUTS RESPECTIVELY [ON THE CALCULATING SURFACE] THE ARRAY OF COEFFICIENTS FOR WEIGHTING IN FUNCTION OF THE DEGREE [...commentary...] AND, IN AN AUXILIARY [POSITION], ONE ADDS THEM TOGETHER, TO MAKE THE DIVISOR. ONE MULTIPLIES, BY THAT WHICH IS SHARED, THE [WEIGHTS IN FUNCTION OF THE DEGREE THAT ONE HAD] BEFORE THEY WERE ADDED TOGETHER, WHICH RESPECTIVELY MAKES THE DIVIDENDS. [commentary: ... With the procedure of 'suppose'...]

name is also followed by a commentary on the expression. As we shall see below, this layout is specific to the Southern Song edition, in which similar names of operations are placed in specific columns in the same way. Note that in *The Nine Chapters*, it is rare for procedures to be associated with names for the operation they execute. This feature awaits further research.

The phenomenon that is of the utmost importance for us is now manifest: we see that the title of the chapter is the same as the name attached to the first procedure. What is the meaning of this *dispositif*? And how does this question relate to the issue we are addressing, which is to interpret the meaning of chapters in *The Nine Chapters*?

Finally, in the columns to the left of that containing the name of the operation, the opening page of Chapter 3 gives the text of the procedure executing this operation. It begins with the term ‘PROCEDURE 術 *shu* ...’, and commentaries are interspersed between sentences of the procedure. One of the functions of these operations, and of the names associated with them, in the mathematical practice to which the commentaries attest, is evidenced by how commentators make use of them. For instance, in the commentary on the procedure executing the operation ‘SHARING IN FUNCTION OF THE DEGREE’, Liu Hui mentions the operation ‘SUPPOSE 今有 *jin you*’ and the procedure executing it (dealt with in Chapter 2), as well as the operation ‘DIRECTLY SHARING 經分 *jingfen*’ (introduced in Chapter 1), to account for the meaning of the procedure under examination

In the case of Chapter 3 that we observe, the text of the procedure is placed outside the framework of any mathematical problem. However, immediately after its text, a sequence of problems follows, each associated with its numerical answers and a procedure specifically solving it. The commentaries make clear how these problems and specific procedures relate to the general procedure ‘SHARING IN FUNCTION OF THE DEGREE’. We return below to this feature of the chapter.

Let us first present evidence establishing that the phenomenon highlighted above about the titles of the chapters in *The Nine Chapters* is general. Since titles are part of a document that are, in general, easily modified in written transmission, we need here a rather long philological discussion to establish the fact.

5.3.1 *The Title of a Chapter Is the Name of Its First Operation*

The extant part of the Southern Song edition, on which we have relied, only has the first five chapters of *The Nine Chapters*. It shows that all the features described above for Chapter 3 hold true for Chapter 4, entitled ‘REDUCING THE WIDTH 少廣 *shaoguang*’. In particular, its first procedure executes an operation, whose name is placed in a separate column immediately before the text of the procedure. This name is identical to that of the chapter: ‘REDUCING THE WIDTH.’

If we now turn to the opening page of Chapter 1, we also observe a similar phenomenon. However, given the present-day condition of the Southern Song edition, it is less easy to establish the phenomenon than before. Figure 5.2 shows the first two pages of the thirteenth-century printed edition of Chapter 1. The layout is quite similar to that described above for the title of *The Nine Chapters*, the number of the roll, the names of the commentators and the title of the chapter ‘RECTANGULAR FIELD 方田 *fangtian*’, followed by the commentary on it. The difference begins in the column which follows it. Here, we find the outline of a problem, which asks one to determine the area of a rectangular field. The statement is followed by, first, the answer to the problem, and then another problem with the related answer. However, the upper part of the latter answer has been erased as well as what the next column once contained. Indeed the last column of Page 1 (on the right-hand side) seems to be empty. However, this phenomenon does not occur anywhere else, at least in the extant part of the printing.⁴⁰ We must assume the printing originally contained characters. The empty column is followed, in the next column on Page 2, by the text of a procedure, which prescribes how to compute the area of a rectangle.

The second set of ancient editions which philologists rely on in any critical edition of *The Nine Chapters* immediately suggests a way of restoring what is missing in the last column of Page 1 in the thirteenth-century edition. This second set of textual evidence relates to the project of the *Complete library of the four treasuries* (四庫全書 *Siku quanshu*, hereafter the *Complete library*), launched under imperial sponsorship at the end of the eighteenth century.⁴¹ In the context of this project, Dai Zhen (戴震, 1724–1777) was the scholar in charge of the edition of mathematical books, including *The Nine Chapters*. For his edition of the book, he relied on a copy he made of the edition of the canon included in the *Grand Classic of the Yongle period* —hereafter: *Grand Classic*—, an editorial project commissioned almost four centuries earlier by the Emperor Yongle (reign dates: 1403–1425) and carried out between 1403 and 1408. At the time Dai Zhen started his work, he was not yet aware of the existence of a partial copy of the thirteenth century printing of *The Nine Chapters* mentioned above. Even before the *Complete library* was published in 1784, a first edition of *The Nine Chapters* Dai Zhen had prepared in this context was printed in 1774, together with a selection of books among those chosen to be included in the *Complete library*. This selection formed the edition of the ‘Assembled gems from the Wuying Palace’ (*Wuyingdian juzhen ban*). As far as *The Nine Chapters* was concerned, as we shall see below, even before the *Complete library* was made public, this 1774 edition was followed by several other editions, also prepared by Dai Zhen. For our purpose, our comments on this set of editions will mainly, even though not only, rely on the *Wuyingdian juzhen ban* edition.⁴² In contrast to the 13th century edition, it is complete.

⁴⁰The only empty columns that occur in the edition are at the end of chapters, since each chapter starts on a new page.

⁴¹On the history of the extant editions of *The Nine Chapters*, see Guo Shuchun, Chap. C, in Chemla and Guo Shuchun (2004: 71–78).

⁴²It is reproduced in Guo Shuchun (1993, Vol. I: 95–213). Unless otherwise specified, the other editions belonging to the same family have the same characteristics as those we mention.

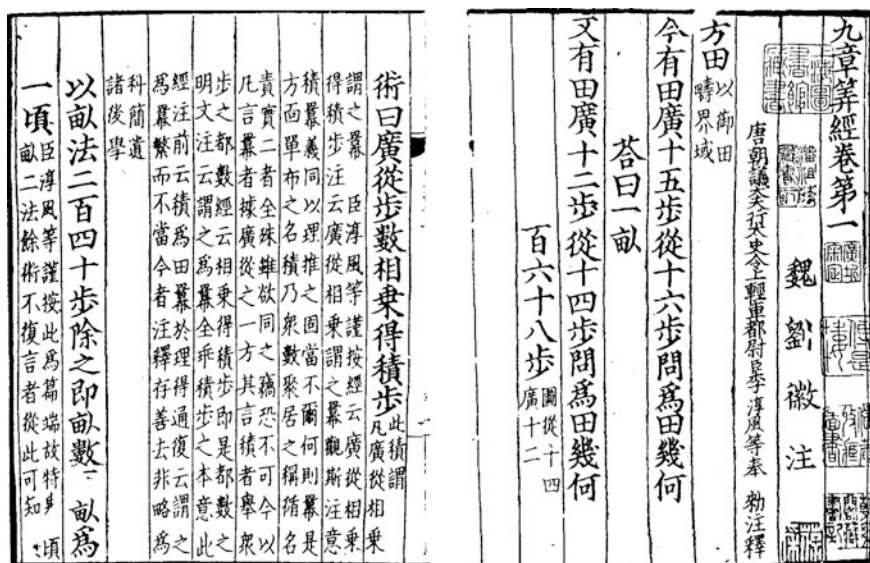
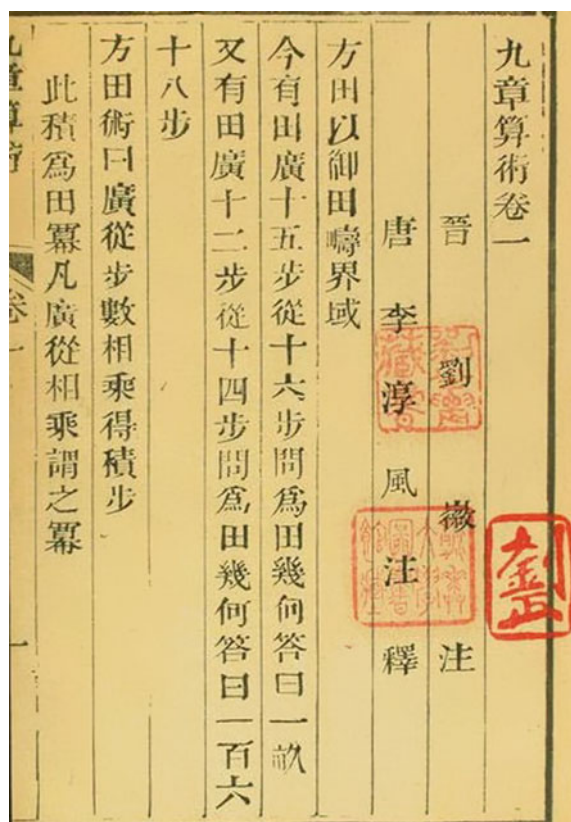


Fig. 5.2 The first two pages of Chapter 1, in the extant copy of Bao Huanzhi's early thirteenth-century printing of *The Nine Chapters*. The first procedure reads as follows: [blank column] PROCEDURE: THE QUANTITY OF *BU* OF THE WIDTH AND THE LENGTH BEING MULTIPLIED BY EACH OTHER YIELDS THE *BU* OF THE NUMBER-PRODUCT/AREA

Figure 5.3 shows the layout of Page 1 of the first chapter of *The Nine Chapters* according to the *Wuyingdian juzhen ban* edition. Some of its features are similar to those described above for the Southern Song edition. Others are not. Among the latter, let us mention in particular the layout of the first procedure. Following immediately after the first two problems in Chapter 1, we have in the next column: 'RECTANGULAR FIELD. PROCEDURE: THE QUANTITY OF *BU* OF THE WIDTH AND THE LENGTH BEING MULTIPLIED BY EACH OTHER YIELDS THE *BU* OF THE NUMBER-PRODUCT/AREA.' The text of the procedure is identical to that in the Southern Song edition. However, before the term 'procedure', two characters are added, which are actually identical to the title of the chapter: 'RECTANGULAR FIELD'. This is, in fact, how, by contrast to the Southern Song edition, all the names of the operations executed by the procedure whose text directly follows after them are set up in the *Wuyingdian juzhen ban* edition.⁴³

⁴³ A nuance must be added to this assertion. As can be seen in Fig. 5.3, in the *Wuyingdian juzhen ban* edition, the commentaries are not featured in smaller characters and in double columns, between the sentences of the canon. They are, by contrast, laid out in separate columns, starting with a new column and having throughout the commentary an upper margin longer than that for the main text. When a commentary on the name of an operation is inserted between the name and the character 'procedure,' which signals the beginning of the text of the procedure, the name occurs alone in a column. By contrast, in that case, in the Song edition, the commentary is placed in the same column as the name of the operation (see Fig. 5.1).

Fig. 5.3 First page of Chapter 1, in the *Wuyingdian juzhen ban* (1774) printing of *The Nine Chapters*. The first procedure reads as follows: RECTANGULAR FIELD. PROCEDURE: THE QUANTITY OF *BU* OF THE WIDTH AND THE LENGTH BEING MULTIPLIED BY EACH OTHER YIELDS THE *BU* OF THE NUMBER-PRODUCT/AREA



We can thus assume that the empty column, on Page 1 of the first chapter in the Southern Song edition (Fig. 5.2), originally contained the two characters 'RECTANGULAR FIELD'. The fact might look unimportant. However, it matters to us, since, from this remark, we deduce that as in Chapters 3 and 4, the *title* of Chapter 1 is the *name* of the *first operation* dealt with in the chapter. That case enables us to discard the assumption that the title of the chapter would be an incipit. Indeed, in Chapter 1, the title is different from the first two characters in the chapter.⁴⁴

In effect, the phenomenon that we have brought to light with respect to Chapters 1, 3 and 4 turns out to characterize the titles of chapters in most of the book. The phenomenon holds that the name of the operation carried out by the first procedure is, up to an exception discussed below, identical to the title of the chapter. This is particularly clear in the 13th century edition, in which the name of the first operation is isolated in a specific column, before the text of the procedure executing it begins. However, in the extant copy of this Southern Song edition, only the five first

⁴⁴Incidentally, the same holds true for the headings of sections in *Writings on Mathematical Procedures*.

chapters have survived. There are reasons to believe that the other chapters presented the same features.⁴⁵ Establishing that the title of a chapter is, in general, the name of the first operation in this chapter is not straightforward in all cases. Our argument will rely on the ancient editions already mentioned, in particular the *Wuyingdian juzhen ban* edition. Moreover, we will use another partly extant ancient edition of *The Nine Chapters* that is, to a certain extent, independent from those mentioned above: the 1843 edition established by Song Jingchang (宋景昌) of the thirteenth century subcommentary Yang Hui (楊輝) completed in 1261 on *The Nine Chapters* as well as Liu Hui's and Li Chunfeng's commentaries. This subcommentary, entitled *Detailed explanations of The nine chapters on mathematical methods* (*Xiangjie jiuzhang suanfa* 詳解九章算法, hereafter *Detailed explanations*), also contained Jia Xian's subcommentary dating most probably from the first half of the eleventh century.⁴⁶ The documents Song Jingchang used for his work are now lost.

Figure 5.4 shows the first two pages of Chapter 9, “BASE AND HEIGHT 勾股 *gougu*,” in the *Wuyingdian juzhen ban* (1774) printing of *The Nine Chapters*. As we have already emphasized, the 13th century edition of this chapter is no longer extant. In the *Wuyingdian juzhen ban* edition, the layout of the first four columns is identical to what Fig. 5.3 shows about Chapter 1. In Chapter 9, after three problems and their answers, in the eighth column we see two characters referring to the name of the operation carried out by the procedure that follows them. They read “BASE AND HEIGHT,” and are followed in the next columns, by a commentary on that name. We thus see that again the title of the chapter is identical to the name of the operation placed at the beginning of the chapter.

The case for Chapter 8 is slightly more delicate to establish. If we observe the first two pages of Chapter 8 in the *Wuyingdian juzhen ban* edition (see Fig. 5.5), we see the same layout as before for the first four columns of the chapter, the title ‘MEASURES IN SQUARE 方程 *Fangcheng*’ occurring in Column 4. Thereafter, the statement of a problem and the corresponding answers are found. They are immediately followed by a commentary, which discusses the meaning of the two characters making up the expression ‘MEASURES IN SQUARE’. Exactly the same phenomenon occurs in the 1843 edition of Yang Hui's *Detailed explanations*. Nowhere else in *The Nine Chapters* is such a commentary directly appended to a problem.⁴⁷ It is thus highly probable that before this commentary, there was a column containing the expression ‘MEASURES IN SQUARE,’ since this is precisely the

⁴⁵We shall see below that Dai Zhen and the nineteenth century editor of another edition of *The Nine Chapters*, Song Jingchang, apparently both thought in that way.

⁴⁶The edition of the various layers of earlier texts Yang Hui included in his *Detailed Explanations* does not depend on Bao Huanzhi's printing. Guo Shuchun, Chap. C in Chemla and Guo (2004: 73–74), argues that they share a common prototype. Note that Yang Hui must have known Bao Huanzhi's reprint, since his subcommentary included the latter's postface to *The Nine Chapters* mentioned above. On the chapters extant in this edition, see Guo, Chap. B in Chemla and Guo (2004: 68).

⁴⁷The commentaries bear, for the most part, on the procedures.

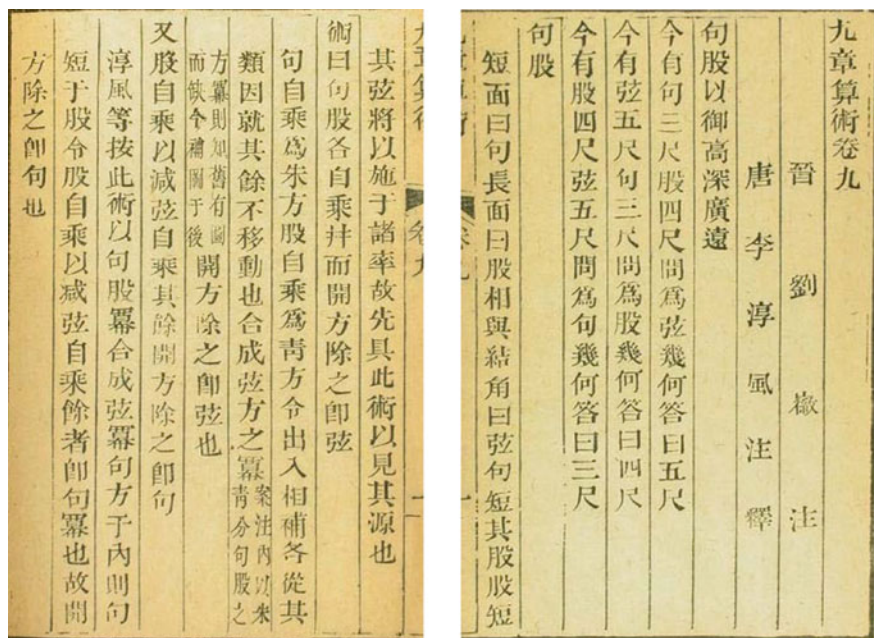


Fig. 5.4 The first two pages of Chapter 9, 'BASE AND HEIGHT', in the *Wuyingdian juzhen ban* (1774) printing of *The Nine Chapters*

expression whose meaning the commentator glosses. This conclusion is supported by the following remark: the subsequent procedures in Chapter 8 explicitly and regularly refer to the operation 'MEASURES IN SQUARE' by its name, using the following recurring expression: 'One follows "Measures in square"' (*ru fang cheng* 如方程). Incidentally, we have mentioned above how commentators used names of operations. This expression shows that the compilers of *The Nine Chapters* used such names in a similar fashion.

Dai Zhen and Song Jingchang also believed that the name of the operation 'Measures in square' was missing immediately before the commentary mentioned above. This is clear, if we observe the two editions published by Dai Zhen in 1776 and 1777, as derived products of his work for the *Complete library*, as well as Song Jingchang's editorial notes.⁴⁸ These scholars also formulate exactly the same belief,

⁴⁸See Guo Shuchun, Footnote 2, in Chemla and Guo 2004: 616). To understand this feature better, it is useful to recall that Dai Zhen had compiled the document that served as the basis for his edition of *The Nine Chapters* from the edition included in the *Grand Classic of the Yongle Period*. In this encyclopedia, as far as we can see from the remaining chapters on mathematics, mathematical books had been dissected into parts corresponding to given operations, and the various parts corresponding to the same operation were brought together. So, under a given name of operation, for instance 'REDUCING THE WIDTH', a sequence of excerpts about that operation coming from various books had been compiled, each beginning with the title of the book quoted. In that

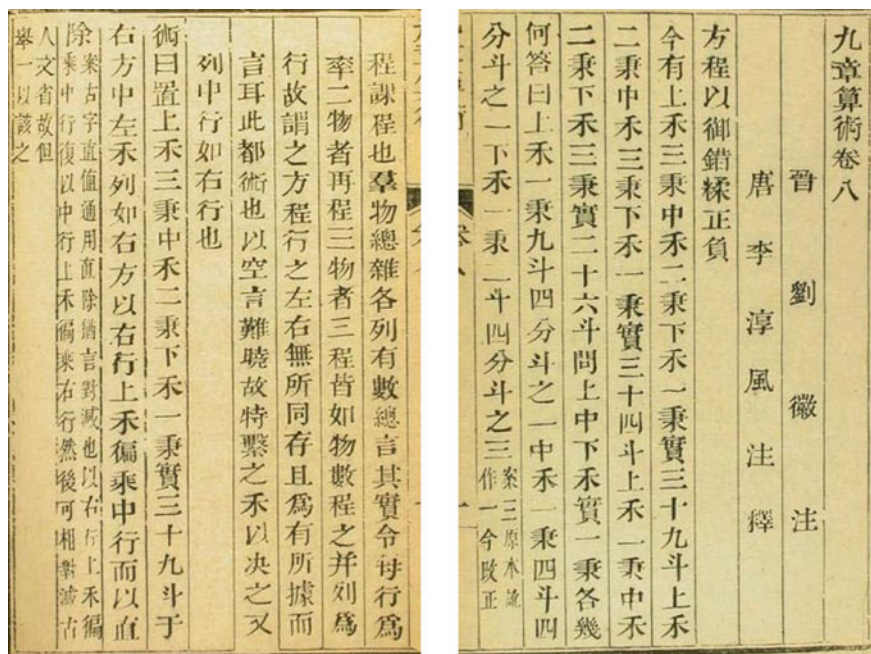


Fig. 5.5 The first two pages of Chapter 8, ‘MEASURES IN SQUARE’, in the *Wuyingdian juzhen ban* (1774) printing of *The Nine Chapters*

when encountering a similar situation for the first procedure in Chapter 6, ‘FAIR TAX PAYING ACCORDING TO TRANSPORTATION 均輸 *Junshu*’.⁴⁹ The title of the procedure was, in their view, similar to the title of the chapter and had been dropped in the extant editions. In that case, the topic of the problem being explicitly ‘Fair tax paying according to transportation’ and thus echoing the title of the chapter, the hypothesis looks reasonable.

case, under the title of the section ‘REDUCING THE WIDTH’ comes directly the title of the book *The Nine Chapters*. This title is immediately followed by Liu Hui’s commentary on the title of Chapter 4, ‘REDUCING THE WIDTH’ and then Li Chunfeng’s gloss on the meaning of the expression ‘REDUCING THE WIDTH’, without repeating the expression ‘REDUCING THE WIDTH’ either as the title of Chapter 4 or as the name of the operation (see the reproduction of the remaining mathematical chapters of the *Grand Classic* in Guo Shuchun (1993, Vol. I: 1414). It is thus highly probable that when recompiling *The Nine Chapters* from the *Grand Classic*, Dai Zhen did not understand how the names of operations were used in *The Nine Chapters*. His 1776 and 1777 editions testify to the fact that in between, he had consulted the 1213 edition. Apparently, this document made him rethink the part played by names of operations in the original book, as is made manifest by the changes he carried out in this respect for the last four chapters as well as for Chapters 2 and 3 in his later editions.

⁴⁹For Dai Zhen, see Guo Shuchun, Footnote 2, in Chemla and Guo (2004: 486). For Song Jingchang, see his endnotes, *Yijiatang congshu*: 24a (Guo Shuchun 1993, vol I: 1038).

Chapter 7, entitled ‘EXCESS AND DEFICIT 盈不足 *ying buzu*’, raises a problem similar to and even more complex than that for Chapter 8. The reason is that the various eighteenth- and nineteenth-century editions on which we rely to examine the structure of its opening section present important differences.⁵⁰ Beyond these differences, neither the *Wuyingdian ban* printing nor the Song Jingchang edition has a name for the operation corresponding to the first procedure. However, a piece of commentary appears to correspond to such a name. Moreover, the first procedure is explicitly mentioned by its full name in several procedures recorded in that chapter. There one reads: ‘ONE LOOKS FOR THIS [UNKNOWN] BY MEANS OF THE PROCEDURE OF EXCESS AND DEFICIT’ (*yi ying buzu shu qiu zhi* 以盈不足術求之). As for Chapter 8, and for the same reasons, it thus seems that the title was dropped. Again, in the editions Dai Zhen produced after he had seen the Song printing, he introduced the name ‘EXCESS AND DEFICIT’ in a separate column before the piece of commentary glossing its two characters and then the text of the related procedure.

So far, we have discussed the cases of all but two chapters. Their case requires more careful examination.

Chapter 2 is entitled ‘UNHUSKED AND HUSKED GRAINS 粟米 *sumi*’, and its name, if not that of the first procedure, fits with the name of the table actually put at the beginning of this chapter: ‘NORMS/DIVISORS FOR UNHUSKED AND HUSKED GRAINS 粟米之法 *sumi zhi fa*’.⁵¹ Despite the fact that at first sight, this is not a procedure, one may argue that in this chapter, the table plays a part similar to that played by the first procedure in the other chapters. We shall see below that the commentators address this question.

The second exception is more difficult to handle. The title of Chapter 5, ‘DISCUSSING WORKS 商功 *shanggong*’, seems to refer not to the first procedure but to the main topic addressed in the chapter. Let us formulate two remarks about it, and return below to the chapter and these remarks. Firstly, the organization of the chapter is unusual, and the commentators somehow acknowledge this fact. Secondly, it seems that it is the second procedure, and not the first, that, in this case, plays a key part in the chapter. However, neither the name of the bodies it deals with nor the operation attached to the related procedure, present a link with the title ‘Discussing works’.

In conclusion to this lengthy survey, we can thus state that, except for one case, the titles of the chapters in the Classic were, in fact, the names of the operation executed by the procedure placed at the beginning of the chapter, or the name of something essential to the chapter and placed at its beginning. This is the case, whether the procedure is placed outside the framework of a problem (Chapters 2, 3, 4 and 7 (?))⁵² or after one or several problems (Chapters 1, 6, 7 (?), 8 and 9). We

⁵⁰We do not comment on this problem here. See Guo Shuchun, footnotes to the opening section, in Chemla and Guo (2004: 558–564).

⁵¹In Chinese, ‘UNHUSKED AND HUSKED GRAINS’ are the first two characters in the name of the table.

⁵²As mentioned above, the case of Chapter 7 is unclear because of the divergence between the various ancient editions in this respect.

have seen how the thirteenth-century edition displayed this phenomenon quite clearly for the first four chapters (Chapter 5 being an exception). We have also showed how, under the influence of the Southern Song printing, the eighteenth- and nineteenth-century editors of *The Nine Chapters*, Dai Zhen and Song Jingchang, respectively, restored this feature for the last four chapters.

These remarks confirm that the question raised above is important: why are these names systematically the same? What is the meaning of this *dispositif*? In particular, what is the part played by the first procedure placed at the beginning of a chapter and giving its name to the chapter? Before we turn to considering these questions, let us say a few words on how the commentators deal with the entity ‘chapter’ (*zhang* 章).

5.3.2 *How Do the Commentators Refer to the Chapters?*

Clearly, the ancient editions of *The Nine Chapters* on which the commentators worked had actual chapters. Commentators provide evidence on this feature of the documents they used. Their commentaries also show how they relied on this way of structuring the book.

Commentaries on a part of the text regularly use the term ‘chapter’ (which occurs in the title of the Classic) to refer to another part of that same chapter. This is the case for instance, when, in the context of his commentary following Problem 9 in Chapter 5, Liu Hui states for the procedures presented in that chapter: ‘Since *in this chapter*, procedures likewise take as *li*⁵³ three for the circumference (of the circle) and one for the diameter, they are all wrong.’ (此章諸術亦以周三徑一爲率,皆非也。) (our emphasis). On this question, Liu Hui could have referred to the whole book, in which the value for what we call π is taken as equal to three throughout. For instance, the circle is the topic of problems, procedures and commentaries in Chapters 1 and 4. However, the scope of the above statement is restricted to Chapter 5. Perhaps, the point is in the “likewise 亦 *yi*,” which emphasizes that in this chapter, the procedures accordingly are incorrect *for the same reason*. In any event, this illustrates statements commentators make on a given chapter, which manifest their awareness that the book is composed of chapters.

Still on the same chapter, Liu Hui writes after Problem 10: ‘*In this chapter*, there are *qiandu*, *yangma*, which all, when assembled (in several identical samples), yield a cube. This is probably why those who explain procedures have established these three categories of blocks to reproduce the volumes to which height and depth (give rise)’ ((此章有壅堵、陽馬, 皆合而成立方, 蓋說算者乃立棊三品, 以效高深之積) (our emphasis). *Qiandu* is the name given in *The Nine Chapters* to the

⁵³This term refers here to the integers considered as having the same ratio as the magnitudes to which they are attached. For a more complete treatment of the term, see Li Jimin (1982), Guo Shuchun (1984) and Chemla, Glossary, in Chemla and Guo (2004: 956–959).

half-parallelepiped (Problem 5.14), whereas *Yangma* refers to a specific type of pyramid (Problem 5.15), one angle of which is a right trihedron. The key point here is that the statement picks up two solids, among all those dealt with in the same chapter—Chapter 5 has twenty-eight problems, mostly devoted to the volume of solids. What, in Liu Hui’s view, distinguishes these solids from the others and brings them together is that they share a property with the cube: either one, or two or three copies of each constitute a cube. This property is regularly used to account for some procedures. More generally, Liu Hui’s statement refers to these three solids as playing a key part in the proofs in Chapter 5 and only there. These proofs decompose the solids treated into these three types of blocks to prove the correctness of procedures given to compute their volume. The first occurrence of such proofs is in the commentary placed after Problem 5.10, that is, precisely where Liu Hui inserts his statement. One could thus interpret this sentence as designating the essential part of the chapter—that from which a great deal of the procedures included in it flow. We return below to this idea of “flowing.”

Similarly, after Problem 3 in Chapter 6, the commentator introduces a statement that aims to capture a feature unifying the procedures in the chapter. He writes: ‘This whole chapter contains *lǚ* for which, in all cases, (sets of quantities), being put in relation with each other, communicate and the effects of which are thus combined. They are thus more or less similar to each other.’ (此一章皆相與通功共率, 略相依似). The statement is not easy to interpret.⁵⁴ We can nevertheless make the following observations. Again, this statement is about a whole chapter, no less, no more, and it highlights a unifying theme. Moreover, again this theme can be captured on the basis of proofs of the correctness of the procedures, in which the concept of *lǚ*, which we have encountered above, plays a central role. Such declarations reveal a conviction that seems to be shared by the commentators: it is not meaningless to look for a common thread establishing relationships between the procedures brought together in a given chapter.

Thus far, the statements analyzed formulate something general about the chapter in which they were included. The commentators also rely on the entity that a chapter constitutes to refer to elements in another chapter. For instance, when Liu Hui comments on the procedure given after Problem 6.7 in *The Nine Chapters*, he notices: ‘The (problem) “One borrows one thousand cash from someone” in the chapter “Sharing according to the degree” is identical to this one’ (衰分章“貸人千錢”與此同). A problem is thus identified first by means of the chapter in which it was placed and then by the first characters of the statement that allow the commentator to outline its topic. The system used to point out a problem in the book is different from the one we use when, relying on numbers, we designate a problem by its position in the list of problems making up a chapter and refer to the chapter by means of a number that defines its position in the list of chapters. Similarly, in the commentary following Problem 8.8, Liu Hui states: ‘The (problem) on gold and

⁵⁴On this issue, see Chemla, introduction to Chapter 6, in Chemla and Guo (2004: 459–474).

silver in the chapter “Excess and deficit” is equivalent to this one’ (盈不足章黃金白銀與此相當).

In all these cases, the term ‘chapter’ is used to refer to textual parts making up *The Nine Chapters*. In other cases, the chapter is simply mentioned using its title. The commentary following Problem 1.36 illustrates this point. In it, Liu Hui states: ‘It is appropriate then to rely on the procedure of the (*problem*) where one saws a log with a circular section in the (chapter) “Base and height” and to look for the diameter of the corresponding (circle) by taking the chord of the circular segment as the length of the path of the saw, and the arrow as the depth of the piece sawn’ (宜依句股鋸圓材之術, 以弧弦爲鋸道長, 以矢爲鋸深, 而求其徑) (our emphasis).

Commentators also refer from within one chapter to another when they point out an essential feature of one of its components. For instance, in the commentary following Problem 8.18, we read ‘This (problem) “Hemp, beans and barley” as well as the “reiteration of weighting according to degrees” and the “accumulation of parts”⁵⁵ of chapters “Fair tax paying according to transportation” and “Reducing the width” are all important achievements’ (此麻麥與均輸、少廣之章重衰、積分皆爲大事). Interestingly enough, in contrast to Problem 8.18, which is the last one in the chapter, the two facets of Chapters 6 and 4 mentioned can be related to the first procedures in the chapters. Two further mentions of chapters will confirm this importance granted to the opening part of the chapter.

After Problem 2 in Chapter 1, the commentary composed under Li Chunfeng’s supervision states:

This is the beginning of a **chapter pian** [or: of the chapters, since we are at the beginning of the book, translators’ note.]. *This is why* one especially mentions the two divisors/norms of the *qing* and the *mu*.⁵⁶ In the remaining procedures, if one does not repeat this, this is because one can get to know them from this one. 此爲篇端, 故特舉頃、畝二法。餘術不復言者, 從此可知 (our emphasis). (Chemla and Guo 2004: 154–155)

Interestingly, the commentator accounts for the fact that *The Nine Chapters* provides data in its first procedure. Let us stress that he thereby makes sense of the position where data are given, that is, in this case, precisely at the beginning of the chapter. Note, moreover, that the commentator refers here to the chapters not by means of the term *zhang*, which is the chapter as the component of a book, but by the term *pian*, which refers to its material realization.

A last declaration that we find in a commentary and that comments on all the chapters will bring us back to one problem addressed in this chapter and still left unattended. To understand this declaration, let us outline some elements of the context in which it is made. We remember that Chapter 2, ‘UNHUSKED AND HUSKED GRAINS,’ had a title evoking its first component, namely, a table entitled ‘NORMS/DIVISORS FOR UNHUSKED AND HUSKED GRAINS’. This table displays a list of grains and for each, a number. In the table, these numbers are designated as *lǚ*, which, as we

⁵⁵For a bibliography on these technical terms and first explanations, see Chemla, Glossary, in Chemla and Guo (2004: 910, 933–934).

⁵⁶These are measurement units for surfaces.

have seen above, designates a concept of number relative to other numbers. It is precisely to this concept, and to the fact that the table provides a set of *lǚ*—that is, a set of numbers on the whole relative to each other—that the commentary on the title of the table, and thus on the title of the chapter, is devoted. The table is followed by a procedure, which executes an operation whose name is striking, since it is called ‘SUPPOSE’ (*jinyou* 今有). The corresponding procedure—in modern terms, a rule of three—is formulated in abstract terms and gives pride of place to the concept of *lǚ*. The commentary attached to the name of the operation it executes precisely highlights the importance of *lǚ* in terms that far exceed the framework of Chapter 2. We thus begin to perceive a possible reason why the title of this chapter is that of the table placed in its opening section and composed of *lǚ*. The commentary in question reads as follows:

SUPPOSE. This is a universal procedure. All ‘nine parts of mathematics (*jiu shu*)’ that give their names to the chapters (*pian*) can be widely extended, with the help (of this procedure), by means of *lǚ*. This is what is meant by ‘to be informed about the past and from this know the future’, or ‘to be presented one corner and derive by analogy about the three others’. 今有此都術也。凡九數以爲篇名,可以廣施諸率,所謂告往而知來,舉一隅而三隅反者也。 (our emphasis) (Chemla and Guo 2004: 222–223)

This statement is extremely rich in information, which we shall unpack progressively. First, we see that, as above, chapters are designated by means of the material entity embodying them: *pian*. Secondly, the commentator emphasizes that the chapters are named after the elements that so far we have translated as the ‘nine parts of mathematics’ (*jiu shu*).⁵⁷ Note that the commentator distinguishes between the chapters (*pian*) and the ‘nine parts of mathematics’. Concerning the *jiu shu*, he says they give the chapters their name. How is this phenomenon linked to the structure of the opening section of the chapters? Since the titles of the chapters are also the names of the first operation they contain, this remark implies that there is also a strong connection between the first operation in each chapter and the list of *jiu shu*. Let us stress, *en passant*, that this commentator shares a vision of the ‘nine parts of mathematics’ as corresponding to what *The Nine Chapters* embodies. We shall soon understand the possible meaning of this remark. We have already seen that several competing ideas existed as for the actual composition of the *jiu shu*. This point thus deserves some attention.

⁵⁷The exegete Li Ji, whose dates are unclear (Tang or Northern Song Dynasty) and who composed, as for the other mathematical classics, *Meaning and Pronunciation on The Nine Chapters on Mathematical Procedures* (*Jiu zhang suanshu yinyi* 九章算術音義), links in the same way the ‘nine parts of mathematics’ and the ‘nine *pian*’, when he writes: ‘The “nine parts of mathematics” ... that is, *The Nine Chapters*. When one explains in terms of procedures of computation [*suan*], one says “the nine parts of mathematics” and when one explains in terms of in terms of material chapters (*pian* 篇), one says “the nine chapters.” (九數(...), 即九章是也。以算言之,故曰九數;以篇言之,故曰九章)’ (Guo 1990: 457). We return below to this statement.

Thirdly, in the above statement, the commentator ties the ‘nine parts of mathematics’ to the concern of a ‘wide extension’. This is where the concept of *lǚ* and the operation commented upon, ‘SUPPOSE’, play a key part: they are the means by which the extension is carried out. This explains why the declaration is placed here. The importance of the extension is reinforced by the fact that the sentence is followed by two quotations from Confucius’ *Analects*, which both extol the knowledge involved in extending the meaning of what was learnt.⁵⁸ This declaration underlines the fundamental part played by *lǚ*, a part that places them even above the ‘nine parts of mathematics’. The idea adds support to our argument accounting for the meaning attached to the fact of calling Chapter 2 after a table of *lǚ*. In effect, the declaration discloses a mode of reading of a chapter and a way of linking the ‘nine parts of mathematics’ to *The Nine Chapters*. These points will become clearer when we now turn to a statement in which a commentator explains why, in his view, a procedure can be placed at the beginning of a chapter.

5.3.3 *The Meaning of the First Procedure in a Chapter and of Jiu Shu*

Let us return to the commentary glossing the meaning of the name of the first operation in Chapter 9, ‘BASE AND HEIGHT’. This commentary yields a key to interpreting the phenomena we are interested in. After having glossed the meaning of the terms composing the title and related terms, the commentator continues as follows:

[Base, height, hypotenuse and the procedure linking these terms, that is, a procedural form of the so-called “Pythagorean theorem”] are about to be *extended* to all *lǚ*;⁵⁹ *this is why* this procedure is *set out first* so as to make their *origin/source* appear. 將以施於諸率,故先具此術以見其原也.” (our emphasis)

Several features are essential here. First, the commentator accounts for the reason why a procedure is placed at the beginning of a chapter. Clearly, the statement thus provides evidence to deal with the question we address in this chapter. Secondly, this explanation is related to the previously analyzed declaration,

⁵⁸Greater detail and references are given in Chemla, notes to the translation, in Chemla and Guo (2004: 786, Endnotes 13 and 14).

⁵⁹Here, we interpret *lǚ* as values attached to right-angle triangles mentioned in the problems that follow, and the algorithm attached to them. In this context, the concept of *lǚ* designates a set of numbers whose ratios are the same as those between the lengths of the sides of an actual triangle, or between quantities deriving from them. We return below to *lǚ*. One can also interpret the statement as follows: “(Base, height, hypotenuse and the procedure linking these terms, that is, a procedural form of the so-called “Pythagorean theorem”) are about to be *extended* by means of all *lǚ*.” In the latter case, the emphasis is placed on the dimensions of the right-angled triangle by means of which the procedure is to be applied, whereas in the former case, it is on those of the triangle to which the procedure is to be applied.

since it also gives pride of place to the concern of ‘extending’ procedures in relation to the concept of *lǚ*. In that other statement, these two ingredients occurred in relation to the *titles* of the chapters and what we have so far translated as the ‘*nine parts of mathematics*’. Now they are related precisely to the *positioning* of a procedure at the beginning of a chapter. We shall establish a close relationship between these aspects.

In the statement just quoted, opening a chapter with an operation and the related procedure is interpreted as an assertion that it is the ‘origin’ or the ‘source’ of the procedures following it in that chapter. The commentaries on the procedures presented in Chapter 9 actually show, through proving their correctness, that these procedures in fact consist of applications of ‘Base and height’. We suggest there is a link between these two facts: a relationship of this type, between the first operation and the procedures that follow it, is what is meant by the claim that ‘Base and height’ is the ‘source’ of the other procedures. In the commentators’ terminology, the connection between the ‘source’ procedure and the others is not perceived in terms of ‘application’, but in terms of ‘extension’.⁶⁰ Through proving the correctness of the procedures, the commentators establish that ‘Base and height’ is the source. For them, these proofs simply make the “meaning” of *The Nine chapters* explicit, since, in their view, the fact of placing ‘Base and height’ at the beginning of the chapter asserts precisely this fact.

The statement in question relates the process of extension to the position of a procedure at the beginning of a chapter. These two elements strongly evoke the declaration on which we concluded the previous section. There, the idea of ‘extension’ was introduced in relation to the ‘*jiu shu* that give their names to the chapters’. However, we remember that the name of the first operation in a chapter is systematically the title of this chapter! It thus appears that, in the statement and more generally, the expression *jiu shu* might refer to ‘the nine procedures’ that are systematically placed at the beginning of a chapter and provide a chapter with its name, and also its ‘source’.⁶¹

If we adopt this interpretation, it becomes easy to understand how these ‘nine procedures’ relate to ‘nine parts of mathematics’: they provide the ‘sources’ from which the ‘nine chapters’, as embodying ‘the nine parts of mathematics,’ derive, in the same way as we have seen the chapter ‘Base and height’ derives from the eponymous operation.

Let us sketch another example of this fact. Chapter 1 is entitled ‘Rectangular Field’, and its first procedure executes an operation having the same name. The chapter has two main components. It presents the arithmetic of fractions or quantities having both integers and fractions. It also deals with all kinds of areas. In their

⁶⁰On the concept of ‘source/origin’ and its relation to ‘extension’, and also to the proofs commentators carry out, see Chemla (2008b).

⁶¹The meaning of *shu* 數 as ‘procedure’ is attested. See the evidence provided in Chemla, Glossary, in Chemla and Guo (2004: 984–986). Volkov (2014: 56, Footnote 2) suggests a similar interpretation of *shu* as ‘operations with numbers’ or ‘numerical procedures’ and evokes other interpretations (Volkov 2014: 57).

proofs, the commentators bring to light that fractions are associated with the geometrical shape of a rectangle. The transformations of fractions are then interpreted as a change of shape of these rectangles, while preserving their areas. Further, the commentators show how the procedures given to compute the areas of different shapes can be proved correct, since they rely on the transformations of these shapes into rectangles having the same areas. It is from this double perspective that we can interpret Chapter 1 as deriving from its first procedure.⁶²

Likewise for all chapters, we can infer that through proving systematically in the same way the correctness of the procedures presented in a chapter, commentators show their link to its ‘source’.⁶³ As a result, more than simply ‘nine procedures’, the *jiu shu* appear to be ‘the nine fundamental procedures’.

To recapitulate, we can now suggest an answer to the question of the meaning that ‘chapters’ had in *The Nine Chapters*. A chapter meant a set of procedures deriving in a specific way from the procedure among the ‘the nine fundamental procedures’ that gave the chapter its name and represented its ‘source’.⁶⁴ Its beginning had a specific meaning, since it stated the ‘source’. The *jiu shu* were thus a synecdoche for the various branches of mathematics. This interpretation accounts for why the titles of the chapters are, in general, the same as the name of the operation opening the chapter.

This raises a new question: why is this point made clear at the beginning of Chapter 9, and not before? Answering this question requires returning to Zheng Zhong’s statement (quoted by Zheng Xuan in his commentary on *Zhou Rites*), which we analyzed in Sect. 5.2 of this chapter. In this statement, if we now take our interpretation of *jiu shu*, Zheng Zhong had listed what he understood to be the ‘nine fundamental procedures’ meant by *Zhou Rites*. His list included: ‘Rectangular field, Unhusked and husked grains, Sharing according to the rank, Reducing the width, Discussing works, Fair tax paying according to transportation, Measures in square, Excess and deficit, *pang yao*.’ Although we cannot be certain about the meaning of the last name, clearly, it was related precisely to the right-angled triangle. What is essential for us is that after listing the ‘nine fundamental procedures’ to which, in Zheng Zhong’s view, *Zhou Rites* referred, he apparently adds: ‘In modern times,

⁶²Chemla (1992) has argued in favor of this interpretation (see, in particular, Endnote 50, Chemla 1992: 123.)

⁶³Liu Hui’s preface also makes clear that he establishes a relationship between finding the source and ‘extending,’ when he explains how he suggests dealing with a problem left unsolved in the version he reads of *The Nine Chapters*. The third-century commentator on the Han classic *The Gnomon of the Zhou*, Zhao Shuang, also links placing something at the beginning of a section and stating that it ‘extends’ to what follows. See notes by Chemla, in (Chemla and Guo 2004: 878–879).

⁶⁴Here, by derivation, we do not mean ‘historical origin’, but the possibility of establishing a link of derivation between the ‘fundamental procedure’ and those placed in the same chapter.

there are “Reiterated differences [*chong cha* 重差],” “??? [*xi jie*, 夕桀, another term impossible to interpret]” and “Base and height” as well’.⁶⁵

In other words, the set of ‘nine fundamental procedures’, like the received version of *The Nine Chapters*, corresponds almost completely to the oldest list, except for the last item. For this last item, ‘*pang yao*’ has been replaced by ‘Base and height’. Against this backdrop, we see that the commentary on the title of Chapter 9 and the name of its first operation has been inserted precisely for the only case for which *The Nine Chapters* differs from the ancient ‘nine fundamental procedures’ as expounded by Zheng Xuan. The judgment the commentator formulates on this ninth chapter can thus be understood as justifying the fact that ‘Base and height’, and no other procedure like, for example, ‘*pang yao*’, is legitimately placed at the beginning of the chapter. This unique circumstance would explain why he only then details what justifies placing a procedure in the first position of a chapter.

The commentator’s statement also allows us to return to Liu Hui’s preface, quoted in the introduction of our chapter, and to offer a more precise interpretation for it. We can now offer a new translation for the passage, in which Liu Hui recounts how *The Nine Chapters* came into being:

It is only when the Duke of Zhou established the Rites that [we know that] ‘the nine fundamental procedures’ [*jiu shu*] existed. The development [*liu*] of ‘these nine fundamental procedures’, this is precisely what *The Nine Chapters* is.

If we interpret the ‘development’ to which Liu Hui alludes as meaning the operation of ‘extension’ that leads from ‘the nine fundamental procedures’ to *The Nine Chapters*, we obtain a unified interpretation of all these statements.

Interestingly enough, this interpretation of ‘development’ echoes another use of the notion of ‘development’, by the other commentator on *The Nine Chapters*, Li Chunfeng. In the first half of the seventh century, Li Chunfeng did not only supervise the commentary on *The Nine Chapters* and other canons, but he also composed some technical monographs in official histories, such as the *History of the Sui*. In the ‘Monograph on pitch-pipes and the calendar,’ he inserted a statement detailing his vision of the progressive emergence of mathematical knowledge. The ‘nine (procedures/chapters)’ also appear to play a key part in his account, as he writes:

As for what is called *liü*, there are *nine* [parts of mathematics/fundamental procedures] that *flow from them/develop from them*: the first is called ‘rectangular field’ [Li Chunfeng lists here the titles of all the chapters of *The Nine Chapters*, that is to say, the name of the ‘nine *shu*—fundamental procedures’, and Liu Hui’s commentary on the main purpose of these chapters] ... They [i.e., the nine (parts of mathematics/fundamental procedures) or

⁶⁵Tang commentators on *Zhou Rites* seem to believe that this list was corrupted. See below the list they attribute to Zheng Zhong, as distinct from the list they attribute to Ma Rong (馬融, 79–166). We already met Ma Rong’s brother, Ma Xu, as someone who had studied *The Nine Chapters* (see Footnote 20). Ma Rong was a commentator on Confucian Classics, including *Zhou Rites*. Zheng Xuan counted among his students.

(chapters)] all multiply to disaggregate them [i.e., *lǚ*], divide to assemble them, homogenize and equalize to make them communicate, apply the [procedure] of ‘suppose’ [i.e., the rule of three] to link them together, hence the *methods of the mathematical procedures are exhausted by these*.⁶⁶ 夫所謂率者,有九流焉:一曰方田,以御田疇界域。二曰粟米,以御交質變易。三曰衰分,以御貴賤座稅。四曰少廣,以御積纂方圓。五曰商功,以御功程積實。六曰均輸,以御遠近勞費。七盈朒,以御隱雜互見。八曰方程,以御錯柔正負。九曰句股,以御高深廣遠。皆乘以散之,除以聚之,齊同以通之,今有以貫之。則算數之方,盡於斯矣。

We cannot discuss here the interpretation of this complex declaration in detail. Only some of its features are important for our present analysis. We see the central role played by the notion of ‘development’ in the statement. We suggest it makes sense precisely on the basis of an analysis of the procedures as provided in the commentaries on *The Nine Chapters*. Li Chunfeng asserts how ‘the nine fundamental procedures’ or, alternatively, ‘the nine chapters’ develop by means of the *lǚ*.

The conception asserted in this statement is thus interestingly close to the declaration inserted as a commentary on the “SUPPOSE” operation, translated above. There, the commentator claimed, with our new interpretation of the term *jiu shu*: ‘All “nine fundamental procedures” (*jiu shu*) that give their names to the chapters (*pian*) can be widely extended, with the help [of this procedure], by means of *lǚ*.’ (emphasis added). In both contexts, the part devoted to the concept of *lǚ* is similar. Moreover, both statements apparently share the same conception of ‘the nine fundamental procedures’.⁶⁷ Perhaps the commentary in question was originally composed by Li Chunfeng and later mistakenly attributed to Liu Hui. Whatever the case may be, two points remain valid. First, these two declarations echo the presence of the term *lǚ* in many of the commentators’ statements on which we focused. Secondly, both Liu Hui’s preface and Li Chunfeng’s statement quoted above speak of mathematics as ‘developing’ on the basis of ‘the nine fundamental procedures’, the difference between them being the emphasis placed on the concept of *lǚ*.

To summarize the points made in this section, we suggest that *The Nine Chapters*, as a book composed of nine chapters, embodies an interpretation of which nine procedures are the most fundamental and why they have this property of extending to cover all procedures. We saw that Zheng Xuan’s quotation of Zheng Zhong’s position on this issue presents a strong continuity with what the received version of *The Nine Chapters* displays. We can thus conclude that the description of *jiu shu* quoted by Zheng Xuan has to be interpreted in this light. This fact may indicate that the program of finding the nine fundamental procedures had been active for a long time. Liu Hui, like Zheng Zhong, clearly believed that this program was launched before the establishment of the Empire.

Clearly also, the existence of at least two lists in the statement inserted in Zheng Xuan’s commentary, and the discontinuities between Zheng Zhong’s lists and *The*

⁶⁶Our emphasis. See *Suishu* (Yang Jialuo 1978 Vol. III: 1859). We cannot enter into the details of the meaning of this declaration. See Li Jimin (1990: 136–137) and Chemla (2008b).

⁶⁷In this conception, ‘Reiterated differences’ does not play any part. Liu Hui’s preface, and the statement attributed to Zheng Zhong bring the latter ‘fundamental procedure’ into focus.

Nine Chapters, suggests that various solutions existed for this program. This fact indirectly shows that the point may have been a topic of discussion.

An outcome of these discussions is manifest: ‘Base and height’ at some point replaced ‘*pang yao*’ as the most fundamental procedure in relation to the right triangle. We have suggested we might interpret in this way the commentator’s remark on this name. This change might have involved a rewriting of the chapter during the Han Dynasty, with a new beginning and a different set of procedures.

Evidence from the seventh-century commentator Jia Gongyan’s commentary on the same passage of *Zhou Rites* supports these hypotheses.⁶⁸ Jia Gongyan writes:

When one speaks of the ‘*jiu shu*,’ from ‘rectangular field’ onwards, they are all explained on the basis of *The Nine Chapters on mathematical procedures*. The reason why the [commentator] says: ‘In modern times, there are “Reiterated differences”, *xijie*, and “Base and height” is that he added Han [Dynasty] methods.’⁶⁹ Mr Ma [Rong 馬融], in his commentary, considers that ‘in modern times there are “Reiterated differences” and *xijie*’. *Xijie* is likewise the name of a mathematical procedure, and on this, he differs from Zheng [Zhong].⁷⁰ Commentary: In the present-day *Nine Chapters*, ‘Base and height’ has replaced *pang yao*, hence *pang yao* is of the category of ‘Base and height’

云‘九數’者，‘方田’已下皆依“九章算術”而言。云‘今有重差、夕桀、句股也’者，此漢法增之。馬氏注以爲‘今有重差、夕桀’。夕桀亦是算術之名，與鄭異。案：今九章以句股替旁要，則旁要句股之類也。”

Again, this statement by Jia Gongyan is rich in information, but we focus on only those points worth noting for us.

Jia Gongyan provides support to our thesis that there were competing ideas on the issue of which procedures could be considered the most fundamental, namely, the *jiu shu*. Moreover, the reason he adduces for the replacement of ‘*pang yao*’ by ‘Base and height’ is that *pang yao* has been proved to belong to the category of ‘Base and height’, that is, in our interpretation, that it derived from the latter. Such a derivation would have shown that *pang yao* was less fundamental than ‘Base and height’ and could thus yield the derivation of fewer procedures than the latter. The replacement of one by the other as the ‘source’ possibly refers to a reorganization of mathematical knowledge, with a change in one of the fundamental procedures and a reshaping of a chapter. This is, in our view, the point which Liu Hui’s commentary on ‘Base and height’ underlines.

⁶⁸We are grateful to Zhu Yiwen, who pointed out this document to us. See Ruan Yuan (1980: 731). This document is partly quoted in Guo Shuchun (1992:97).

⁶⁹We thus see that Jia interprets the items in the list as ‘procedures,’ referring to them as ‘*fa*’ (method).

⁷⁰Again, this remark confirms that the items in the list are mathematical procedures. Moreover, note that, in fact, Jia Gongyan seems to believe that the list of three “modern times” additions should in fact be two lists: one is attributed to Zheng Zhong and another one to Ma Rong, whereas Zheng Xuan seems to have given a compilation of the two. This interpretation further confirms our suggestion that there were competing ideas with respect to the *jiu shu*. The same idea is indirectly acknowledged by Kong Yingda, in a commentary on another Classic about rituals (*Liji*); see the quotation in Sun Wenqing (1931: 37–38).

On this basis, we see that Liu Hui's conception of 'the nine fundamental procedures', which included 'Reiterated differences,' seems quite close to what, in Jia Gongyan's interpretation, is the 'modern' list deriving from Zheng Zhong. Accordingly, Liu Hui's preface explains how he modified a chapter of *The Nine Chapters*. This remark highlights a continuity between the two authors. By contrast, Li Chunfeng seems to have a conception of 'the nine fundamental procedures' identical to that embodied by *The Nine Chapters*. i.e., the old list with the replacement of *pang yao* by 'Base and height'. In his edition of *The Nine Chapters*, he accordingly removed Liu Hui's addition to the text of the Classic and treated it as a separate book (Qian 1963). The historical evidence we have on the reshaping of chapters is thus closely connected with the evidence about the varying conception of the 'nine fundamental procedures' examined above.

5.4 Conclusion

In conclusion, we can now interpret chapters, as textual parts, in *The Nine Chapters*. We have seen that far from merely being material divisions, chapters bore a meaning. Each chapter embodies the mathematical knowledge deriving from a fundamental procedure, which gives the chapter its title. We argue that one goal of the commentaries is to highlight how this held true. In other words, except for Chapter 5, whose case remains to be interpreted, all the chapters seem to be organized according to the same mathematically meaningful principle. From a textual viewpoint, the chapter first provides the most general procedure and then it expounds what derives from it.

As a result, *The Nine Chapters*, as a book, appears to embody a scholarly division of mathematical knowledge into nine branches, emerging from the *duan* or beginnings of chapters. We see that its material organization in chapters refers to a conception of mathematics and mathematical knowledge, both attached to *Zhou Rites*. It is from this viewpoint that we can understand the close adherence of *The Nine Chapters*, by contrast to other mathematical books, to *Zhou Rites* and, more widely, to Confucian writings. Arguably, this textual feature embodied its status and might explain why it was perceived as being among those books whose circulation the first Qin emperor tried to control through an imperial decree.

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Chapter 6

“Parts of Text” in the Mathematical Literature of Ancient Greece: From the Author to His Commentator. The Example of *Conics* by Apollonius of Perga



Micheline Decorps-Foulquier

Abstract From the concrete examples of *Conics* by Apollonius of Perga and the commentary on Books I–IV by Eutocius of Ascalon, the author examines the different means used in Ancient Greece by mathematicians and copyists so that the elements that contribute to constructing the meaning of the text are clearly identified.

From the *loci mathematici* contained in the oldest philosophical works to the mathematical treatises of the Hellenistic and Roman periods, the extant texts show that the ways of presenting mathematical knowledge in Ancient Greece were very varied.¹ The multitude of ‘utterance situations’ and the existence of writing traditions linked to disciplinary categories and to the nature of the objects being studied produced great diversity in the choice of literary genres adopted, as well as in the formal structures used (Decorps-Foulquier 2011). In this context, it is well worth studying one particular aspect of the writing of Greek mathematical text: its divisions, in the widest sense of the term.

We can observe, in fact, from concrete examples, that a certain number of specific methods were used by the authors of mathematical treatises and by copyists, so that the elements that contribute to constructing the meaning of the mathematical writing are clearly identified. Whether at the level of the entire book,

The research leading to these results has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007-2013)/ERC Grant Agreement No. 269804.

¹For an overview of the extant texts and writing methods, see Knorr (1996) and Taub (2013).

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of the text itself or the written page of the manuscript, multiple interactions are observed between elements in the work that contribute to this construction: they concern not only all the links in the demonstrative chain developed in the treatise and, more particularly, the component parts that make up the same proposition, but also the text and its figure, and the text and its paratext (whether they were part of the original or whether they appeared later). These are all meaningful units whose identification was codified by the authors and subsequent editors; such elements legitimately belong to a study on “parts of text”, even if such a study cannot but exceed the limits of “textual division”, in the strictest sense.

While it is important to grasp the intentions behind this intellectual and material structuration, as well as the methods employed, it is also useful to look at the evolution of these first structures in the chain of transmission. The celebrated *Conics* treatise by Apollonius of Perga (around 200 BCE) and the ‘commented edition’² of the first four books produced by Eutocius of Ascalon in the sixth century CE provide the opportunity to study what can be covered by the notion of “parts of text” in a work in the Euclidean tradition, as well as the way, much later, the commentator perceived the reality when he wanted to produce a new edition of the original treatise.

6.1 Conics

Conics illustrates a well-defined chapter in the history of mathematics: conical geometry. It is a chapter that was developed, if not opened, in Plato’s Academy. The collections of testimonies assembled by Eutocius in his commentary on Proposition II.1 of *On the Sphere and the Cylinder* by Archimedes show that research into solutions to “solid problems”³ was one of the contexts in which the contemporaries of Plato (including Menaechmus, a disciple of Eudoxus of Cnidus) highlighted the fundamental properties of conic sections. Our later sources—Pappus of Alexandria (sixth century), in Book VII of his *Collection*; the philosopher Proclus (fifth century), in his commentary on Book I of Euclid’s *Elements*; and Eutocius—associate the great names of Hellenistic Greek mathematics⁴ to this field of mathematics: Euclid, Conon of Samos, Archimedes and Diocles (in particular for research on burning mirrors and gnomons), to which we should add the name of

²On the different known forms of ‘commented editions’ in Ancient Greece, see the articles by Irigoin (1994), Dorandi (2010), Maehler (2010) and Andorlini (2010).

³This is the name given in the Greek mathematical tradition to problems which cannot be solved by means of straight lines and circles and whose solution requires the use of conical sections.

⁴In this domain in particular, very few works exist today from the flourishing scientific activity in the Classical and Hellenistic periods. Other than the treatise by Apollonius, there are two treatises by Archimedes: *On Conoids and Spheroids* and *The Quadrature of the Parabola*, and Diocles’ treatise, *On burning mirrors*, passed on only in its Arabic translation.

Aristaeus the Elder, according to the testimony by Pappus (*Collection Mathématique* VII.30; ed. Jones (1986: 114).

In his treatise, Apollonius of Perga, who is at the confluence of these streams of research, offers a masterful synthesis enriched by his own discoveries, in the form of a theoretical presentation, originally written in eight books, that methodically explores the properties of conical forms.

Of this treatise,⁵ only the first seven books have survived, each one containing sixty or so propositions (theorems and problems). Book VIII is lost. The seven books have not been passed down in their original form: the Greek tradition remained only in the recension of Books I–IV⁶ produced by Eutocius, from various manuscripts for his “commented edition” of the books making up the ‘elements’⁷; the Arabic tradition, which preserved Books I–VII,⁸ passed on the work by Apollonius via a very elaborate tenth-century Arabic translation, created by the mathematical elite in Baghdad,⁹ from two relatively corrupted Greek sources, the first of which gave them access to Books I–VII, while the second was an example of the recension by Eutocius of Books I–IV, obtained later in Syria.¹⁰

Thus the layout of the work, as originally conceived by the author, as well as the later editorial work that resulted in the conservation of the treatise, offer us the opportunity to study the role played by “parts of text” in this eventful history.

⁵*Conics* is the only work by Apollonius passed down in Greek. No other work has reached us, except for *De Rationis Sectione*, passed on only in an Arabic translation.

⁶We know from Eutocius himself that his edition of the first four books was in the form of a ‘commented edition’, in which we find his historical and mathematical commentary in the margins. This edition has not been passed down to us as it was. The two texts—that, by Apollonius edited by Eutocius and that of the commentary—were transcribed separately, some time between the end of Antiquity and the ninth century, the date of our first Byzantine testimonies. This separation has allowed the commentary by Eutocius to escape its marginal status and to be conserved in its entirety. The new critical edition of *Conics*, after that by Heiberg (1891–1893), and the two parts of the work by Eutocius (his edition of Apollonius and his commentary) are published by De Gruyter (Apollonius of Perga 2008, 2010; Eutocius of Ascalon 2014).

⁷The term ‘elements’ used by Apollonius himself to qualify the first four books (see later), should not be taken to mean ‘elementary propositions’, which would make the first four books a synthesis for educational use, but in the sense where each proposition is a theorem useful in the understanding of other propositions; in his commentary of Book I of Euclid’s *Elements*, Proclus clearly explains the use of this word (Friedlein 1873: 71–72).

⁸The critical edition was published by De Gruyter (Apollonius of Perga 2008a, b, 2009a, b, 2010). See also Apollonius of Perga (1990).

⁹This vast editorial project was carried out by the Banû Mûsâ; on these dignitaries and scholars, see Rashed (1996: 1–7).

¹⁰This information appears in the preface of the Banû Mûsâ edition of *Conics*; see Rashed (2008a: 501–507).

6.2 “Parts of Text” in Conics

6.2.1 *The Division into Books*

The Conceptual Necessities

Conics was devised by its author in eight books. This division into books, to which each of the cover letters which precede them¹¹ must be included as other “parts of text”, corresponds to a mathematical project; it is directly linked to Apollonius wanting to provide a specific setting for the treatment of what were, in his opinion, fundamental questions in conical geometry. The cover letter to Book I, addressed to Eudemus, a mathematician and friend from Pergamum, and which serves as a general preface to the collection, clearly shows this intention. The text reads:

Ἀπολλώνιος Εὐδήμῳ χαίρειν. Εἰ τῷ τε σώματι εὖ ἐπανάγεις καὶ τὰ ἄλλα κατὰ γνώμην ἐστί σοι, καλῶς ἂν ἔχοι· μετρίως δὲ ἔχομεν καὶ αὐτοί. Καθ' ὃν δὲ καιρὸν ἤμην μετὰ σου ἐν Περγάμῳ, ἐθεώρουν σε σπεύδοντα μετασχεῖν τῶν πεπραγμένων ἡμῖν κωνικῶν· πέπομφα οὖν σοι τὸ πρῶτον βιβλίον διορθωσάμενος· τὰ δὲ λοιπά, ὅταν εὐαρεστήσωμεν, ἐξαποστελοῦμεν. Οὐκ ἀμνημονεῖν γὰρ οἶομαί σε παρ' ἐμοῦ ἀκκηότα· διότι τὴν περὶ ταῦτα ἔφοδον ἐποίησάμην ἀζιωθεὶς ὑπὸ Ναυκράτους τοῦ γεωμέτρου, καθ' ὃν καιρὸν ἐσχόλαζε παρ' ἡμῖν παραγενηθεὶς εἰς Ἀλεξάνδρειαν, καὶ διότι πραγματεύσαντες αὐτὰ ἐν ὅκτῳ βιβλίοις ἐξ αὐτῆς μεταδεδώκαμεν αὐτὰ εἰς τὸ σπουδαιότερον διὰ τὸ πρὸς ἔκπλῳ αὐτὸν εἶναι οὐ διακαθάραντες, ἀλλὰ πάντα τὰ ὑποπίπτοντα ἡμῖν θέντες ὥς ἔσχατον ἐπελευσόμενοι. Ὅθεν καιρὸν νῦν λαβόντες αἰεὶ τὸ τυγχάνον διορθώσεως ἐκδίδομεν. Καὶ ἐπεὶ συμβέβηκε καὶ ἄλλους τινὰς τῶν συμμεμιχτῶν ἡμῖν μετεिल्φέναι τὸ πρῶτον καὶ τὸ δεύτερον βιβλίον πρὶν ἢ διορθωθῆναι, μὴ θαυμάσης ἂν περιπίπτῃς αὐτοῖς ἐτέρως ἔχουσιν. Ἀπὸ δὲ τῶν ὀκτῶ βιβλίων τὰ πρῶτα τέσσαρα πέτωκεν εἰς ἀγωγὴν στοιχειώδη. Περιέχει δὲ τὸ μὲν πρῶτον τὰς γενέσεις τῶν τριῶν τομῶν καὶ τῶν ἀντικειμένων καὶ τὰ ἐν αὐταῖς ἀρχικὰ συμπτώματα ἐπὶ πλεόν καὶ καθόλου μᾶλλον ἐξεργασμένα παρὰ τὰ ὑπὸ τῶν ἄλλων γεγραμμένα. Τὸ δὲ δεύτερον τὰ περὶ τὰς διαμέτρους καὶ τοὺς ἄξονας τῶν τομῶν συμβαίνοντα καὶ τὰς ἀσυμπτώτους καὶ ἄλλα γενικὴν καὶ ἀναγκαίαν χρεῖαν παρεχόμενα πρὸς τοὺς διορισμούς· τίνες δὲ διαμέτρους καὶ τίνες ἄξονας καλῶ, εἰδήσεις ἐκ τούτου τοῦ βιβλίου. Τὸ δὲ τρίτον πολλὰ καὶ παράδοξα θεωρήματα χρήσιμα πρὸς τε τὰς συνθέσεις τῶν στερεῶν τόπων καὶ τοὺς διορισμούς, ὧν τὰ πλείεστα καὶ κάλλιστα ξένα [...]. Τὸ δὲ τέταρτον ποσαχῶς αἰ τῶν κόνων τομαὶ ἀλλήλαις τε καὶ τῇ τοῦ κύκλου περιφερείᾳ συμβάλλουσι [...]. Τὰ δὲ λοιπά ἐστι περιουσιαστικώτερα· ἔστι γὰρ τὸ μὲν περὶ ἐλαχίστων καὶ μεγίστων ἐπὶ πλεόν, τὸ δὲ περὶ ἴσων καὶ ὁμοίων κόνων τομῶν, τὸ δὲ περὶ διοριστικῶν θεωρημάτων, τὸ δὲ περὶ προβλημάτων κωνικῶν διορισμένων. Οὐ μὴν ἀλλὰ καὶ πάντων ἐκδοθέντων ἔξεστι τοῖς περιτυγχάνουσι κρίνειν αὐτά, ὥς ἂν αὐτῶν ἕκαστος αἰρήται. Εὐτύχει. (Apollonius of Perga 2008: 2.1–4.22)

Greetings Eudemus. If your health is restored and the rest is as you desire, then all is well! I myself am well. At the time I was with you in Pergamum, I saw that you were eager to learn about the work I had carried out on conics; this is why I have sent you the first book, which I have corrected, and you will have the others when I am satisfied with them. I told you, and I imagine that you have not forgotten, that I undertook to address this matter at the request

¹¹On the Hellenistic usage of cover letters, see Aujac (1979).

of the geometer, Naucrates, when he came to Alexandria to follow my teaching. I also told you that I had addressed the subject in eight books, which I rushed and gave to him before having corrected them as he had to take his boat, and I had simply written down everything as it occurred to me, with the intention of returning to it later. Seizing the opportunity that is offered to me now, I am publishing the corrected version as I complete each book. As it turns out that some of my acquaintances have read the uncorrected first and second books, do not be surprised if you come across examples in a different version. Of the eight books, the first four enter into the presentation of the elements. The first contains the methods of generating the three sections and the opposite sections, as well as their basic properties, which are developed more fully and more generally than in the works of the other writers. The second addresses the properties of the diameters and axes of sections, as well as asymptotes, and other subjects that are useful in general and necessary to diorisms; this book will also teach you what I mean by diameters and by axes. The third contains a large number of admirable theorems, useful in the construction of solid loci and diorisms, of these, the majority, and the most beautiful, are new [...]. The fourth addresses the different ways in which conic sections intersect each other and intersect the circumference of a circle [...]. The remaining books are at a much higher level. The first develops the subject of maxima and minima; the second addresses equal and similar conic sections; the third, theorems relative to diorisms; and, the last, determinate conical problems. Nevertheless, when all the books are published, the readers are free to have their personal opinions. Farewell.

We see that the distribution of the books in the work first obeys a conceptual logic, as this division was present from the first draft given to the geometer Naucrates. Books I and II are devoted to the presentation of the methods of generating curves as plane sections of a cone, to the demonstration of their characteristic properties, and to a study of diameters, tangents and secants, as well as the examination of properties relative to asymptotes in a hyperbola. What we find here is, although greatly enhanced, a body of knowledge already established in Euclid's time. Books III and IV deal with more circumscribed areas of research, which represent the completion of the works of Euclid and Conon of Samos on these subjects. Book V constructs the theory of maxima and minima, that is, the longest and the shortest straight lines that can be drawn from one point on the perimeter to a conical section. Book VI presents the theory of equality and similarity of conical sections, and Book VII explores the metric relations between the elements of curves, diameters, conjugate diameters, axes, *straight sides*, and tangents, no doubt many tools also forged to resolve the problems to which the lost Book VIII was exclusively consecrated.

By providing a certain number of details on the different subjects to be addressed, the cover letters that precede the extant books¹² conserve the logic that underpinned this layout. Apollonius wanted to divide the presentation of conical properties into eight parts in order to introduce, in a progressive manner, the concepts useful in both the study of the geometry of cones in general and in the exploration of specific questions directly linked to his own research.

¹²With the exception of the cover letter to Book III, which is lost, and that of Book II, which is very personal.

Apollonius also employed the division into books to reserve a separate space for the problems. In each of the books that present them (Books I, II and VI), these construction problems (or the determination of certain points or straight lines) are closely related to the theorems demonstrated and are grouped together at the end¹³; for the problems linked to the proofs in Book VII, the cover letter written by Apollonius and quoted above tells us that a whole book was devoted to them, namely Book VIII. This thematic choice may have encouraged its detachment from the rest of the treatise, and then its loss, which we should place at the end of Antiquity.¹⁴

Beside the division by book of the different areas of research described by Apollonius, the preface of Book I shows another division. By referring to the first four books as ‘elements’ (τὰ πρῶτα τέσσαρα πέπτωκεν εἰς ἀγωγὴν στοιχειώδη), Apollonius creates two new “parts of text”, whose reading order is not unimportant: (1) a body of demonstrations relying on previous learning and providing a conceptual foundation necessary for the exploration of higher level questions (viz. Books I–IV); (2) a set of results from original and much richer research developed in Books V–VIII.

This dividing line, while purely theoretical for Apollonius, had momentous material consequences, as it directly jeopardized the preservation of the use of Greek for the whole treatise. The work’s fate was decided at the end of Antiquity, a crucial period for the passing on of Greek texts in the Medieval West. Eutocius, a late commentator (and doubtlessly also his direct predecessors), took this distinction when he wanted to produce a new version of the treatise. By limiting his work to the books of the ‘elements’,¹⁵ accompanied in the margins by an invaluable commentary, he gave the scientific community and the world of teaching a particularly useful instrument, whose diffusion was thereby assured. It is clear that this success led directly to copies of the entire treatise becoming scarce and resulted in its disappearance in the Greek world.

The Physical Realities

The eight books that make up the treatise also correspond to a physical reality. Apollonius wrote at a time when progress in the book world with the creation of the Musaeum of Alexandria and its library had given authors a clear understanding of the realities of publishing and thus the necessity of taking these realities into account when drafting their works (Irigoin 1994). Unlike their predecessors in the Archaic and Classical periods, Hellenistic authors adapted their texts to the average length of the supports at their disposal, in this case, the papyrus scroll. In the case of

¹³Except for the construction of a hyperbola whose asymptotes are given and passing through a given point, which appears at the beginning of Book II (Proposition 4).

¹⁴Commentators at the end of Antiquity, including Eutocius, offer no proof that they really had access to the book, but do not go as far as attesting its disappearance. Arab translators searched for it in vain.

¹⁵In the preface of his commentary on Book IV, Eutocius states explicitly that he limits himself to the first four books, while saying that he is ready to work on the other books in the same manner.

large-scale works, the authors matched the content of a scroll to the different books making up the tome. Thus they gave meaning to a division that was imposed on them by practical necessity.

This concrete reality appears in the preface to Book I and in the prefaces to the books that follow. Apollonius spread the initial circulation of his work over time: a complete first draft in eight books was hastily given to a departing geometer, then a revised edition was sent, book by book as they were completed, to contacts in Pergamum. The first correspondent, his friend Eudemus, died between the completion of the final versions of Books III and IV; a certain Attalus received Books IV–VIII. Thus we see that Apollonius had the eight books of the treatise, in as many papyrus scrolls, delivered to Pergamum one after the other. In the case of Book II, it was his own son, also called Apollonius, who took the work to Eudemus.

The somewhat chaotic modalities of this initial publication could raise concerns about the break-up of the work from the very beginning. Apollonius himself was able to weigh up the danger. He worried, in fact, that, owing to the relatively anarchic diffusion of the first versions of Books I and II, there were some inconsistencies with the definitive version.¹⁶ He was careful, however, to clearly state the exact limits of the whole work (eight books), as well as the reading order, in the preface to Book I; in the same way, in the cover letter to Book VIII, he indicates that the forthcoming Book VIII is to be the last. The various much travelled scrolls are thus also, in their physical reality, “parts of text”, that for all the precautions taken by Apollonius, were not always safe from the risk of separation and loss.

6.2.2 *Internal Divisions*

In the same way as Euclid’s *Elements*, *Conics* offers a segmented rather than a continuous read, as the results presented are written in the form of propositions, theorems or problems, which are each independent textual units. However, the order in which these units are read is important; they are the links that make a logical chain, as each new demonstration uses the results obtained beforehand. This reading rule applies to the propositions in each book as well as to the book themselves.

Within this global textual structure, the reader of *Conics* can immediately identify three different types of units whose position, their preceding titles and their writing style signal as “parts of text”. They enter into a significant system of relations and oppositions: namely (1) the cover letters to Books I–II and IV–VII; (2) the *First* and *Second Definitions* in Book I¹⁷ and the *Definitions* in Book IV;

¹⁶On the dangers of this informal distribution to friends and disciples, see Devreesse (1954).

¹⁷They appear respectively under the titles “Ὅροι πρῶτοι” (First Definitions) and “Ὅροι δευτέρτοι” (Second Definitions) in our Medieval manuscript tradition. The *Second Definitions* follow Proposition I.16.

(3) the set made up by the body of propositions in Books I–VII (+<VIII >). The textual units, theorems and problems which make up this last group are just as much “parts of text” themselves, whose codified writing allows the unambiguous identification of where they start and end. To this body of propositions must be added (4) the autonomous developments, which, by their cursory style, their position at the end of a group of propositions and their content should also be considered a “part of text”; they are the opportunity for the author to highlight the importance of the previously proven properties. Let us now take a closer look at the nature of these four “parts of text” and the marks attached to their identification.

The letters Apollonius wrote to his various correspondents (1) are at odds with, by their configuration and their position, the rest of the book whose dispatch they accompany. Each letter constitutes an autonomous part in which complex relationships are forged. They are the only space available in the treatise for personal expression, which, via the recipient, connects the work to the author’s cultural milieu; beyond the person chosen to receive this exchange, there is also of course a specific public who is targeted. The letter is, in fact, an opportunity to give the reader information about the circumstances surrounding the writing of the treatise, to assert its newness and revisit topical scientific questions; it is also directly related to the rest of the work, whose purpose and content it establishes in the same way as a preface.

The presence of these cover letters in Hellenistic treatises is also one of the consequences of the editorial progress occasioned by the Musaeum of Alexandria. Besides the part about the authors themselves, the letters make it easier to consult the works, in the same way as the tables of contents do in later times, and also meet the need to certify the origin of the treatise, passed down to posterity with a title, the name of the author and a preface in due form.

The definitions (2) constitute another specific “part of text”, whose place at the beginning of the book is wholly natural. They are part of the body of the work, which is not the case for the cover letter, but they have a special place, as they guarantee the exact understanding of the propositions set out in the treatise by defining the concepts and establishing the terminology.

The group made up by the ordered succession of propositions (3) makes up the heart of the work. In this group, *Conics* clearly distinguishes two types: the theorems, in a large majority, and the problems, which, as we have said, are given a special place. We will see later that the wording of the problems clearly distinguishes them from the other propositions.

Finally, we find some concluding developments (4) in the text of *Conics*, which represent yet another form of “parts of text”. Here, Apollonius emphasizes a decisive step in the research, thus giving meaning and direction to the intellectual construction that precedes it. This is the case for the remarkable development which follows the final theorem in Book I (Proposition 51). Apollonius draws a general

conclusion from the results obtained in Propositions 46–51,¹⁸ thus showing that an important step has been reached in the writing of the characteristic property of each of the three curves, which, from this point, can be expressed in its most general form.

6.2.3 Segmentation of the Text: Writing in Propositions

The proposition (theorem or problem) is the natural division in the classic geometry treatise; it is directly linked to the way the mathematical knowledge used in this type of work is presented; it is organized as a unit devoted to the statement and to the demonstration of the property being presented or the problem being posed. The succession of the theorems constructs a logical chain and any demonstration draws on results obtained previously, either in the work itself or in the corpuses familiar to readers of scientific texts.¹⁹ This is the very nature of *Conics*.

The Formal Divisions of the Proposition

As a general rule, mathematical propositions in Apollonius follow the canonical structure described by the philosopher Proclus (Friedlein 1873: 203.1–205.21)²⁰ in his commentary on Book I of Euclid’s *Elements* and which was already well codified before Euclid: *protasis*, *ekthesis*, *diorism* (διορισμός), *construction* (κατασκευή), *demonstration* (ἀπόδειξις), *conclusion* (συμπέρασμα).²¹ The earlier steps followed by the reasoning are not presented, except in the case of the problems in Book II, where the deployment of the complete reasoning gives rise to the writing of two “parts of text” which follow one another, clearly identified from a formal point of view by formulas which refer to procedures of analysis (ἀνάλυσις) and synthesis (σύνθεσις)²²; the formula used in the problems in Book II for the

¹⁸Apollonius argued the principal importance of the propositions which establish that the properties relating to the first diameter, demonstrated from the beginning of Book I, apply to all those parallel to the first diameter, in the case of the parabola, and every straight line passing through the center, in the case of the ellipse and hyperbola.

¹⁹See Sect. 6.4.

²⁰I bring to mind here that the description of the logical device of mathematical discourse and explicit definition of its basic terms should not be sought in the treatises which conform strictly to the Euclidean mode of presentation and only have an ordered sequence of results without meta-mathematical considerations. The testimony of epistemological research behind these results is found primarily in our philosophical sources and in the exegetical tradition.

²¹In the case of the theorem, the *protasis* generally provides the data; the *ekthesis* is an exemplification of the data in the statement; the *diorism* states the purpose of the study in terms of the *ekthesis*; the construction, in the words of Proclus, ‘adds what is lacking in the thing given for the continuation of the thing sought’ (that is the construction of auxiliary lines); the demonstration is the place of the proof; the conclusion notes that ownership is demonstrated either in the general terms of the *protasis*, or in the terms of the statement specified by the *ekthesis*.

²²For a summary presentation of these two steps in reasoning, see Euclid (1990: 141–148).

transition from *analysis* to *synthesis* is the following: ‘συντεθήσεται δὴ οὕτως’ (the construction shall be the following).

Other, more flexible, writing schemes appear from Book III, in particular in the theorems which depend on earlier theorems for their assumptions and which start with formulas of the type ‘τῶν αὐτῶν ὑποκειμένων’ (the same assumptions being made). Lighter and sometimes even more cursory writing²³ is often seen in these propositions, which means that the functions provided respectively by the *protatis* (general statement of the data), the *ekthesis* (exemplification of the statement data) and the *diorism* (formulation of the subject of the research in the terms of the *ekthesis*) do not always lead to a separation between “parts of text”.

Complementary “Parts of Text”

The establishment of certain properties can lead to the introduction of new subdivisions inside the textual unit of the proposition. Specific formulas allow these to be immediately identified, even within the demonstration.

This is primarily the case in propositions which require different demonstrative procedures according to the cases. *Conics* thus presents a certain number of propositions where the chains of calculation differ according to the sections,²⁴ where the mathematical situations differ according to the choice of points taken on the curve. A complete presentation devoted to the ordered examination of the new “parts of text” will be required to introduce such cases, where necessary.²⁵

The demonstration can equally require the establishment of an auxiliary construction or theorem that the author chooses to deal with separately, either before the proposition or the group of propositions that use it, or following that proposition. When these auxiliary developments (lemmas) are preceded in our manuscripts by that specific title, Λήμμα (or when an explicit link is formulated between the lemmas and the proposition to which it is destined²⁶), we can consider them as “parts of text”. *Conics* does not offer any examples of this presentation, even if, from the point of view of their content and the relationships they have with the propositions that follow, a certain number of preliminary propositions can be considered as lemmas. In his commentary on Book I of Euclid’s *Elements*, Proclus signals as special meaning, that of a ‘proposition that requires confirmation’ (πρότασις...δεομένη πίστεως) (Friedlein 1873:211.4–5). In the text of Classical treatises, like that in *Conics*, these lemmas, in the second meaning of the word, are implicitly necessary in a number of demonstrations and are not “parts of text”. This state of affairs has subsequently led to their demonstration in the margins of the manuscripts or in parallel collections established by the commentators.²⁷

²³See Apollonius of Perga (2010: 332–333, notes 14 and 18).

²⁴This is the case, for example, for Proposition I.37.

²⁵Proposition IV.27; Apollonius of Perga (2010: 391–394) provides a good example.

²⁶Just as Pappus gives examples in Book IV of his *Mathematical Collection* (Propositions 7–10 and 16–17).

²⁷This is the subject of Book VII of the *Mathematical Collection* by Pappus.

The demonstration of corollaries can also be added.²⁸ They have a natural place following the proposition. Certain manuscripts precede them with the title ‘πρόρυσμα’ (corollary); a canonic formula identifies them at the beginning of the development (‘καὶ φανερόν ὅτι ἢ ἐκ δὴ τούτου φανερόν ὅτι’; it is evident that; then from this it is evident that). One can also find one or several alternative proofs²⁹ at the end of the proposition that Greek manuscripts introduce under the title ‘ἄλλως’ (otherwise).

Although these cases, these lemmas, these corollaries and these variants, which, moreover, make up the vast majority of the exegetical material in Greek mathematical treatises, are often interpolations, their formal partnership with the demonstration, in the mathematics books passed down, equally make them “parts of text”.

Figures as “Parts of Text”

It is also necessary for us, as observers, to consider the figure of the proposition as a “part of text”, as the usage, as witnessed by extant Greek texts, shows a close interaction with the text of the proposition.

The figures in *Conics*, always following the Euclidean pattern, allow us to immediately see the completed state of the constructions sought by the proposition as well as the internal relationships between the different constitutive elements. The figure illustrates the case on which the reasoning is built; and even if the wording of the proposal does not establish a clear link with the figure, the correspondence of the letters assigned to the variables in the *ekthesis* and those in the *construction* with the letters of the figure is enough to show the relationship. Moreover, in the passages where the writing is brief, one often finds ‘appeals to the figure’, that is, the use of points which are constructed on the figure but which the written text has not previously identified. The figure is therefore an integral part of the proposition and, as such, is a “part of text” and not a “paratext”. It enjoys its own space. In the manuscript which is the basis of the manuscript tradition to which *Conics* belongs, *Vaticanus graecus* 206 (late twelfth or early thirteenth century), the figures are drawn, in accordance with ancient custom, at the beginning of the proposition that follows; there it occupies a space that the copyist carefully saves on the right-hand side of the writing surface.

The propositions in *Conics* which are exceptions to the uses we have described are those which see the successive examination of several cases. The text then refers the reader explicitly to the different figures which illustrate them, according to a reference number: ‘ὥς ἔχει ἐπὶ τῆς δευτέρας καταγραφῆς’ (as is the case in the second figure) (Apollonius of Perga 2010: 62.1–2); on the other hand, we observe that in *Vaticanus graecus* 206, these figures are grouped at the end of the proposition and drawn in a full page.

²⁸See, for example, *Conics*, I.7.

²⁹*Conics* offers no examples.

6.3 Linguistic Expression and “Parts of Text”

Classical Greek mathematical language, such as that used in *Conics*, is highly coded on account of its systematic recourse to linguistic abbreviation³⁰ procedures as well as to the use of syntax and lexis that exclude the agent, movement and temporality.³¹ In this context, the linguistic examination of *Conics* carried out by Michel Federspiel,³² in the context of a more general study on the language of Classical and Hellenistic mathematical treatises, has not only brought to light modes of expression relating directly to the parts of the proposition and with their function, but also led to the redefinition of these parts from the point of view of the way they operate linguistically (Federspiel 1995).

Similarly, the development of a number of specialized pathways must be linked to the very nature of the “parts of text” that make up the proposition. Examples include the systematic use of the perfect indicative or of the *praesens pro perfecto* and the indefinite expression of the agents (subjects and complements) in a specific part of the demonstration, introduced by ‘καὶ ἐπεὶ’ (or ‘ἐπεὶ οὖν’) (therefore since), that Michel Federspiel has identified and characterized as ‘anaphora’ (Federspiel 1995: 253; 2015).; it allows the author to bring to mind the data in the *ekthesis* or in the *construction*.

Like the theorems and problems that make up the two forms of proposition, the various parts of the proposition, are also the framework for the very specific distribution of the verbs,³³ particles³⁴ and a certain number of formulas³⁵ and pathways.³⁶

The way the reasoning itself works within the proposition and the communication that takes place between the “parts of text” has led to a focus both on

³⁰See the specific study devoted to them by Federspiel (2003).

³¹On this subject, one can reread the introduction to the Greek language by Mugler (1958) in his *Dictionnaire Historique de la Terminologie Géométrique des Grecs*.

³²The results of this examination are recorded in the philological notes published in volumes 107, 112, 113, 115, 121, 122 of the *Revue des Études Grecques* and in a certain number of specialist articles, cited below.

³³See, for example, the complementary distribution of the verbs ‘ἄγω’ (to lead) and ‘ἐπιζεύγνυμι’ (to join) in the *protasis* and other parts of the proposition, which was raised by Federspiel (2002: 133–147) and, again by Federspiel (2010), the three uses (existential, copulative or locative) of the imperative form of the verb ‘ἔστω/ἔστωσαν’ (to be) in different parts of the proposition.

³⁴See, for example, the distribution of the particle ‘γάρ’ in the *ekthesis*, according to the presence, or not, of the imperative ‘ἔστω/ἔστωσαν’ (Federspiel 2010).

³⁵Like that which introduces the *diorism* of the second part of the theorem, ‘λέγω δὲ ὅτι καὶ’ (I say now that), identified by Federspiel (1999: 415–418).

³⁶One can cite the example of the relative subordinate clauses found in the *ekthesis*, whose syntax was elucidated by Federspiel in Apollonius of Perga (2008: 216–218).

multiple forms of abbreviation of statements and all sorts of forms of structural³⁷ and lexical reiteration, which have tapped into the resources of rhetoric.³⁸ I give an example of decomposition of a mathematical proposition into “parts of text” in the annex.

A final example deserves to be mentioned: the analysis of language in the problems in Books I and II of *Conics* has revealed very specific usages, which are reflected in the language used by the predecessors of Apollonius, and especially by Archimedes (Federspiel 2008). Examining them allows us to measure the difference from the language of the theorems.³⁹ If we add this last example to all those that have been previously presented, it is clear that the diversity of Greek mathematical elocution cannot be explained independently of “parts of text”.

6.3.1 References to “Parts of Text”

The “parts of text” are not named in the course of *Conics*, which keeps to the refined writing tradition of the presentation of Euclidean mathematics. This tradition is so deeply rooted in the usage of the authors who follow this model that it also removes from the writing of the propositions both the linguistic markers of the agent who operates in the construction and the relationship to the reader. However, this is not the case in the text by the commentator Eutocius who, as we shall see, identifies the “parts of text”, names them and offers his reader real guidance through the work by Apollonius, in much the same way as the cover letters Apollonius wrote to precede the various books in the treatise.

The transition from analysis to synthesis in the problems of Book II and the explicit reference to the figure when the presentation includes a case study, are the only examples, as we have seen, which shows named “parts of text”, but this formulaic identification provides only discursive indications and concerns the “parts of text” directly related to intellectual operations used in the discovery and development of the proof.

³⁷They are linked to the organization of the proposition itself, where the *ekthesis*, which follows the *protasis*, incorporates its elements, where the *conclusion* incorporates the terms of the *protasis*, and where the anaphoric part of the *demonstration* recalls the data in the *ekthesis* or in the *construction*.

³⁸See, in particular, the use of anadiplosis in the *construction* (repetition in the imperative of the previous verb) revealed by Federspiel (2011).

³⁹See Federspiel (2012: 1).

6.4 Intertextuality and “Parts of Text”: The Demonstration

Among the parts that make up a proposition, the demonstration is the perfect place for all the elements put in place since the beginning of the proposition and already identified in the analytic stage to find their articulation and their purpose. The logical necessities of mathematical proof are that the demonstration must relate not only to the other parts of the proposition, but also to all the demonstrative chain which precedes it in the work. A property cannot be proven without the implicit or explicit mobilization of earlier texts that are agents to its knowledge. This inherent intertextuality in the writing of the demonstration does not leave the reader free to create their own associations, as here, the validation of the demonstrative texts depends on the use of previously proven properties. The library of texts that can be incorporated into the demonstration is strictly defined.

It is therefore interesting to observe how this relationship is established in *Conics*. It is a question here of the use made by the author of the “parts of text” in relation to the mathematical project.

Previously, we have seen that linguistic analysis has revealed the existence of the ‘anaphora’, a “part of text” in the demonstrative part of a mathematical proposition which repeats data from the *ekthesis* or the construction. Its function is clear: it is to enlist these data in order to lead to the result being sought. Here, we have a form of internal communication between the demonstration and other “parts of text” within the proposition.

The author could also enlist knowledge that was exterior to the proposition either by referring to properties already proven in the work or in earlier treatises, or in the supposedly already understood ‘elements’ corpus. This is a form of external communication reserved only to the demonstration. Three situations can be identified where the demonstration required the intervention of external knowledge, which leads us to examine successively (1) internal references, (2) references to content outside the work, (3) the case of the lemmas.

- (1) It is interesting to observe how Apollonius referred to preceding “parts of text” where it was necessary, and which methods for their identification were made available to his readership. At such an early date, it was not usual to refer explicitly to an earlier proposition by its own number. The very rare references of this type found in the Greek books of *Conics* are not authentic.⁴⁰ However, in his presentation, there are frequent references by the author to properties proven earlier in the treatise. These reminders use various formulas recorded in the tissue of the demonstration, but all of which include occurrences of the verb ‘δείκνυμι’ (to show) and its composites (‘διὰ τὰ δεδειγμένα πρότερον’ or

⁴⁰They are found in groups of related propositions and appear at the end of the sentence, introduced by stereotypical formulas. The numbers correspond to those in the edition by Eutocius. On this subject see Federspiel (1994: 213–214); see also Apollonius of Perga (2008: 233–234).

‘διὰ τὸ προδεδειγμένον’; by virtue of what has been shown previously) associated with deictic adverbs or preverbs referring, without further detail, to an earlier or more or less immediate precedence in the text. As we see, such references, which guide more than they locate, enable the reutilization of earlier learning but presuppose an informed readership. We can easily understand why, in later periods, such a system lost ground to numeric references referring to specific propositions.

- (2) In the demonstration one can find references either to earlier works by the author (as is the case for Archimedes) or treatises by his predecessors. The formulas for reference increase in precision with the later mathematicians. Such references are not found in *Conics*. However, the demonstrations of theorems and problems constantly and implicitly require knowledge of Euclid’s *Elements* and *Data*. All these are content associated with the validation of the proof but are not written as “parts of text” in the development of the demonstration.
- (3) One often finds, in Apollonius and authors of this period, the inclusion of auxiliary theorems which are used without proof in the demonstrations. We have seen that discovery and demonstration of these auxiliary theorems made up a large part of the work of later commentators. This corpus of propositions that were considered to be evident should be distinguished from the Euclidean propositions which they implicitly draw on, but which are duly established in the *Elements*. The lemmas have a relationship with the written demonstration that, from the beginning, comes from intertextuality, in so far as the reader knows that within the text, there are demonstrative links to re-establish and for which he is required to mobilize knowledge gained independently of the work. These “parts of text” to re-establish in the demonstration could remain in a virtual state as long as the reader had the required skills. But progressively with recensions of the text, these ellipses tended to disappear. Later editors gave them the form of “parts of text” either by interpolation in the original demonstration or by associating them explicitly with the proposition as a paratext.

6.5 The Use of “Parts of Text” by the Commentator

We must now examine the manner in which the commentators and editors identified the existence of constituent ‘parts of text’ in the mathematical treatise and appropriated them. The Greek books of *Conics* offer, by the history of their text,⁴¹ an excellent field of study, as the tradition has given us both the text by Apollonius edited by Eutocius and the commentary he wrote to accompany the original. It is a

⁴¹For an overview, see the respective introductions to the volumes in the edition by Decorps-Foulquier and Federspiel (Apollonius of Perga 2008, 2010; Eutocius of Ascalon 2014).

real editorial and exegetical project which gives us the opportunity of knowing which of the “parts of text” played a fundamental role.

6.5.1 *The Use of the Apollonian Text in the “Commented Edition” by Eutocius*

In his commentary on *Conics*, Eutocius accomplishes three essential missions Antiquity required of the exegete and that Diogenes Laertius formulates so clearly *à propos* Platonic writings (*Vie des Philosophes*, III, 65): ‘firstly, give all the explanations on the nature of each proposition of the statement’ (πρῶτον μὲν γὰρ ἐκδιδάξαι χρή ὅ τι ἐστὶν ἕκαστον τῶν λεγομένων), ‘secondly, on the intention attached to each one’ (ἔπειτα τίνος εἵνεκα λέλεκται), ‘thirdly, on the accuracy of its enunciation’ (τὸ δὲ τρίτον, εἰ ὁρθῶς λέλεκται). The last two missions lead to the evaluation of the author’s approach. The ancients accorded particular importance to the justification of the purpose of the work.⁴² Therefore, it is the overall composition that the commentator is led to highlight and the way in which everything converges toward the ultimate goal. This exigence naturally leads to an interest in “parts of text”. Eutocius conforms entirely to this practice.

The Identification of “Parts of Text”

As described below, it is the recognition of the various “parts of text” in the work by Apollonius that is the basis for the general economy of the ‘commented edition’ produced by Eutocius and the structuration of his commentary. Note from here onwards that in his commentary, Eutocius clearly distinguishes a certain number of parts in *Conics* to which he gives names and to which he refers explicitly. He thus identifies the definitions at the beginning of Book I and those which follow Proposition I.16 by calling them ‘ὅροι’ (definitions) and commenting on them one after the other. Similarly, the different prefaces Apollonius wrote, the cover letter to his dedicatees, are referred to with the term ‘ἐπιστολή’ (letter); the propositions are designated by the term ‘θεώρημα’; the synthetic development which follows I.51 receives the name ‘ἐπίλογος’ (epilogue). Eutocius also refers to the different sections of the proposition by their own names, which he reflects to the reader; the *protasis*, the *ekthesis*, the *demonstration*, the ‘textual figure’ (ἡ ἐν τῷ ῥητῷ καταγραφή). The propositions by Apollonius are given a sequential number in the commentary which considerably facilitates navigation within the treatise. This shows that the assistance given to reading the work by Apollonius starts by the clear identification of the different “parts of text” that structure it.

The implicit content which participates in the validation of the proof finds new visibility in the commentary. The unproven auxiliary theorems used by Apollonius

⁴²For an overview of the principles followed in the exegetical tradition, see, among others, Mansfeld (1994, 1998).

which Eutocius discovers himself or collects from the commentaries of his predecessors are referred to explicitly as ‘lemmas’ and are the subject of their own demonstration in the commentary.

Editorial Work on “Parts of Text”

One can easily imagine that the manner in which Eutocius perceived the structuration of the Apollonian text had a direct bearing on his editorial work. The importance given to the dividing line between the books of the ‘elements’ and the books that followed dictated the boundaries in his own edition,⁴³ with the dramatic consequences that we know. On the other hand, while Eutocius provides an accomplished commentary, he does not comment on the text in a continuous manner. As we will see later, he only provides explanations to a small number of propositions. This preliminary selection and the willingness to include a commentary in the margins of his edition of the text by Apollonius which can clarify its meaning as it is read leads him to take a new factor into consideration: the necessity of spatial correlation between the primary text and the secondary text within the same page.

We should bring to mind here that, in Antiquity, between the second and the fourth centuries, a major change occurred in publishing, which saw the progressive replacement of papyrus scrolls by the codex, the book with pages. This change of support completely changed the conception of “parts of text” in a work. As the new form of book had much greater capacity than the scroll, publishing a text originally written on several scrolls in a codex led to new configurations. At the same time, the codex made new spaces available for paratext, namely the margins at the top and bottom of the page, and at its sides. The preserved remains of manuscripts from the end of Antiquity, like the very existence of the commentary by Eutocius, have led us to assume that these margins could be relatively wide (Irigoin 1994: 77–79).

In a passage in his introduction, Eutocius gives us valuable insight into the presentation of his edition, which helps us understand how the space was distributed between primary and secondary text in a codex page:

Πλείονων δὲ οὐσῶν ἐκδόσεων, ὡς καὶ αὐτός φησιν ἐν τῇ ἐπιστολῇ, ἄμεινον ἡγησάμην συναγαγεῖν αὐτάς ἐκ τῶν ἐπιπτόντων τὰ σαφέστερα παρατιθέμενος ἐν τῷ ῥητῷ διὰ τὴν τῶν εἰσαγομένων εὐμάρειαν, ἔξωθεν δὲ ἐν τοῖς συντεταγμένοις σχολίοις ἐπισημαίνεσθαι τοὺς διαφοροὺς ὡς εἰκὸς τρόπους τῶν ἀποδείξεων.

As there are several editions of the book, as Apollonius himself said in his dedication, I thought it expedient to reunite them into one, by placing in the text the clearest parts of those available to me, for the convenience of the student and by noting in the margins, as is natural, in the commentaries that I wrote, the different types of demonstrations that arose. (Eutocius of Ascalon 2014: 11. 26–31).

On reading this testimony, one can therefore imagine the text by Apollonius in the center of the page and, in the margins, the corresponding explanations by Eutocius. Such a configuration presupposes a clear distinction between the space devoted to the edited text and the text of the commentary. On the other hand, we

⁴³See his preface to Book IV.

can assume that the exegetical part was read almost facing the passage from *Conics* it concerned. Here, we grasp the editors' obligation to create a real strategy for the page layout.⁴⁴ Add to these constraints the fact that the margins had to accommodate the figures belonging to the commentary without the possibility of confusion with the figures in the edited text. They also had to offer the space necessary for the large figures demanded by Apollonius as well as by the commentary by Eutocius for the representation of a hyperbola with two branches and the representation of conjugate hyperbolae. The fact that, when the two texts were later separated, no mistakes had been made, other than an inversion of the commentaries to Propositions I.44 and 45, allows us to conclude that the separation between "parts of text" was perfectly mastered in the original edition as well as in the surviving copies.

The division of the page into regulated spaces, from which communication must be articulated, is confirmed by the uses observed in the commentary to refer to the edited text: (1) the commentary on each proposition is preceded by a title which refers to the sequence number of the proposition in Apollonius; for example, 'Εἰς τὸ δ' (in Proposition 4). (2) When Eutocius comments on a "part of text" of another type, he refers to it, as we have already noted, by a specific title, as in the title given in the development which follows Proposition I.51: 'Εἰς τὸ ἐπίλογον' (in the epilogue). This title, absent from the Apollonian text, is a type of metadiscourse, and sheds light on the representation the commentator makes of the "parts of text" found in the author's work. (3) When Eutocius does not devote a global commentary to a proposition but wants to explain a particular sequence, he segments his own text by reserving the start of his commentary to the reprise of the first few words or the totality on the Apollonian sequence (the lemmas, in the literary sense). (4) When the reader is referred to Apollonius' edited text, it is the specific term that is used: 'τὸ ρητόν'. The commentator can even go further in the back-and-forth between the edited text and the commentary: in certain of his own demonstrations, we see him draw directly on part of the juxtaposition of the two texts, to ask the reader to work on one "part of text" in the commented treatise—in this instance, the figure in Apollonius—so that he could lighten his commentary and economize by one figure (Eutocius of Ascalon 2014: 171)!

"Parts of Text" and the Structuration of the Commentary

The physical requirement of matching the primary and secondary text within the page of the codex obviously exercised an influence on the very structuration of the commentary by Eutocius, which yields to the segmentation in the text by Apollonius.

First and foremost, Eutocius respects *Conics*' division into books, as he organizes his own commentary in relation to this division. Each of the books by Apollonius is the subject of a specific commentary, which Eutocius precedes with a preface in which he enters into a dialogue with his dedicatee and friend Anthemius.⁴⁵

⁴⁴The fourteenth-century Byzantine manuscript *Parisinus graecus* 2342 gives a concrete example of the deployment of this type of strategy in copying the commentary.

⁴⁵Almost certainly the celebrated architect Anthemius of Tralle; see Eutocius of Ascalon (2014: XII–XIII).

It is also clear that the selection that Eutocius had previously made for the “parts of text” in *Conics* served as the basis for the general organization of his commentary. Firstly, he offers a long preamble, with no textual interruption, devoted to the presentation of the treatise⁴⁶; its length leads us to assume that this development proceeded the start of the text by Apollonius and opened the ‘commented edition’. It would not, therefore, have been written in the margin. It ends after the short development that introduces the commentary on the *First Definitions*. It is followed by the commentary on the three *First Definitions* and on the propositions chosen (in total, thirty-nine of the sixty propositions in Book I, nine of the fifty-three in Book II, twenty of the fifty-six in Book III and three of the fifty-seven in Book IV). Eutocius provides relatively accurate historical and mathematical explanations throughout this work and makes remarks that justify both the reasoning by Apollonius and his own editorial choices.

We should add to this exegetical body the summaries devoted to the three groups of Propositions 1–13, 14–16 and 17–60 in Book I. The distinction between these three groups is not Apollonian in origin and is not represented by the articulation found in *Conics*; it is based strictly on the personal judgement of Eutocius the mathematician. Here we see that the commentator’s text creates new “parts of text” within the author’s own text.

6.5.2 “Parts of Text” and Editorial Manipulation

Conics, as passed down in the ‘commented edition’ by Eutocius, offers, as we have seen, the possibility of accurately comparing how the author and commentator used “parts of text” in the context of a scientific Greek work from Antiquity. It has provided enough concrete elements for us to judge the role of the “parts of text” in the context of two perfectly coherent projects, both scientific and editorial, that of the author who presents an official version of his work to the public and that of the commentator who wishes to provide a new edition.

But the “parts of text” have also played a key role in the process of transmission which have progressively contributed to the degradation of the initial coherences.

We have already seen this in the fate reserved for the last book in *Conics*, devoted exclusively to problems relating to Book VII. To this we can add the fact that the initial form of the ‘commented edition’ by Eutocius has not been conserved.

⁴⁶The biographical information on Apollonius (1), the information on the history of conical sections. (2), the warning by Eutocius on the nature of his edition and the method of working employed (3), then the commentary of the letter-preface by Apollonius (4) and finally the short introduction to the commentary of the *First Definitions* (5) make up the different sections. The continuity of the discourse, which is assured by the liaison particles, makes this group a very separate textual unit from the rest of the commentary.

The two “parts of text” (the treatise by Apollonius and the commentary by Eutocius) were later separated and associated with different corpuses in the Medieval manuscript tradition.⁴⁷ It can even be assumed that the rigor with which the copyist of the examples of the ‘commented edition’ divided them on the page authorized the detachment of the commentary; such division preserved the exegetical part of the edition by Eutocius but put an end to the interaction intended by the commentator. The scientific logic of one project has been substituted by another, that of integrating two major works into thematic units useful for teaching.

“Parts of text” have been at the center of other types of editorial manipulation. Comparative analysis of Greek and Arabic sources, both direct and indirect, allows us to make an assessment of the progressive diversification of the text to the advantage of interventions by the readers and the editors. The statements by Apollonius have not been affected, as their complexity has kept them safe from rewriting, but the more “operational” parts of the text have, like the chains of calculation within the demonstration, the internal references, the presentation of the different cases and the figures themselves. As textual units, the propositions are also subject to re-composition. *Conics* is far from being unique in this respect.⁴⁸ In different branches of the manuscript tradition, they are sometimes divided or, on the contrary, reunited anew.

All these interventions show how “parts of text” in Greek scientific writing have also been at the heart of the editorial and exegetical work of later recensers.

Appendix

“Parts of text” in the propositions in *Conics*: The example of I.19

Ἐν πάσῃ κώνου τομῇ, ἥτις ἂν ἀπὸ τῆς διαμέτρου παρὰ τεταγμένως κατηγμένην ἀχθῇ, συμπεσεῖται τῇ τομῇ.

Ἐστω κώνου τομὴ ἥς διάμετρος ἡ AB· καὶ εἰλήφθω τι σημεῖον ἐπὶ τῆς διαμέτρου τὸ B, καὶ διὰ τοῦ B παρὰ τεταγμένως κατηγμένην ἤχθω ἡ BG.

Λέγω ὅτι ἡ BG ἐκβαλλομένη συμπεσεῖται τῇ τομῇ.

Εἰλήφθω γάρ τι σημεῖον ἐπὶ τῆς τομῆς τὸ Δ· ἔστι δὲ καὶ τὸ A ἐπὶ τῆς τομῆς· ἡ ἄρα ἀπὸ τοῦ A ἐπὶ τὸ Δ ἐπιζευγνυμένη εὐθεῖα ἐντὸς πεσεῖται τῆς τομῆς.

Καὶ ἐπεὶ ἡ ἀπὸ τοῦ A παρὰ τεταγμένως κατηγμένην ἀγομένη εὐθεῖα ἐκτὸς πίπτει τῆς τομῆς, καὶ συμπίπτει αὐτῇ ἡ AΔ, καὶ ἔστι τῇ κατηγμένην παράλληλος ἡ BG, καὶ ἡ BG ἄρα συμπεσεῖται τῇ AΔ· καὶ εἰ μὲν μεταξὺ τῶν A, Δ σημείων, φανερόν ὅτι καὶ τῇ τομῇ συμπεσεῖται· εἰ δὲ ἐκτὸς τοῦ Δ ὡς κατὰ τὸ E, πρότερον τῇ τομῇ συμπεσεῖται.

⁴⁷The commentary by Eutocius became part of the corpus known as the ‘Little Astronomy’.

⁴⁸For examples in the tradition of Euclid, see Vitrac (2004).

Ἡ ἄρα ἀπὸ τοῦ Β παρὰ τεταγμένως κατηγμένην ἀγομένη εὐθεῖα συμπεσεῖται τῇ τομῇ. (Apollonius of Perga 2008: 76.9–78.8)

<Protasis> In every section of a cone, any straight line drawn from the diameter parallel to an ordinate will meet the section.

<Ekthesis> Let there be a section of a cone whose diameter is AB, and let some point B be taken on the diameter, and through B, let BΓ be drawn parallel to an ordinate.

<Diorism> I say that the continuation of BΓ will meet the section.

<Construction> Let some point Δ be taken on the section; but A is also on the section; therefore, the straight line drawn from A to Δ will fall within the section.

<Demonstration> Since a straight line drawn from A parallel to an ordinate falls outside the section, and a straight line AΔ meets it, and BΓ is parallel to the ordinate [anaphora], therefore BΓ will also meet AΔ. And if it meets AΔ between A and Δ, it is evident that it will also meet the section; if it meets it beyond Δ as at E, it will first meet the section.

<Conclusion> Therefore the straight line drawn from B parallel to an ordinate will meet the section.

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Chapter 7

Text Segmentation, Chapter Naming and the Transmission of Embedded Texts in South Asia, with Special Reference to the Medical and Philosophical Traditions as Exemplified by the *Carakasamhitā* and the *Nyāyasūtra*



Karin Preisendanz

Abstract This chapter addresses the large issue of the practice of text segmentation—formal or functional and semantic or content-related—and its various modes and devices, in the context of oral instruction and the study and transmission of text through recitation and memorization in the traditional, predominantly oral Sanskrit culture of South Asia, as well as in the context of the written transmission of Sanskrit texts in South Asian manuscripts. Here, attention is also paid to the implications of practices of text segmentation for the transmission of embedded texts in commentaries as well as to related modes of quotation and text-internal reference. Another major topic is the related issue of the practice of chapter naming—generic and specific—descriptive—treated under various aspects, such as linguistic strategies and semantic preferences, and the social context and function of a text. The chapter further considers the nature of text-internal and text-external surveys of content, which may include lists of text

Research for this chapter was made possible by the generous support of the FWF (Austrian Science Fund) in the context of FWF projects P23330-G15 and P24388-G15. It has also received funding from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013)/ERC Grant Agreement No. 269804. The chapter was first presented as a paper at a seminar on "History of Science, History of Text: Parts of Texts" organized in the context of the mentioned ERC Advanced Grant research project "Mathematical Sciences in the Ancient World" (Agreement No. 269804) on May 12, 2012. The paper greatly benefited from the remarks, suggestions and questions of the colleagues who participated in this seminar and in the two follow-up workshops where its revised and enlarged version as a chapter of the present volume was presented. My special thanks go to Karine Chemla, the inspiring principle investigator of the project, to Florence Bretelle-Establet and Stéphane Schmitt, the editors of the present volume, and to Christine Proust, Agathe Keller, Micheline Decorps-Foulquier, Julie Lefebvre and Mathieu Ossendrijver.

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segments, numerical and quantitative information, characterizations of content and explanations of the names of text segments, especially in terms of their relevance for our knowledge of the historical development of a given text. The practices of both text segmentation and chapter naming are discussed with reference to texts belonging to the oldest corpus of orally transmitted religious texts of the Brahminical tradition, to the epic genre and to the scientific genre exemplified by works on socio-religious norm, medicine and philosophy.

Abbreviations

ĀD	<i>Āyurvedadīpikā</i> , edited in Jādavaji Trikamji Āchārya (1941)
ĀDhS	<i>Āpastambadharmasūtra</i> , edited and translated in Olivelle (2000)
BṛD	<i>Bṛhaddevatā</i> , edited and translated in MacDonell (1904)
Ci	Cikitsāsthāna of the <i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941)
CS	<i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941)
CS (CE)	<i>Carakasamhitā</i> (Vimānasthāna 8), critically edited in Preisendanz et al. (forthcoming)
HV	<i>Harivaṃśa</i> , critically edited in Parashuram Lakshman Vaidya (1969–1971)
Ka	Kalpasthāna of the <i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941)
MBh	<i>Mahābhārata</i> , critically edited in Sukthankar et al. (1933–1966)
NBh	<i>Nyāyabhāṣya</i> , edited in Thakur (1997)
Ni	Nidānasthāna of the <i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941)
NS	<i>Nyāyasūtra</i> , edited in Thakur (1997)
Si	Siddhisthāna of the <i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941)
Sū	Sūtrasthāna of the <i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941)
Vi	Vimānasthāna of the <i>Carakasamhitā</i> , edited in Jādavaji Trikamji Āchārya (1941), Chap. 8 critically edited in Preisendanz et al. (forthcoming)

7.1 Introduction

In 1957, the great French Sanskritist Louis Renou inaugurated the newly founded Indo-Iranian Journal with an admirably broad and insightful paper on ‘Les divisions dans les textes sanskrits’.¹ In a further paper on the form of some Sanskrit texts, Renou also addresses the issue of text segmentation and architecture, with reference

¹See Renou (1957a).

to four scientific works belonging to different areas of traditional knowledge: the *Viṣṇusmṛti* (law), the *Nirukta* (etymology), Kauṭilya's *Arthaśāstra* (statecraft and economics) and the *Brahmasūtra* (philosophy).² More recently, Klaus Karttunen has addressed the issue of text division in a short paper in which he compares this practice in classical antiquity and India.³ However, in spite of the auspicious beginning in the form of Renou's excellent contribution, a comprehensive study on the vast topic of text segmentation and chapter naming in Sanskrit works does not yet exist. I am also not aware of any broadly conceived studies focused on the issue relating to a specific literary genre or historical period. The following essay aims to present a general introduction to the topic before the background of traditional South Asian literary culture. Within this larger aim, special reference will be made to text segmentation and chapter naming in early-classical and classical scientific literature, as exemplified by two foundational works of the medical and philosophical traditions, the *Carakasamhitā* and the *Nyāyasūtra*. Among the two, the latter work is also an interesting case for the transmission of an embedded text. As will be seen, many features of the issue at hand that will be pointed out for these two works are rooted in earlier cultural practices or are better understood in their significance before this general background.

7.2 The Dominance of Orality Over Writing in South Asian Sanskritic Culture

From its very beginning, South Asian culture was a pronounced oral culture, and in spite of the introduction of writing, first documented in the third century BCE⁴ in the context of state administration and policy through the Aśokan inscriptions,⁵ the traditional Sanskritic culture of the subcontinent continued to put great emphasis on orality in many contexts, foremost in the religious context, but also in the context of the various branches of learning that arose in the wake of the composition and compilation of the oldest religious oral literature of South Asia, the Vedic corpus, and further developed in its milieu. The practice of learning religious and scientific texts by heart through recitation under the guidance of a teacher traditionally

²See Renou (1961).

³See Karttunen (2011).

⁴Ever since the publication of Falk (1993a), the *communis opinio* in South Asian Studies, at least outside India, very much tended towards the assumption that this time was also the time of the introduction of writing in South Asia. However, doubt has again and again been cast on this assumption. For a recent careful discussion of some relevant aspects and arguments, see Hartmann (2016: 15–27). See also Deshpande's (2011: 57–59) judicious judgment, with special reference to the issue whether Pāṇini, whose Sanskrit grammar predates the Aśokan inscriptions (see Note 36), was familiar with the practice of writing. On evidence for this practice in the background of the oral composition and transmission of his grammar, see Deshpande (2011: 89–94).

⁵For a concise exposition on the various issues involved here, with a focus on the pillar inscriptions, see Falk (1993b).

precedes the obtainment of any instruction on the contents of a particular work and thus its actual study with the aim of intellectually grasping and fully understanding its meaning and ideas.⁶ Until today, the practice of memorization and recitation of texts parallels the use of written resources such as manuscripts⁷ or printed books. In the orthodox-Brahminical cultural environment, memorized knowledge is esteemed much higher than written-down knowledge: knowledge by heart is preferred to knowledge where one refers or points to some written source, and knowledge obtained orally from a teacher is valued more than knowledge acquired from a written source. Recitation with the help of a written (*likhita*)⁸ text was looked down upon,⁹ and ‘obedience to a book’ (*pustakaśūsrūṣā*) was even considered an obstacle to knowledge and learning.¹⁰ An often quoted proverb says that knowledge contained in a book (*pustakasthā vidyā*) is like capital that is in somebody else’s hand; when the time for action comes, it may not be readily available. Thus, it is not really knowledge, just as the capital is not really capital.¹¹

Similar to the orthodox-Brahminical transmission of the corpus of Vedic texts, which is traditionally considered to have been impersonally revealed to the seers of yore, the early transmission of the Buddhist canon in South Asia was an oral one. Within the early monastic community, it was placed into the hands of specialists to

⁶See the report on this sequence of study in the field of Sanskrit grammar by the late seventh-century Chinese pilgrim to India I Tsing, referred to by Pant (1979: 26) and translated by Takakusu (1896: 172–178).

⁷I Tsing (see Note 6) refers to the oral transmission of the Veda at a time when manuscripts were widely in use and to the idea that repeated memorization leads to the development of the intellect; see Takakusu (1896: 183).

⁸Literally: ‘scratched, scraped’. For this and other terms in Sanskrit referring to writing, see Falk (2010: 208–210).

⁹‘One who recites something written’ (*likhitapāṭhaka*), i.e., a person who recites from a written text before him, is one of the six types of awfully bad reciters (*pāṭhakādhamā*) listed in *Pāṇinīyaśikṣā* 32. The other five types are persons who recite in a singing manner or rapidly, shake their head while reciting, do not know the meaning of what they recite, and have a low voice. See *Pāṇinīyaśikṣā* 32, as quoted by Pant (1979: 7, note 3): *gūṭi śīghrī śīraḥkampī tathā likhitapāṭhakaḥ / anarthajño ’lpakaṇṭhas ca ṣaḍ ete pāṭhakādhamāḥ* // See also Deshpande (2011: 64–65) on this stanza.

¹⁰See Nārada as referred to in the *Smṛticandrikā* (Saṃskārakāṇḍa), quoted by Pant (1979: 8, note 4): *dyūtaṃ pustakaśūsrūṣā nātakāsaktir eva ca / striyas tandrī ca nidrā ca vidyāvighnakarāṇi ṣaṭ* // *Nāradaśikṣā* 2.8.30, as quoted by Falk (2010: 212), reads differently: *dyūtaṃ pustakavādyaṃ ca nātakeṣu ca saktikā / striyas tandrā ca nidrā ca vidyāvighnakarāṇi ṣaḍ* // According to the latter version, instead of ‘obedience to a book’ ‘speech based on a book’, that is, reading loudly from a book (?), would be an obstacle to knowledge. Further obstacles are playing dice, attaching oneself to actors, women, lassitude and sleep. The word *pustaka* (‘book’) is probably a loan word from Persian and derived from a word meaning ‘leather’ or ‘skin’. It does not appear in South Asian literature before the early centuries CE. See Scharfe (2002: 12–13) and Falk (2010: 212). On various other views on the meaning and origin of the word *pustaka*, see Falk (1993a: 305–306).

¹¹See the stanza cited by Pant (1979: 8, note 5): *pustakasthā tu yā vidyā parahastagataṃ dhanam / kāryakāle samāyāte na sā vidyā na tad dhanam* // With the variant *samutpanne* for *samāyāte*, it is also cited by Plofker (2015: 179) from *Cāṇakyanūtiśāstra* 16.20. On the negative attitude towards the use of manuscripts in studying and learning, see further von Hinüber (1990: 10, with references).

ensure that the word of the Buddha would be preserved faithfully.¹² The eventual commitment of the oral texts to writing in the first century BCE in Ceylon was looked upon with a slightly negative attitude. Thus, a commentator on the Singhalese chronicle *Mahāvamsa* attributes the acknowledged necessity of this mode of preserving the texts to the decline of both the human lifespan and intellect in the Kali Age, the present age characterized by overall degeneration which in his view endangers the proper continuation of the established oral tradition.¹³ However, the different circumstances of the textual transmission within the Buddhist tradition led to a much earlier and much more enthusiastic embracement of literacy in Buddhist circles. This attitude led rather soon, approximately in the early centuries CE, to the development of a book cult¹⁴ which was accompanied by a general high esteem of written sources of the tradition. Even so, the practice of memorization and recitation of canonical and other texts continued,¹⁵ and some parts of the Buddhist canon in South Asia, namely, the collection of monastic rules and their casuistry (Vinaya), were probably preserved mainly orally for quite some time. We know from Fa Hsien's travel report that this early fifth-century Chinese pilgrim-traveler to the Buddhist monasteries and sites of South Asia evidently had a difficult time to get hold of manuscripts containing the monastic codes of the various Buddhist congregations so that he may carry them back to China for translation.¹⁶

7.3 Text Segmentation

7.3.1 Text Segmentation and Segment Names in the Oral Tradition of the Veda

In the orthodox-Brahminical tradition, before the introduction of writing in South Asia and even afterwards, due to the negative attitude towards writing much emphasis was put on the development of appropriate methods for memorizing and reciting large amounts of text. Sophisticated tools and techniques were developed especially to ensure the impeccable oral preservation, syllable by syllable and complete with all accents, of the Vedic corpus of religious and ritual texts.¹⁷

¹²On the early oral transmission of texts in the Buddhist context, see von Hinüber (1990: 67–70).

¹³See *Mahāvamsaśīkā* II 623,10f., referred to by von Hinüber (1990: 63). See also Hartmann (2016: 36–37) on two verses in the oldest Singhalese chronicle called *Dīpavamsa* where the purpose of writing down the canonical texts is said to be their preservation at a time of beginning human decline.

¹⁴See von Hinüber (1990: 71).

¹⁵See the detailed description of individual and joint ceremonial recitation in Buddhist monasteries of the seventh century by I-Tsing, translated by Takakusu (1896: 152–166).

¹⁶See Scharfe (2002: 24–25). See the translations of this part of Fa-Hsien's report by Legge (1886: 98–100) and Giles (1923: 64–65).

¹⁷On the past and present-day practice of memorization of the four Vedas, together with some particular texts closely associated with them, and on some technical aspects, such as continuous vs. word-by-word recitation and the so-called modifications designed as mnemotechnical tools, see Scharfe (2002: 242–248).

Furthermore, the mass of oral material comprised in this corpus must have necessitated the early introduction of some kind of suitable architecture and segmentation within the larger collections constituting this corpus, to facilitate the organized memorization and study of manageable chunks of text, versified and in prose. A structure thus imposed upon the textual material may also have supplemented other means of reference to various parts of the text in the course of oral instruction. However, it is difficult to ascertain when precisely such an organization of the textual material occurred, and in many cases more than one way of segmenting a particular text has been transmitted.

Among the large textual divisions of the Vedic corpus and among the four Vedas properly speaking, traditionally considered as a single impersonal and eternal revelation, the *Rgveda* ('The Knowledge of the Stanzas of Praise') provides a good example. It is the earliest monument of South Asian literature consisting of altogether 1,028 hymns (*sūkta*)¹⁸ with 10,462 stanzas of praise (*rc*) and seems to have been organized in ten 'cycles' (*maṇḍala*-s)¹⁹ of hymns from a rather early time onwards. The ten unnamed cycles were compiled following several criteria. Among these, (1) the criterion of authorship stands out. Thus there are several cycles with groups of hymns composed by seers belonging to different families of poet-priests, and cycles with hymns ascribed to members of just one such family that may have occupied a dominant position. This feature probably has to be seen as the reflection and outcome of individual preferences of the hereditary professional groups of priests who used the hymns in ritual and were responsible for this organization of the text. (2) A further criterion is that of the function of particular hymns on account of their content. Thus we have a cycle consisting entirely of hymns that address Soma, a plant used in many rituals and—deified as a liturgical deity—itself at the center of rituals, and poetically describe the ritual activities connected with it. (3) Still another criterion is that of content. This criterion seems to have been applied in the case of a cycle of historically later hymns that formulate new ideas and touch upon topics and contexts not addressed in the bulk of the earlier hymns. In this cycle, we find proto-philosophical hymns, that is, hymns with metaphysical and theological reflections in the context of cosmogony and ritual, hymns expressing facets of popular religious belief, and hymns with literary themes in the broadest sense. Within the ten cycles, the hymns are arranged individually in several coherent and ordered, but unnamed series according to a number of content-related and formal principles, and following some special tendencies.²⁰

¹⁸Literally: 'something well/beautifully spoken'.

¹⁹The word *maṇḍala* literally refers to something round, like a disk, circle or ring.

²⁰See Oldenberg (1888: 191–270), building upon Abel Bergaigne's earlier foundational research on this issue. For a more recent concise account and historical analysis, see Oberlies (2009a: 627b–628a).

Originally, cycles two to seven, which are exclusively composed of hymns attributed to authors belonging to a particular family of poet–priests, were probably arranged according to their length, in ascending order.²¹ They are flanked by cycles one and eight which comprise hymns by members of various families. These eight cycles are followed by the thematically focused liturgical Soma cycle. The final, tenth cycle is characterized by hymns with rather diverse topics and functions; it is of special interest because many of them are expressions of innovative and highly original thinking, such as on matters of religion and ritual, and of the conceptualization of novel world views. As for criteria guiding the internal arrangement of the cycles, for example hymns to the most important gods may come first, in a specific order determined by the perceived rank of the addressed gods, with the longer hymns among them, that is, those with the higher number of stanzas, preceding the shorter ones. Apart from the ten cycles, a formal subdivision into eighty-five numbered ‘recitations’ (*anuvāka*) of uneven size was superimposed upon the cycles, respecting their boundaries and even the structure of the hymns.²² Both types of division, ‘cycle’ (*maṇḍala*) and ‘recitation’ (*anuvāka*), are already referred to by name in the Anukramaṇī-s of the *Ṛgveda*, such as the *Bṛhaddevatā*.²³ Anukramaṇī-s are basically catalogues, registers or lists that provide detailed information—supplemented by related myths and legends—on the content of this collection of hymns and of other collections. The information is organized according to the subjects of the hymns, like the deities addressed in them, the meters employed in their composition, and their traditional authors. The Anukramaṇī-s thus achieved the status of canonical commentaries.²⁴ Composed approximately between the fifth and third century BCE, i.e., most probably before the introduction of writing in South Asia, the Anukramaṇī-s of the *Ṛgveda* generally follow its division described above, which is the one observed in the contemporary oral tradition as well as in the manuscripts.²⁵ The manuscripts themselves may actually be considered examples of a material segmentation of the larger corpus of the *Ṛgveda* and the entire Vedic corpus. In the context of the oral transmission of these corpora, the counterpart of this segmentation would clearly be a temporal segmentation conditioned in innumerable ways by the modes of the performance of the oral text, that is, a segmentation due to the various concrete occasions and situations where text from among these corpora is recited, such as the teaching of text and content, learning text by heart through repeated recitation,

²¹On this principle, see Renou (1957a: 2).

²²See Renou (1957a: 3).

²³See, e.g., BrD 5.103 (referring to the sixth *maṇḍala* as that of the poet–priest Bhāradvāja and his sons); 6.39 (referring to the eighth *maṇḍala* attributed to Pragātha, son of Ghora and brother of Kaṇva, and members of his family); 6.130 (characterizing the ninth *maṇḍala* as being addressed to Soma); 6.146 (referring to the seven *anuvāka*-s of the ninth *maṇḍala*). On the *Bṛhaddevatā*, see especially Patton (1996).

²⁴On the Anukramaṇī genre, with special emphasis on the *Bṛhaddevatā*, see Patton (1996: 6–12 and 27–35).

²⁵See Winternitz (1909: 244 = 1981: 267).

practicing and studying text, its employment in ritual and its presentation in competitive performance.

A further, historically clearly later division of the text of the *Ṛgveda* is a formal one. It takes the amount of text to be learnt, that is, memorized and recited by heart, for its guideline. According to this segmentation, there are eight ‘octads’ (*aṣṭaka*), each with eight large text segments meant for repeated recitation, the ‘portions for recitation’, ‘study portions’ or ‘lessons’ (*adhyāya*).²⁶ The latter are further subdivided into sixty ‘questions’ (*praśna*) each, usually consisting of three stanzas, and into ‘groups’ (*varga*) comprising an average of five stanzas.²⁷ There are numerous other examples of formal textual segmentations that were superimposed for pragmatic reasons, namely, for the well organized and absolutely reliable oral performance and preservation of the text, upon content-related segmentations of the individual texts of the Vedic corpus or upon existing formal segmentations that had been introduced earlier on for the same functional purpose.²⁸ Louis Renou calls the former segmentations ‘mechanical divisions’,²⁹ the latter ‘semantical divisions’.³⁰ The case of the segmentation of the *Atharvaveda* in its two preserved ‘branches’ (*śākhā*), or recensions, is especially complex. Here, Renou suggests a further pragmatic reason for the introduction of an intricate division of text relating to its recitation, namely, the desire to elevate this less respected and to some extent disreputable fourth Veda by means of increasing sophistication to the same level of general orthodox appreciation, respect and veneration as was enjoyed by the *Ṛgveda*.³¹ Next to the names for various text segments already mentioned above, we encounter further names here, such as ‘internode’ (i.e., ‘section’) (*kāṇḍa*)³² and ‘portion to be recited loudly’ (i.e., ‘lecture’) (*prapāṭhaka*),³³ ‘troop’ (i.e., ‘cluster’) (*gaṇa*) and ‘little stick’ (i.e., ‘short text sequence’) (*daṇḍaka*),³⁴ ‘period hymn’ (*paryāyasūkta*) and ‘subject-matter hymn’ (*arthasūkta*), and ‘period’ (*paryāya*).³⁵

²⁶On the presentation and treatment of these two types of text segments in the architecture of Sāyaṇa’s commentary on the *Ṛgveda*, see below, Note 128.

²⁷See especially Renou (1957a: 2–3), further Scharfe (2002: 245 and 248–249) and Oberlies (2009a: 628a).

²⁸See Scharfe (2002: 250) and, for a comprehensive treatment with many informative details and salient remarks, Renou (1957a: 5–18).

²⁹See Renou (1957a: 2).

³⁰See Renou (1957a: 18).

³¹See Renou (1957a: 4–5).

³²The word also refers to an internode, or section between the nodes, of the stem of a plant, especially of sugarcane and bamboo; this may actually be its primary meaning. See Mayrhofer (1992: 336–337).

³³This word is derived from the verbal root $\sqrt{pāth}$, meaning ‘to recite, read’, with the preverb *pra-* (‘forth, forward’).

³⁴The etymology of the word *daṇḍa*, which refers to a stick or staff made of a tree branch, is unclear.

³⁵See Whitney and Lanman (1905: General Introduction, Part II, 9 [‘The Divisions of the Text’] = pp. CXXVII–CXL); on the ‘periods’ and ‘period hymns’, see especially pp. CXXXIII–CXXXVII. For a concise exposition of the segmentation of the *Atharvaveda*, see also Oberlies (2009b: 658).

The textual division of the *Atharvaveda* in its Paippalāda recension, as laid out in an ancillary work of this Veda, the *Karmapañjikā*, has an additional segmentation into ‘feet’ (i.e., ‘quarters’) (*pāda*)³⁶ and ‘small sections’ (*kaṇḍikā*).³⁷

From the above examples it can be seen that in the Vedic corpus text segments are designated with a variety of formal or functional terms, some of which relate to the concrete performance of the text in recitation (e.g., ‘recitation’ [*anuvāka*] or ‘portion to be recited loudly’ [*prapāṭhaka*])³⁸ or to the organization of its memorization through recitation and study (e.g., ‘study portion’ [*adhyāya*] or ‘question’ [*praśna*]).³⁹ Others were developed as technical terms through the metaphorical application of words referring to various kinds of material segments (e.g., ‘internode’ [*kāṇḍa*])⁴⁰ and ‘little stick’ [*daṇḍaka*]), groupings (e.g., ‘group’ [*varga*])⁴¹ and ‘troop’ [*gaṇa*]) and configurations (e.g., ‘cycle’ [*maṇḍala*]).⁴² Still others, which could be styled ‘numerical terms’, refer directly to the distinctive number of text segments contained in a particular larger segment designated in this way (e.g., ‘octad’ [*aṣṭaka*]), or, in the case of the term *pāda* (‘foot’, ‘quarter’), originally

³⁶Renou (1957a: 15, note 43) points out that the word *pāda*, derived from Vedic *pād*, ‘foot’, is used in the sense of ‘portion’, referring to a metric ‘foot’, already in the *Rgveda* itself and from there was eventually used—in a further metaphorical application—to refer to a quarter, a usage first observed in the *Śatapathabrāhmaṇa*. As the text of the Paippalāda recension of the *Atharvaveda* and some of its ancillary works, such as the *Karmapañjikā* (see Note 37), had not yet become fully available to modern scholarship, Renou assumed that the name *pāda* for a text segment first came into use with Pāṇini’s Sanskrit grammar, called the *Aṣṭādhyāyī* (‘[treatise] consisting of eight study portions’), and that this usage may even have been created by the great grammarian. He therefore considered the employment of the term *pāda* in two ancillary works of the *Atharvaveda* a secondary feature inasmuch as their authors here related to the use of this—possibly innovative—term for a text segment of the *Aṣṭādhyāyī*. See Renou (1957a: 15) and the discussion by Griffiths (2003: 29). The date of Pāṇini’s grammar cannot be later than the middle of the fourth century BCE; see Cardona (1976: 3.1.1–7 = pp. 260–268).

³⁷On the textual division of the *Atharvaveda* in its Paippalāda recension according to the Vedavratavidhi section of the *Karmapañjikā*, see Griffiths (2003), especially pp. 26 (on the *kaṇḍikā*-s) and 28–29 (on the *pāda*-s). An actual segmentation of the text similar to that into the *prapāṭhaka*-s of the Śaunaka recension can be discerned in the manuscripts of the text of the Paippalāda recension. However, the term itself does not appear in the latter or in the *Karmapañjikā* and this segmentation may therefore have been adopted secondarily; see Griffiths (2003: 29–31). On further examples in Vedic literature of the diminutive *kaṇḍikā* as the name of a sub-segment of a text, see Karttunen (2011: 6, note 12). The word may be derived from a verbal root *√kaṇḍ* ‘to thresh’.

³⁸See Karttunen (2011: 6, notes 14–15) for some further examples in Vedic literature where these terms are used for text segments at different levels of segmentation.

³⁹For some examples of Vedic and Sanskrit works where the major segments or first-level sub-segments of the text are called *adhyāya*, and for examples of the term *praśna* used as a designation of major text segments, see Karttunen (2011: 5, note 10, and 6, note 19).

⁴⁰For *kāṇḍa* as a name for the major segments of some Vedic and Sanskrit texts, see Karttunen (2011: 6, note 11).

⁴¹On *varga* as a common name for text segments in works on lexicography, see Karttunen (2011: 7, note 28).

⁴²See above, Note 19.

allude by way of metaphor to the number of segments of a larger whole, namely four, that are designated with that particular numerical term.⁴³ Some terms refer to the literary genre to which the thus designated text segments belong (e.g., ‘hymn’ [*sūkta*] and ‘stanza of praise’ [*rc*]).⁴⁴ In the other two Vedas, not addressed here, one also encounters the designation of text segments with terms relating to their relative position or order in the text. For example, in the *Sāmaveda* the first of its two large parts is called ‘[the text segment] relating to the stanzas of praise’ (*ārcika*) and has itself two large segments called ‘the earlier [text segment] relating to the stanzas of praise’ (*pūrvārcika*) and ‘the later [text segment] relating to the stanzas of praise’ (*uttarārcika*). Similarly, the *Vājasaneyisaṃhitā* of the White Yajurveda, in its Mādhyamīna recension, shows traces of a division in an ‘earlier half’ (*pūrvārdha*) and a ‘later half’ (*uttarārdha*), whereas the *Maitrāyaṇīsaṃhitā* of the Black Yajurveda is segmented into three large ‘sections’, called ‘the first section’ (*prathamakāṇḍa*), ‘the middle section’ (*madhyamakāṇḍa*), and ‘the section on top’ (*uparikāṇḍa*).⁴⁵ These positional and ordinal designations must refer to the temporal position and order of the segments in the practice of recitation. They do not per se imply a spatial or physical position of the text segments which would point at the use of manuscripts in some form.⁴⁶ The naming practices for segments of the Brāhmaṇa-s, the comprehensive proto-scientific works composed by the Vedic ritual and exegetical specialists, provide some additional terms that relate in normal, non-metaphorical use to material segments, such as ‘piece’ or ‘fragment’ (*khaṇḍa*),⁴⁷ and numerical terms, such as ‘pentad’ (*pañcīkā*). Furthermore, text segments may be generically called as the text of which they are segments, i.e., in the case of the *Śatapathabrāhmaṇa*, ‘The Brāhmaṇa of a Hundred Paths’, its hundred ‘portions for recitation’ or ‘lessons’ (*adhyāya*) are further segmented into a total of 438 *brāhmaṇa*-s.⁴⁸ The word *brāhmaṇa* has been interpreted as a derivation

⁴³See above, Note 36. As has been shown by Renou (1957a: 15–16), who adduces a large number of examples from classical Sanskrit literature, the technical term *pāda* was adopted mainly to segment works in the field of the grammatical science. Furthermore, it was employed in the segmentation of some foundational philosophical works composed in the *sūtra* style (see below, Sect. 7.3.2). In the course of time, however, the original connection with the number four came to be ignored.

⁴⁴See above for these text segments.

⁴⁵See Renou (1957a: 7–8), also for the similar segmentation of the *Kāṭhaka* and *Kaṣiṭhalasaṃhitā* of the Black Yajurveda.

⁴⁶The complementary pronominal adjectives *pūrva* and *uttara* indicate a relative position in space and time: ‘being in front’, ‘eastern’, ‘previous, earlier’, ‘former, anterior, antecedent’ vs. ‘upper, higher’, ‘northern’, ‘later, following, subsequent’. Similarly, the adjective *madhyama* (‘middle’) is used in a spatial and temporal sense. The same applies to the adverb *upari* (‘on top, above, upon’, ‘at the end’, ‘beyond’ and ‘after’) which is frequently used as a preposition.

⁴⁷See the works adduced by Karttunen (2011: 7, note 25).

⁴⁸See Renou (1957a: 11–12) on the phenomenon of naming text segments after the name, or part of the name, of the text of which they are segments, which continues into the segmentation practice of later Vedic and classical Sanskrit literature (28).

from the word *brahmán* ('ritual specialist'), meaning 'related to a ritual specialist', and would thus serve as the designation of text segments meant for the use by ritual specialists or composed by rituals specialists. As a—much more probable—derivation from the related word *bráhman*, it would refer to text segments that are related to, i.e., concerned with *bráhman*, the solemn poetic articulations or formulations of truthful reality, in all its interrelatedness, by the inspired poet–priests of yore⁴⁹ which are collected, as stanzas of praise and hymns, in the *Ṛgveda*, *Sāmaveda* and *Atharvaveda*, and, in the form of sacrificial formulae, in the *Yajurveda*. Different from the historically later practice referred to in the present context, namely that of naming the text segments after the text which they make up, it is probable that the literary genre of *Brāhmaṇa*-s—and with it ritual exegesis as a highly developed 'proto-scientific science'⁵⁰—actually arose from the practice of interpolating individual exegetical and explanatory discussions on the sacrificial formulae and related *Ṛgvedic* stanzas, or parts of them, collected in the *Samhitā*-s of the Black *Yajurveda* when such discussions, called *brāhmaṇa*-s, were first combined to form independent compositions. These compositions were then called *Brāhmaṇa*-s and set the pattern for the production of further similar compositions with that name, a process that resulted in a new proto-scientific genre of Vedic literature.

It thus emerges that text segments were not assigned individual descriptive or otherwise characteristic names relating to their specific content or subject matter. Within a particular work, they were rather distinguished from other segments of their kind by their respective ordinal numbers.

7.3.2 Text Segmentation and Segment Naming in Early Scientific Sūtra-Style Compositions—The Case of the Āpastambadharmasūtra

In the case of the early scientific literature that evolved around the transmission and study of the Vedic corpus, orality and the established mode of transmission of specialized knowledge led to the introduction of a specific style of composition, the so-called *sūtra* style.⁵¹ To reduce the already formidable burden of memorization to be borne by the learned, scientific treatises were composed in extremely concise and pithy, but also frequently elliptical sentences and phrases that could easily be learnt by heart. These *sūtra*-s ('threads')⁵² provided the condensed points of departure for

⁴⁹On *bráhman*, see especially Thieme (1952).

⁵⁰See Oldenberg (1919).

⁵¹See Renou (1963). For a survey of Sanskrit literary compositions in the *sūtra* style see Bronkhorst (2010).

⁵²See Bronkhorst (2010: 182) for a summary, with bibliographical references, of the different opinions on the meaning, imagery and linguistic origin of the word *sūtra*.

further instruction and elaboration by a teacher and could subsequently serve as reference points or ‘guiding stars’, facilitating the grasp and recollection of the matter conveyed in the more extensive instruction that had accompanied them. Here, too, the texts, in this case composed of the individual *sūtra*-s as their basic textual units, were further segmented and structurally organized, and sometimes alternative segmentations are transmitted. Furthermore, the texts themselves were designated as *Sūtra*-s⁵³ and distinguished from each other by the addition of the term for the scientific genre to which they belong and a reference to the name of their traditional author to this generic designation. This reference may either consist in the author’s name itself (‘the *Sūtra* on [y] by [x]’) or in an adjective derived from the author’s name (‘the *Sūtra* on [y] Belonging to / Associated with [x]’).

For the field of the ritual science (*Kalpa*), where the genre of *sūtra*/*Sūtra* may have arisen,⁵⁴ the segmentation of the *Āpastambadharmasūtra*, a treatise on socio-religious norm (*dharma*) and its associated ritual aspects, provides an informative example. The *Āpastambadharmasūtra*, which is dated to the beginning of the third century BCE as its upper limit,⁵⁵ consists of a total of 1,364 *sūtra*-s.⁵⁶ According to the evidence of the segment titles traditionally placed *after* the text segments in the manuscripts, a practice that has been largely adhered to in modern printed editions, especially those from South Asia,⁵⁷ these *sūtra*-s are divided into two ‘questions’ (*praśna*), which are actually ‘questions’ number twenty-eight and twenty-nine of a larger comprehensive *sūtra* text on ritual, the *Kalpasūtra* of Āpastamba.⁵⁸ Thus, the *Āpastambadharmasūtra* constitutes itself a two-segment segment of a much larger text, and its manuscripts can be considered the results of a material segmentation of this larger text when committed to writing. Similarly, the Vedic Āraṇyaka-s, works on ritual and ritual exegesis associated with thinkers and practitioners who have withdrawn to the forest (*araṇya*), and the older Upaniṣad-s are traditionally transmitted as the final segments of a particular Brāhmaṇa; sometimes, they may even be identical. For example, the *Bṛhadāraṇyaka*

⁵³This may be compared with the case of the hypothetical origin of the designation Brāhmaṇa for compositions made up of individual *brāhmaṇa*-s; see above, Sect. 7.3.1.

⁵⁴See Renou (1963: 168 and 175). See also Bronkhorst (2010: 182–184) for a summary of opinions on the issue of the origin of this style.

⁵⁵See Olivelle (2000: 10).

⁵⁶See Olivelle (2000: 11).

⁵⁷Some editors duplicate these post-positioned segment titles as usually found in the manuscripts by inserting matching European-style headings *before* the individual text segments.

⁵⁸See Olivelle (2000: 20). The major segments of an ideal complete *Kalpasūtra* are a Śrautasūtra (*Sūtra* on solemn rites), a Grhyasūtra (*Sūtra* on domestic rituals), a Dharmasūtra (*Sūtra* on socio-religious norms and associated rituals), further specialized *Sūtra*-s devoted to ancestral rites and ritual geometry, and diverse appendices. See Renou (1957a: 12–13) on the exemplary case of the *Kalpasūtra* of Baudhāyana.

(‘Extensive Āraṇyaka’) constitutes the last text segment of the *Śatapathabrāhmaṇa* which bears the designation *upaniṣad*.⁵⁹ It is thus called the *Bṛhadāraṇyaka-Upaniṣad*. As has been emphasized by Thomas Oberlies,⁶⁰ the separation of the old Upaniṣad-s from their original context was the work of followers of the philosophical tradition of Vedānta which had its beginnings in the late classical period. However, the creation of Upaniṣad-s as independent literary compositions started already before this time.

The two ‘questions’ of the *Āpastambadharmasūtra* are further subdivided into ‘small sections’ (*kaṇḍikā*) of more or less identical size. This division is paralleled by a subdivision of the ‘questions’ into eleven ‘lumps’ or ‘masses’ (*paṭala*) each.⁶¹ Each *paṭala* contains two, three or four *kaṇḍikā*-s.⁶² Incidentally, the difference in size of the *paṭala*-s suggested by this remarkably diverging number of *kaṇḍikā*-s may be a seeming one because their extent may be similar from the point of view of the number of syllables of text they comprise. In pre-modern South Asia, the number of syllables (*akṣara*) that make up a Sanskrit text is generally used to indicate its size, individually or calculated as clusters of thirty-two syllables. These clusters are called ‘knots’ (*grantha*)⁶³ and comprise the number of syllables that occur in a stanza composed in the most common classical meter, the *anuṣṭubh* or *śloka*. The traditional memorization and recitation of texts involves many sophisticated techniques in which the syllables are the basic units of text,⁶⁴ and professional scribes of Sanskrit manuscripts often calculate their fee by counting the number of syllables they copied for their client, more precisely: the number of syllabic characters or writing blocks, i.e., simple or conjunct consonant characters

⁵⁹Similar to the term *brāhmaṇa* (see Sect. 7.3.1), the designation *upaniṣad* is metaphorically applied to statements or text segments dealing with *upaniṣad*-s, and, like *brāhmaṇa* and *sūtra*, to entire works characterized by such text segments. On the meaning of the term *upaniṣad*, which has been the subject of controversial discussion for quite some time, see Falk (1986). See further Vacek (1991: especially 259–260) and Hara (2000).

⁶⁰See Oberlies (2009c: 568b).

⁶¹On the uncertain meaning of this segment designation, see the appendix below.

⁶²The *Āpastambagrhyasūtra* and the closely related *Hiranyakeśigryhasūtra* display a very similar segmentation, i.e., ‘question’, *paṭala* and ‘section’ (*khaṇḍa*) for the three levels of segmentation in descending order; see Renou (1957a: 13).

⁶³According to Renou (1957a: 12), the term *grantha* already appears as the name of the smallest text segment of the Kāṇva version of the *Śatapathabrāhmaṇa*. However, as becomes clear from Caland’s introduction to his edition of the text, the (rough) number of *grantha*-s per ‘section’ (*kāṇḍa*) of the text is merely noted on the fly leaf of ms. O. It is obviously not mentioned in some colophon added after the post-positioned ‘section’ titles, where one would expect information of this kind in manuscripts, nor is it found in any ancient structural–numerical analysis of the text. See Caland (1926: Introduction, 6). For *grantha* as a term to designate a major text segment in the *Kāṇhaka*, see Oberlies (2009d: 633b) and Sect. 7.5.3 below.

⁶⁴See, e.g., Gonda (1975: 16–17), and specifically on the ‘step-by-step recitation’ (*kramapāṭha*) and its different types Renou (1957b: 411–412).

together with vowel and other diacritical signs, summed up in clusters of thirty-two. Similarly, one would have to make a precise count of the number of writing blocks for each *kaṇḍikā* to obtain a more precise picture of their size and thus the size of the *paṭala* they make up.

The division of the two ‘questions’ of the *Āpastambadharmasūtra* into *kaṇḍikā*-s was clearly not introduced primarily to provide a structure of the text in terms of its content, but rather from the pragmatic point of view of creating manageable text portions for memorization and recitation.⁶⁵ Sometimes, two *sūtra*-s closely connected from the point of view of their content, or even *sūtra*-s that actually form a syntactical whole, may be separated by a *kaṇḍikā* (‘small section’) division.⁶⁶ This does not mean, however, that a *kaṇḍikā* division may not occasionally coincide with the introduction of a new topic in the exposition. After all, as Renou suggested, the general tendency in textual segmentation was not to dissociate the ‘mechanical’ or functional, pragmatic segmentation of the texts deliberately from their ‘semantical’ or content-related segmentation, but rather to reconcile the two.⁶⁷ Even so, the primary independence of the formal segmentation of the text from considerations of its content cannot be denied. It is further seen in cases where this functional segmentation disregards the occasional segmentation of the content by particular linguistic means, such as the employment of the formulaic conjunction ‘now’ (*atha*) at the beginning of a *sūtra* which definitely introduces a new topic,⁶⁸ sometimes in connection with a *verbum dicendi* in the future tense. *Sūtra*-s formulated in this way do not necessarily form the beginning sentences of a *kaṇḍikā*.⁶⁹

⁶⁵This type of formal segmentation can be adduced as an argument for the original orality of the *Sūtra* literature; see Renou (1963: 199).

⁶⁶For example, ĀDhS 1.7.31 and 1.8.1: ‘³¹Even after he has returned home, the accepted practice is that he should behave towards these individuals exactly the same way ¹as he behaved when he was a student’ (tr. Olivelle (2000: 37) (*samāvṛttasyāpy etad eva sāmāyācārikam eteṣu / yathā brahmacāriṇo vṛttam*). See also 1.13.22 and 1.14.1–2: ‘²²[F]or after a man has married and settled down, he is enjoined by Vedic texts to perform daily rites, ¹namely, the daily fire sacrifice, hospitality towards guests, ²and others of this sort’ (tr. Olivelle 2000: 47) (*niveśe hi vṛtte naiyyamikāni śrūyante / agnihotram atithayaḥ / yac cānyad evamyuktam*).

⁶⁷See Renou (1957a: 18). This tendency may also be the reason for the often observed unevenness in size of formal text segments that are on the same level of segmentation and should thus have roughly the same size.

⁶⁸See the initial *sūtra* of the *Āpastambadharmasūtra* (ĀDhS 1.1.1), which announces the subject matter to be elucidated by the author, which is a new topic seen in the context of an ideal comprehensive work on ritual: ‘Now then, we shall explain the norms that relate to customary practice’ (*athātaḥ sāmāyācārikān dharmān vyākhyāsyāmaḥ*). On *atha* and *athātaḥ* in the Vedic ritual *Sūtra* literature see Renou (1963: 178) and Sankaranarayanan (2001: 6–14). Sankaranarayanan also discusses the use of these introductory words in the initial *sūtra*-s of the classical philosophical *Sūtra* literature, especially in the first *sūtra* of the *Vaiśeṣikasūtra*, and addresses their interpretation by the commentators.

⁶⁹For example, ĀDhS 1.12.13: ‘Now rites spoken about in the Brāhmaṇa-s’ (*atha brāhmaṇoktā vidhayaḥ*), ĀDhS 1.27.9: ‘Now another (scil. penance): ...’ (*athāparam ...*), and ĀDhS 1.22.4: ‘Now we will name the faults that distress other creatures’ (*atha bhūta-dāhīyān doṣān udāhariṣyāmaḥ*).

Similarly, *sūtra*-s with other phrases that announce a new topic, like ‘... which we are now going to speak about’, do not necessarily trigger a break in the text in terms of its formal segmentation.⁷⁰ A *sūtra* in which the ending of a content-related segment is explicitly stated with the phrase ‘with this ... has been explained’ may even be the initial *sūtra* of a new *kaṇḍikā*.⁷¹

At least according to the evidence of the manuscripts on which the modern printed editions are based, the *sūtra*-s often consist of independent sentences. However, a sentence may sometimes be split into two or more *sūtra*-s, that is, two or more *sūtra*-s form a complete syntactical unit, frequently with a syntactical dependence of the word or phrases contained in the subsequent *sūtra* or *sūtra*-s on the word or phrase contained in the initial *sūtra* of such a chain.⁷² This again demonstrates the priority of function over content at the level of the smallest or basic unit of segmentation and at the same time a kind of countervailing consideration of the content because the internal syntactical structure of sentences is taken into account. In general, though, one has to keep in mind that the segmentation of the text into *sūtra*-s as it is presented in modern printed editions of the Dharmasūtras actually depends on the explicit segmentation of the texts by their much later commentators. It does not seem that a particular fixed segmentation of the texts into *sūtra*-s was in place right from the beginning, i.e., at the time when they were composed.⁷³ Even so, it cannot be ruled out that the internal segmentation of longer sentences into meaningful syntactical sub-units was a device already employed by the authors of these oral texts in order to provide space for their free step-by-step commentary in the course of oral instruction. Such segmentation may also have facilitated the incremental memorization of the *sūtra*-s together with the gist of the teacher’s explanations on the part of the students.

⁷⁰For example, ĀDhS 1.1.27: ‘... so that he would be capable with regard to the observances that we are now going to speak about’ (... *yathā vrateṣu samarthaḥ syād yāni vakṣyāmaḥ*) is not followed by the beginning of a new *kaṇḍikā*.

⁷¹For example, ĀDhS 2.15.1: ‘With this, the norms of regions and residences (i.e., extended families) have been explained’ (*etena deśakuladharmā vyākhyātāḥ*). See further Renou (1963: 178) on this style of internal reference to earlier text segments in the ritual Sūtra literature.

⁷²For example, ĀDhS 1.2.11–16: ‘¹¹An initiated person should reside as a student in his teacher’s house ¹²for forty-eight years, ¹³or for three-quarters of that time, ¹⁴or for half that time, ¹⁵or for one-quarter of that time; ¹⁶the minimum is twelve years’ (tr. Olivelle 2000: 27) (*upetasyācāryakule brahmacārvīśaḥ / aṣṭācatvāriṃśad varṣāṇi / pādūnam / ardhena / tribhir vā / dvādaśāvarārdhyam*). See also the examples for *kaṇḍikā* breaks that occur within syntactical wholes adduced in Note 66 above.

⁷³Thus Renou (1957a: 13–14). For the science of Sanskrit grammar, Deshpande (2011: 84–84) has convincingly shown that Pāṇini’s grammar, written approximately 150 years or even more before the *Āpastambadharmasūtra*, was transmitted as a *saṃhitāpāṭha*, i.e., as a continuous text without gaps, and not as a text segmented into the individual *sūtra*-s as we know them from the later, written transmission. As can be expected, this results in uncertainty about the original division and numbering of the *sūtra*-s; see further Deshpande (2011: 85–88).

As in the examples adduced above, the text segments of the *Āpastambadharmasūtra* explicitly defined by the segment titles following upon them⁷⁴ are designated by generic names and their ordinal numbers in the linguistic form of ordinal adjectives. They are not characteristically named after the major or distinctive topic treated in them, which would be difficult in view of the fact that the formal segmentation does not consistently match the content-oriented organization of the text.

7.3.3 Text Segmentation, Segment Naming and Structural Organization of Text in the Bardic Tradition—The Case of the Epic *Mahābhārata*

The situation is different with the partly formal, partly content-related segmentation of the text of the two great Sanskrit epics of ancient South Asia, the *Mahābhārata* and the *Rāmāyaṇa*. We can assume that they were originally composed in a courtly context and that their texts were subsequently developed and transmitted by professional bards and court poets specialized in either of the two metrical compositions. The case of the segmentation of the *Mahābhārata* is more complex, but also more instructive and has attracted much scholarly attention. It is therefore fitting to address aspects of this segmentation as an example for text segmentation in the epic genre of South Asian literature which has an undisputed oral origin and long oral history. In the following exposition and observations, I largely base myself on a valuable recent contribution by the great master of Epic Studies, John Brockington, which rests upon his earlier in-depth research into the issue.⁷⁵

In its critical edition⁷⁶ and by and large in the modern printed, regionally shaped editions that preceded its publication, the *Mahābhārata* is divided into eighteen ‘joints’ or ‘nodes’ (*parvan*),⁷⁷ a number of further sub-divisions, also called *parvan*, and a large number of ‘portions for recitation’ (*adhyāya*)⁷⁸ with varying numbers of stanzas. The major and minor *parvan*-s, or *parvan*-s and sub-*parvan*-s, which are

⁷⁴See above for this sequence.

⁷⁵See Brockington (2010).

⁷⁶See Sukthankar et al. (1933–1966).

⁷⁷See Renou (1957a: 19) on this distinctive term for a text segment which is typical for the *Mahābhārata* and rarely used elsewhere afterwards; it is first found in the *Sāmaveda* (see *ibid.*: 6). According to Mayrhofer (1996: 99), the word *pārvan* may also refer to a human limb or body part between two joints. Thus, a meaning ‘internode’ is also conceivable; cf. above, Sect. 7.3.1, on *kāṇḍa*, with Note 32.

⁷⁸The less literal translation ‘study portion’ or ‘lesson’, which is suitable in the context of proto-scientific and scientific texts in general, does not fit the epic genre.

made up of an extremely uneven number of *adhyāya*-s,⁷⁹ are all individually designated with some reference to their content. However, their names may vary in the segment titles appended to the respective text segments in the manuscripts, and some manuscripts may not have sub-*parvan* names at all. Furthermore, the manuscripts testify to different numbers of sub-*parvan*-s, ‘portions for recitation’ and stanzas. A list of the names of one hundred *parvan*-s, which includes names of *parvan*-s and sub-*parvan*-s, the Anukramaṇī,⁸⁰ is contained in the *Mahābhārata* itself where it precedes the ‘Summary of *parvan*-s’ (*parvasaṃgraha*).⁸¹ The ‘Summary of *parvan*-s’ provides information such as on the names of the eighteen major *parvan*-s, the number of ‘portions for recitation’ in each of them—altogether 1,958—and the number of stanzas in each ‘portion for recitation’ which altogether amount to 82,134. In the case of the first major *parvan*, some sub-*parvan* names are also given. Both the Anukramaṇī, that is, the *parvan* list, and the summary of *parvan*-s with its diverse information are found right at the beginning of the *Mahābhārata*, in the second ‘portion for recitation’ of the first *parvan*, and are themselves designated as (sub-) *parvan*-s in the segment titles of its critical edition. The second of the two, the ‘Summary of *parvan*-s’, is obviously of late origin and meant to provide some kind of table of contents. It can be assumed that the epic already existed as a written text when this summary was composed and inserted.⁸²

An enumeration of nineteen—or even twenty or twenty-one—(major) ‘nodes’ (*parvan*-s) of the *Mahābhārata* is also found in the *Harivaṃśa*,⁸³ in Horst Brinkhaus’ words originally ‘a world history from creation up to the dynasty of the *Mahābhārata* heroes’⁸⁴ that was eventually considered by tradition as some kind of appendix (*khila*) to the *Mahābhārata*. The *Harivaṃśa* itself is added to the *parvan*-s mentioned in this passage.⁸⁵ Brinkhaus, who closely examined the segmentation of the *Harivaṃśa* into *parvan*-s, assumes that the enumeration belongs to the kernel of the *Harivaṃśa* and that the ‘portion for recitation’ containing it originally concluded the *Harivaṃśa* and should thus not have been relegated to the appendix in its critical edition.⁸⁶ Another old source for ordered *parvan* names of the

⁷⁹See Brockington (2010: 85). There are 3 and 353 *adhyāya*-s in the Mahāprasthānikaparvan (‘The Node Relating to the Great Departure’) and Śāntiparvan (‘The Node on Peace’), respectively, and, e.g., 1 and 186 *adhyāya*-s in the Parvasaṃgrahaparvan (‘The [Sub-]node with the Summary of Nodes’) and the Mokṣadharmaparvan (‘The [Sub-]node on the Norms Concerning Liberation’), respectively. On the basically formal nature of the *adhyāya*-s of the *Mahābhārata* and their greatly differing numbers of stanzas, see Renou (1957a: 19, with note 51).

⁸⁰On the Vedic Anukramaṇī-s, see above, Sect. 7.3.1.

⁸¹MBh 1.2.33–71.

⁸²See Brockington (2010: 76–77).

⁸³HV, appendix I, 40.[110]–[140]. On the calculation resulting in alternative numbers of names, see Brockington (2010: 84).

⁸⁴See Brinkhaus (2002: 159).

⁸⁵HV, appendix I, 40.[139]. See Brinkhaus (2002: 172).

⁸⁶See Brinkhaus (2002: 172 and 175).

Mahābhārata was first discovered and treated by Dieter Schlingloff,⁸⁷ namely, the so-called Spitzer Manuscript (SHT 810), a fragmentary manuscript from Qizil on the northern branch of the Central Asian silk road that contains an early Buddhist philosophical–dogmatic treatise in Sanskrit. The manuscript is dated to the first half of the third century CE,⁸⁸ but the otherwise unknown work itself may of course be somewhat older. The anonymous author and scribe of the work preserved in the Spitzer Manuscript lists the *parvan*-s of the *Mahābhārata* by their names, together with incremental cardinal numbers written as numerals and placed after each of them.⁸⁹

Whereas the differently focused Vedic Anukramaṇī-s present us mainly with an astonishingly stable picture of the precise number and sequence of units, e.g., of the Ṛgvedic hymns,⁹⁰ at the time when these strictly sequentially organized content analyses were compiled, the evidence of the independent lists of named text segments of the *Mahābhārata* and the brief summaries of its contents addressed above is of great importance for research into the history of the epic's growth over several centuries. In the present case, the two independent sources, the *Harivaṃśa* and the Spitzer Manuscript, document 'nodes' (*parvan*-s) that are clearly different from the ones listed in the Anukramaṇī and 'Summary of *parvan*-s' of the *Mahābhārata* and established in the critical edition. They also refer to some existing *parvan*-s with partly different names. Furthermore, some major *parvan*-s were clearly not yet part of the epic when the list of the *Harivaṃśa* and especially the list in the Spitzer Manuscript were compiled, even though the core content of some of the *parvan*-s not mentioned there may have been in existence—albeit in a much less developed form—as content matter of another *parvan* that is in fact listed in these two sources.⁹¹ In other cases, the core 'portions for recitation' (*adhyāya*) of specific sub-*parvan*-s that are identified and named in the segment titles of some manuscripts seem to have previously formed a major *parvan* that bore the very same name and historically preceded the differently named major *parvan* in which the particular *adhyāya*-s are now found to be included.⁹² Upon careful analysis of the two independent lists, Brockington comes to the conclusion that the fragmentary sixteen-item list, which may actually have been an eighteen-item list, of the Spitzer

⁸⁷See Schlingloff (1968, 1969).

⁸⁸See Franco (2005: 109–110) for a discussion of the results of the dating of the manuscript with the carbon-14 method.

⁸⁹See fragments n27b (transcription of a lost fragment) and 66a (facsimile with transcription) in Franco (2004: 323 and 85).

⁹⁰See above, Sect. 7.3.1.

⁹¹For deliberations on the Strīparvan ('The Node on the Women'), not mentioned in the Spitzer Manuscript, and the Anuśāsanaparvan ('The Node on the Instruction'), which is mentioned neither in the Spitzer Manuscript nor in the *Harivaṃśa* list, see Brockington (2010: 82–83).

⁹²See Brockington (2010: 79–80) on the Abhiniryāṇaparvan ('The Node on the Exodus') which was a major *parvan* at the time when the work preserved in the Spitzer Manuscript was written, and the Bhagavadīyāṇaparvan ('The Node on the Journey of the Venerable One'), a major *parvan* also mentioned—in Schlingloff's reconstruction of the truncated name—in the list preserved in this manuscript.

Manuscript bears evidence to the earliest shape of the epic for which there is a datable witness.⁹³

Furthermore, there are minor and major divergences, ranging from mere variants to genuine alternatives, in the names of ‘nodes’ (*parvan-s*), and especially sub-‘nodes’ given in the segment titles of some manuscripts of the epic, from the designations cited in the *Anukramaṇī* and the ‘Summary of *parvan-s*’ in the epic itself. *Parvan* and sub-*parvan* names, and even names of ‘portions for recitation’ (*adhyāya*), are swapped, there is divergence in terms of the *adhyāya-s* assigned to these text segments, and divergence in the overall number of *parvan-s* and sub-*parvan-s*. All this indicates that the *Anukramaṇī* and ‘Summary of *parvan-s*’ were not really considered authoritative in the manuscript transmission of the work.⁹⁴ Nevertheless, the editors of the critical edition of the *Mahābhārata* chose to follow them in their segment titles and have thus created the false impression that this segmentation, together with the segment names, is the original and authentic one.

In the case of the *Mahābhārata*, the occurrence of descriptive and characteristic segment names⁹⁵ may be explained by the fact that we are dealing with a different genre here, characterized by a social context of composition and transmission different from that of the Vedic corpus and the scientific literature attached to it which includes works on ritual and socio-religious norms such as the sample text treated above, the *Āpastambadharmasūtra*. For the epic, this context is the courtly and bardic context,⁹⁶ as opposed to the orthodox-Brahminical context of traditional learning for the *Āpastambadharmasūtra*. Moreover, the epic genre is characterized by a different audience, namely, educated listeners more or less familiar with the epic form of Sanskrit that come from the upper three strata of society according to the hierarchical socio-religious scheme of the powerful orthodox-Brahminical ideology. The audience and recipients of the Vedic corpus and its ancillary scientific literature on the other hand consists of the male orthodox-Brahminical elite involved in traditional training, and of young male initiates of the three upper social classes in their obligatory basic ‘cultural training’. Both types of training comprise the memorization of parts of the mentioned corpus and some of its auxiliary texts. Members of the three upper classes of society in general also become part of this audience when they attend and to some degree participate in rites and rituals where some of these texts are recited and utilized by the officiating Brahmins and those persons who are directly involved in the proceedings. The differences in context and audience imply a further difference in terms of the users or performers of the texts of the two genres. Lastly, the two genres are distinguished by different functions of their texts that emerge during their performance, namely, historical–

⁹³See Brockington (2010: 86).

⁹⁴See Brockington (2010: 77).

⁹⁵For examples, see Notes 79, 91 and 92 above. A further example is the *parvan* name ‘Summary of *parvan-s*’.

⁹⁶On this original context and its historical evolution, which resulted in the shaping and further expansion of the text, as well as its written transmission in a Brahminical context, see Brockington (1998: 18–28 and 155–157).

narrative entertainment, moral and ethical edification, obtainment of religious merit, and the shaping of a general cultural or even ‘national’ identity with religious undertones, as opposed to concrete religious and ritual functions. In the case of the auxiliary texts of the Veda, the precise transmission of these texts was required for the flawless preservation of the Vedic corpus itself, with an emphasis on formal features such as grammar, pronunciation and prosody, and for the preservation of the specialized knowledge pertinent to the detailed regulation of the specific practice and the perpetuation of the related orthodox-Brahminical socio-religious norms. Many of the above factors can be assumed to have contributed to the fact that in the case of the first genre text segments are provided with distinctive content-related names, inasmuch as they are capable to selectively evoke and bring out, in a vivid manner, specific individual narratives—or clusters of narratives—contained in a given text segment in the minds of the bardic performers and their enthralled audience. Such names are missing in the architecture of the works of the second literary genre broadly addressed here. Instead, we find numbered generic names distinguished within a given text according to the hierarchical position of the text segment designated in this way in the formal architecture of the text. One can interpret this phenomenon as an expression of the fact that here the formally perfect and complete performance and preservation of a revered revealed corpus of texts in an ancient idiom of the Sanskrit language was at stake, on the basis of memorization and in the hands of an elite of professional learned men. Similarly, the precise transmission of the texts composed as auxiliaries to achieve this end and further agenda related to this corpus was required and here, too, we observe the same general style of segment designation.

7.4 The Written Transmission of Texts in South Asia

This essay started out with some thoughts on the structuring of text by means of formal segmentation and segment naming in the originally exclusively oral literary culture of South Asia. In the course of these reflections it could not be avoided to refer increasingly also to the evidence and role of written texts, i.e., manuscripts, in the practice of formal segmentation and segment naming of literary works in Sanskrit, religious, scientific and epic. It is therefore time to turn to the topic of segmentation in manuscripts, in a general manner but also with specific reference to manuscripts containing works of the medical and philosophical traditions of South Asia.

7.4.1 The Earliest South Asian Manuscripts

For more than a century, the earliest preserved South Asian manuscripts in Sanskrit known to us were those which had survived, mostly in a fragmentary state, in the favorable dry climate of Eastern Turkistan which roughly corresponds to the western part of present-day Xinjiang. The manuscripts were found mainly in the

libraries of Buddhist monasteries and in Buddhist temples; the Spitzer Manuscript referred to above is one of them. They almost exclusively contain Buddhist texts and the earliest ones can be dated to the second century CE.⁹⁷ More recently, the emergence of a number of Buddhist manuscript scrolls that were acquired by the British Library has pushed the date of available South Asian manuscripts back even further. Some of these manuscripts, which bear canonical texts composed in Gāndhārī, a vernacular language of the area of the South Asian northwest called Gandhāra in antiquity from where the manuscripts probably originate, could be carbon-dated to the sensational date of the first century BCE.⁹⁸ It was precisely in this century that according to a historically reliable tradition the so-called Theravāda version of the Buddhist canon, the Tripiṭaka, was put into writing during the reign of the Singhalese king Vaṭṭagāmaṇi/Vaṭṭagāmiṇi.⁹⁹ Important, albeit less ancient Buddhist manuscripts of the fifth or sixth century CE were discovered in the 1930s in the Gilgit region in present-day Pakistan,¹⁰⁰ and many manuscripts from India, Buddhist and non-Buddhist, have been preserved in the more suitable climate of Nepal, of which the earliest dated one belongs to the early ninth century CE.¹⁰¹ However, the bulk of manuscripts preserved in South Asia were written in late Medieval and modern times, the oldest ones among them dating to the early centuries of the second millennium.

7.4.2 *The Segmentation of Texts in Manuscripts Versus Printed Editions*

In general, it can be assumed that the textual segmentation of Sanskrit texts we see in their modern printed editions goes back to the manuscripts used in editing them, or at least to some of these manuscripts. However, the editors are normally silent on this issue, and the descriptions of the manuscripts they utilized are frequently not very detailed, neither those found in the introductions to the printed editions themselves nor

⁹⁷See, e.g., von Hinüber (1990: 8).

⁹⁸For a comprehensive illustrated introduction to the manuscript scrolls from Gandhāra that were initially acquired by the British Library, see Salomon (1999), for a brief and up-to-date introduction Hartmann (2016: 32–35 and 38–49). Harrison and Hartmann (2014) present a wide range of research results on these and other valuable ancient Buddhist manuscripts from South Asia that came to light over the last two decades.

⁹⁹See, e.g., von Hinüber (1990: 41, 64) and Bechert (1992).

¹⁰⁰See von Hinüber (1979).

¹⁰¹See Adriaensen et al. (1994: 326) on the manuscript of the *Skandapurāṇa*, an anonymous encyclopedic Brahminical work containing myths, legends, dynastic genealogies and expositions on all kinds of religious topics, which is dated to Mānadeva saṃvat 234, i.e., 810 CE. A fragmentary manuscript of the *Suśrutasaṃhitā*, one of the two early-classical foundational works on medicine (Āyurveda), is dated to Mānadeva saṃvat 301, i.e., 877 CE, and thus belongs to the group of oldest manuscripts microfilmed by the Nepal–German Manuscript Preservation Project. On the latter see Wujastyk (2013).

the ones in the descriptive catalogues, if any, of the repositories where the manuscripts are kept. As can be seen in the cases of the *Carakasamhitā*, one of the two early-classical foundational works on medicine (Āyurveda),¹⁰² and of the *Nyāyasūtra* together with its earliest preserved commentary, the *Nyāyabhāṣya*, which both belong to the classical philosophical literature,¹⁰³ the textual segmentation found in the printed editions may sometimes be based on the evidence of a single manuscript only or merely on that of a particular branch of the manuscript transmission of the work.¹⁰⁴ It may also reflect and conflate the evidence of several manuscript sources. Sometimes, the segmentation of a text may even be wholly designed by an editor in reliance on an independent and original understanding of the architecture of the text, with the aim to give it a more reader-friendly structure than the handwritten text which has to be transferred into modern print format. Subsequent editors then often stick to the thus established segmentation of the printed work even though the manuscripts at their disposal, if any were actually consulted, may not at all testify to it. The issue of authorial versus scribal segmentation of a text or segmentation by a commentator, other than in the case of ‘natural’ segmentation, is a problematic one.¹⁰⁵ Authorial segmentation can only be assumed if the author explicitly refers to his own segmentation.¹⁰⁶

7.4.3 *Devices for Textual Segmentation Employed in South Asian Manuscripts*

In the following, some of the many means and modes of textual segmentation in South Asian manuscripts will be addressed. In the case of the orthodox-Brahminical culture, the graphic presentation of the text in manuscripts is much less elaborate when compared to the astounding elaboration of oral techniques employed in the preservation especially of the Vedic corpus and other religious works. This is possibly due to the inferior status accorded to written sources of knowledge and learning in this culture.¹⁰⁷ The normally oblong leaves made of palm-leaves or paper, the ancient birch-bark scrolls in vertical format from the North-West and the leaves of the bound codices, also in vertical format, from Kashmir¹⁰⁸ are generally

¹⁰²See below, Sect. 7.4.6.

¹⁰³See below, Sect. 7.4.4.

¹⁰⁴A critical edition of the *Carakasamhitā* is not available, except for the eighth chapter of its *Vimānasthāna*, the third major text segment. All statements on the *Carakasamhitā* below and all quotations, unless stated otherwise, thus refer to the text as printed in the edition by Jāḍavajī Trikamjī Āchārya (1941).

¹⁰⁵See Karttunen (2011: 4, 8 and 10–11) with special reference to the particular case of dramatic and poetical works.

¹⁰⁶On the issue of the originality of a particular segmentation, see also below, Sect. 7.4.7.

¹⁰⁷See above, Sect. 7.2.

¹⁰⁸For further details on Kashmiri birch bark and paper manuscripts, their format, binding and page set-up, see Witzel (1994: 6–14).

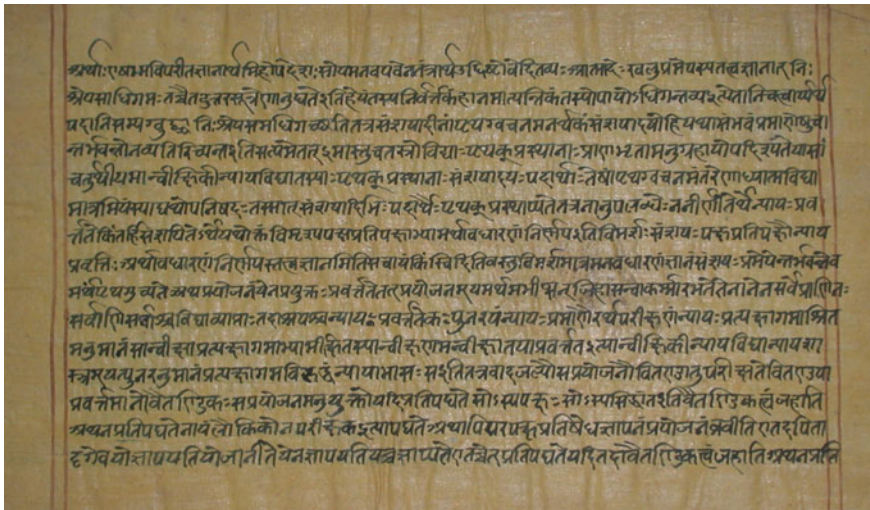


Fig. 7.1 Nyāya-Vaiśeṣika ms. 202, Calcutta Sanskrit College

filled in an even and regular manner with running text in horizontal left-to-right orientation from the top to the bottom of the writing area (see Fig. 7.1). As a rule, there are no prominent, graphically distinguished headings of chapters or other text segments, and the beginning of a new chapter, sub-chapter or section is normally not marked in the way new paragraphs may be indicated in the medieval and modern European tradition of writing, e.g., with the beginning of a new line, an indentation at the beginning of a new line, a blank line or an initial—simple, ornamental, inhabited or even historiated. At the most, the scribe may indicate the beginning of a major chapter with further subdivisions by starting a new side (or page in the case of bound codices) of the precious writing material, thus leaving a variable blank space after the end of the text of the preceding major chapter, even if the text ends at the beginning of a side or page or at the very beginning of a line. This blank space is often filled with repeated punctuation signs that may elsewhere signal the end of a unit of text of any kind or size,¹⁰⁹ small ornaments, ornamental or auspicious letters, auspicious symbols, or short auspicious or devotional phrases, as if out of some *horror vacui* on the part of the scribes who otherwise are very economical in the use of their valuable writing material. The space available for writing is fully used except for regular margins left on all four sides of the rectangular writing area.

¹⁰⁹ See below, Sect. 7.4.4.

Apart from the different layout of the page in general which is normally adjusted to that required by modern European book formats, the textual segmentation beyond the segmentation in chapters, etc., that is clearly stated in the manuscripts, various means of formal segmentation, especially centered chapter headings and the centered printing of post-positioned segment titles, and other related para-textual elements, such as running work and segment titles in page headers, that we see in modern printed editions of Sanskrit texts are thus more recent phenomena and mostly involve some interpretation of the text on the part of the editors to whom they go back.

7.4.4 Spaces, Euphonic Rules and Punctuation Marks, and the Problem of the Transmission of Embedded Texts—The Case of the Nyāyasūtra and Nyāyabhāṣya

Even so, it is not the case that all manuscripts are written in *scriptio continua* as such, that is, absolutely without any blank spaces or inserted markers between words, phrases, sentences and paragraphs. Small spaces left blank in the text serve to separate words and to demarcate clauses and phrases within syntactically complex sentences, for example, to set off subordinate clauses from the main clause, or—in the increasingly rigorous and elaborate nominal style typical of scientific literature in Sanskrit from the classical period onwards—to set off dependent nominal phrases with several components from the nominal phrase that functions as the syntactical head of the construction.¹¹⁰ The use of this device and similar ones, which will be mentioned below, may reflect oral practices in connection with the transmission of a specific text or indicate that the scribe was not a mere copyist but also a reader and user of the text.

Blank spaces of varying size also serve to set off individual *sūtra*-s from each other or from the surrounding text of a commentary on a *Sūtra* when they are transmitted embedded in a commentary, which is actually a common mode of the manuscript transmission of *Sūtra*-s.¹¹¹ This practice can be very frequently observed with the *sūtra*-s of the *Nyāyasūtra*, the foundational work of the Nyāya tradition of philosophy, when it is transmitted embedded in the *Nyāyabhāṣya*

¹¹⁰On blank spaces used in the first exemplars of writing in India, i.e., the inscriptions of Aśoka written in Prakrit, see Janert (1972). The related issue of line spacing in Aśoka's pillar inscriptions is discussed in Falk (1993b: 90–91). On the use of blank spaces in other early Prakrit inscriptions, see Salomon (1998: 67).

¹¹¹See Bronkhorst (2010: 184–185).

(‘Commentary on Nyāya’) (fifth century CE).¹¹² It goes without saying that this scribal practice may eventually cause problems in the transmission of the embedded text, especially if an independent transmission of the basic *sūtra* text does not exist or no longer exists locally or regionally. The merely subtle demarcation of the *sūtra*-s by means of blank spaces may not be preserved with sufficient care by later scribes and thus result in uncertainty about their precise extent within the combined text. In the case of the *Nyāyasūtra* and the *Nyāyabhāṣya*, this problem is aggravated by the fact that the author of the commentary, Vātsyāyana Pakṣilasvāmin, rarely introduces the *sūtra*-s he comments upon with expressions that make it sufficiently clear that he introduces the words of a third person, that is, depending on the individual case, the author of the *Nyāyasūtra*¹¹³ or the proponent of some other philosophical tradition whose argument is put forth by the author.¹¹⁴ Vātsyāyana frequently embeds the *sūtra*-s, which are written in a very concise nominal style, smoothly in his own sentences, or supplements them with contextually and syntactically suitable preceding or concluding words for the sake of explicitness of the arguments put forth in the *sūtra*-s and for their integration into the line of argument in his commentary.¹¹⁵ As a result of these scribal and authorial-commentarial

¹¹²The *Nyāyasūtra* in its classical form was probably completed in the last half of the fourth century, and the *Nyāyabhāṣya* written upon it some fifty to one hundred years afterwards, in the fifth century, depending on how one interprets Dignāga’s (480–540) apparent ignorance of this commentary. On arguments for dating the *Nyāyabhāṣya* to the second half of the fifth century, at the very latest to the first quarter of the sixth century, see Franco and Preisendanz (1995) and Franco (2002: 282–283), corroborating the dating argued for in Oberhammer (1964). However, the dating of the *Nyāyabhāṣya* to the second half of the fifth century assumed there may have to be pushed back some fifty or sixty years. This earlier date depends on the earlier date of the ‘younger’ Vasubandhu suggested by Franco and Preisendanz (2010: xv–xvii) on the basis of Schmithausen’s (1992) important note on the chronology of this Buddhist philosopher relative to the *Laṅkāvatārasūtra*. The ‘younger’ Vasubandhu is chronologically related to the Sāṃkhya teacher Vindhyavāsin and the Mīmāṃsaka philosopher Bhavadāsa, of whom some arguments are probably addressed in the *Nyāyasūtra* (see again Franco and Preisendanz 1995). On these grounds one has to assume an earlier date of the *Nyāyasūtra*, and thus the date of the *Nyāyabhāṣya* may also be moved back in time, to the first half of the fifth century, a date that was already postulated by Vidyabhusana (1915: 82–87).

¹¹³See, e.g., the formal introductions to NS 3.1.61 (NBh 138,13) and 3.1.70 (173,14–15): ‘Therefore he says: ...’ (*ata āha [sūtra 3.1.61 / 3.1.70]*).

¹¹⁴See, for example, the introductions to NS 3.2.35: ‘On this, the proponent of the doctrine that the elements are endowed with consciousness says: ...’ (*atra bhūtacaitanika āha [sūtra 3.2.35]*) (NBh 193,13), 4.1.22: ‘Someone else now says: ...’ (*apara idānīm āha [sūtra 4.1.22]*) (NBh 229,3) and 4.1.25: ‘Others, however, think ...’ (*anye tu manyante [sūtra 4.1.25]*) (NBh 230,6).

¹¹⁵See, for example, the integration of NS 3.1.58 (printed below in italics and Roman type face in the translation and quotation, respectively) into a sentence of the *Nyāyabhāṣya* (NBh 166,15–16; supplements to the text in the translation required for the understanding of the argument are placed between brackets): ‘If the universal (inhering in them, such as smell-ness) consolidates (the individual instances of the different types of sense objects, such as smell, as claimed by you to justify that there are only five senses, and not a multiplicity of senses on account of the multiplicity of the individual sense objects), the result would be that the senses are one because (the sense objects) are not different (from each other) on account of their being sense objects) (literally: on account of their sense object-ness)’ (*yadi sāmānyam saṃgrāhakaṃ prāptam indriyāṇaṃ viśayatvāvyatirekāḍ ekatvam*). The integration of NS

practices taken together, the text of some *sūtra*-s acquired elements of the surrounding commentary and thus grew in size when the *sūtra*-s were extracted one after the other from the commentary with the aim to compile a basic text for the sake of recitation, memorization and study (*sūtrapāṭha*), which may also serve as the reference text of oral instruction, that is, the basis of the composition of some new commentary which may eventually be written down, together with its own embedded *sūtra*-s.¹¹⁶ Furthermore, the subtle demarcation of the *sūtra*-s from the surrounding commentary may cause the loss of parts of a *sūtra* or even complete *sūtra*-s when a *sūtrapāṭha* text is extracted, because an initial, introductory word of a *sūtra* or even the whole phrase or sentence constituting a *sūtra* that was graphically and syntactically well embedded in the commentary, may have erroneously been considered part of the commentary and thus be overlooked.¹¹⁷ Conversely, a short and pregnant sentence or phrase of the commentary, separated from the surrounding prose by blank spaces, may have easily been considered a *sūtra*.¹¹⁸ Thus, we can understand the fluctuation of the *sūtra* inventory in the preserved *sūtrapāṭha* manuscripts and *sūtrapāṭha*-like compilations of the text of the *Nyāyasūtra*,¹¹⁹ and furthermore in later commentaries on the text that were composed with reference to a specific *sūtrapāṭha* or *sūtrapāṭha*-like compilation. This fluctuation is also seen in the various printed editions of the *Nyāyasūtra* where modern scholars had to make their choices. Within the philosophical tradition of Nyāya itself, towards the end of the first millennium scholars obviously felt the need to produce such *sūtrapāṭha*-s and *sūtrapāṭha*-like compilations,

2.2.49 is another example: ‘And it is *not* appropriate to adduce gold as an example *because its modifications do not differ from each other on account of their being gold*’ (*suvarṇodāharaṇopapattiś ca na tadvikārāṇām suvarṇabhāvāvyatirekāṭ*) (NBh 123,8–9). The programmatic first *sūtra* of the *Nyāyasūtra* (NS 1.1.1) is integrated into the text of the commentary as follows: ‘*Because of the adequate knowledge of the following kinds of existing things, (namely) means of knowledge, objects of knowledge, doubt, purpose, ... and points of defeat in debate one obtains the highest good*’ (*tāsām khalv āsām sadvidhānām pramāṇaprameyasamśayaprayojana... nigrāhasthānānām tattvajñānān niḥśreyasādhigamaḥ*) (NBh 2,6–9). In the above examples, I reproduce the text of the *sūtra*-s as it has been identified by the editor of the edition used here. In this edition, they are printed in larger bold type and have their serial numbers attached to them. Furthermore, the editor has set them off from the surrounding text of the commentary by inserting a blank line before and after and by placing them in the center of the line.

¹¹⁶For examples of *sūtra*-s that were possibly enlarged by the integration of text belonging to the surrounding commentary, see Preisendanz (1994: 610–611, on 3.1.47 in Ruben’s edition of the *Nyāyasūtra* = NS 3.1.52 in Thakur’s edition of the *Nyāyabhāṣya*) and Muroya (2006: 28–37, on NS 1.1.2 and 1.1.5).

¹¹⁷For the discussion of a possible instance, see Muroya (2006: 37–40).

¹¹⁸On this phenomenon in connection with the transmission of the *Nyāyasūtra* within the *Nyāyabhāṣya*, see first Windisch (1888: 15–41). For some examples, see Preisendanz (1994: 293–294, on 3.1.16b in Ruben’s edition of the *Nyāyasūtra* = NS 3.1.17 in Thakur’s edition of the *Nyāyabhāṣya*, 422–424 9 on 3.1.26a–26c = NS 3.1.28–30, and 524–525, on 3.1.33b = NS 3.1.38) and Muroya (2007: 425–426, on 3.2.9a in Ruben’s edition of the *Nyāyasūtra*). In his edition of the *Nyāyasūtra*, Walter Ruben (1928) has collected a large number of *sūtra*-s from printed editions of the text and its commentaries that he considers as sentences and phrases of the *Nyāyabhāṣya* turned *sūtra*-s.

¹¹⁹See especially Muroya (2007) on this complex issue.

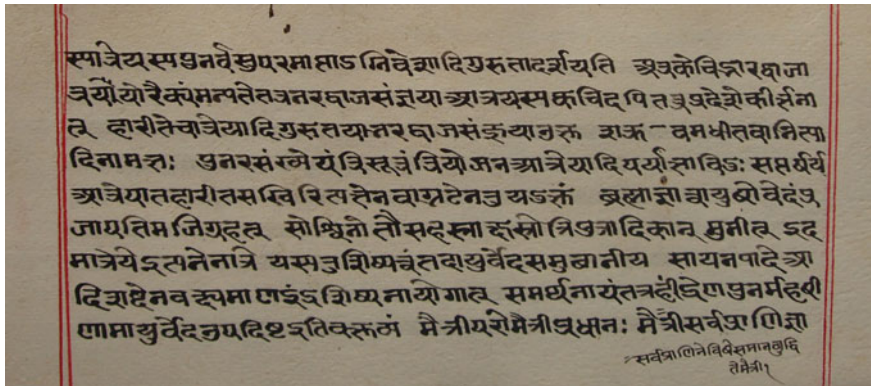


Fig. 7.2 Ms. 12/18, Dahi Lakshmi Library, Nadiad

like the *Nyāyasūcībandha*, and later on the *Nyāyasūtroddhāra*, in order to settle the precise wording and constitution of the basic text of their tradition, and in the late medieval and early modern period the Navya Naiyāyika-s, the ‘new followers of Nyāya’, extensively discussed the authentic inventory of the *Nyāyasūtra* in their commentaries on this work.¹²⁰

Blank spaces may furthermore be employed to inconspicuously demarcate individual sentences from each other (see Fig. 7.2) and to mark—at a still higher level of the structure of a text—the beginning and end of sections, chapters and larger units of text, in the latter cases also in combination with segment titles places after the sections, etc. (see Fig. 7.3; the section title appears in the middle of the second line from the bottom). In metrical texts, blank spaces may serve to set off half-verses, verses and stanzas from each other.

Another way of textual segmentation on all levels of the text is the non-observance in writing of certain euphonic rules of the Sanskrit language that concern the phonological processes occurring inter alia at word boundaries (*sandhi*, lit.: ‘joining’) and would otherwise have necessitated, e.g., the merging of the final and initial vowels of two words into another vowel and consequently the writing of the two words in one string, or, similarly, the merging of written strings that are themselves already the result of such a coalescence of words. This practice in writing presumably reflects a segmentation of the text in speech or recitation practice. For this type of textual segmentation, a special stop-sign is introduced to convey the pause (*virāma*) in speaking also in writing. It is employed in the case of segment-final words or complex segment-final strings ending in consonants. In this way, the required phonetic assimilation of the final consonant to the following initial vowel or consonant and the matching writing of a different consonant character or a conjunct consonant character, often with modification of the original

¹²⁰See Preisendanz (2005: 70–71, 73–74 and 80–85).

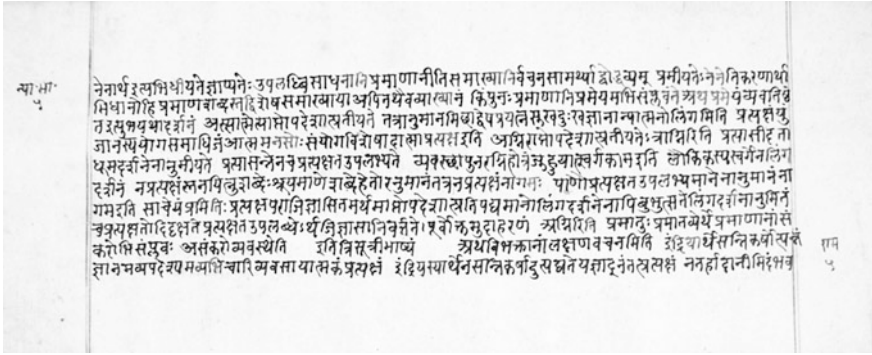


Fig. 7.3 Ms. 267, Vishrambag Collection, Bhandarkar Oriental Research Institute, Pune

glyphs combined therein, are dispensed with. This clarification of the structure of the text through simplification cannot be effected by simply writing the unchanged final consonant without the stop-sign, because in the semisyllabic scripts of South Asia the stop-sign also signals that one should not pronounce the subsequent short *a*-vowel that is implied for any consonant character (called the ‘inherent *a*’) unless some marker, or diacritic, for one of the other vowels is combined with it.¹²¹ In some scripts, there are special forms of consonant characters in word-final position to indicate a pause at the end of a text segment.¹²² If segment-final words or complex strings of words end in a vowel and the first unit of the following segment begins with a vowel, the otherwise required merging of the two units—with a coalescence of the two vowels—is simply not implemented by the scribe and the textual segmentation expressed in this way.

Further graphical means of textual segmentation, also used in combination with blank spaces, are punctuation signs, such as intralinear vertical strokes (*danda*-s) of varying sizes and position, singly, in pairs or in triplets, and dots or small circles placed in the middle of a line of writing between two text units or on top of the line. The dots or circles may be combined with vertical strokes and blank spaces, the vertical strokes with spaces. At the end of major segments of text, the scribe may use vertical strokes, with or without conspicuous spaces, as textual segmentation devices (see Fig. 7.4). These may be supplemented by the already mentioned ornamental or auspicious letters and symbols (see Fig. 7.5), or short auspicious or devotional phrases. The punctuation of half-verses, verses and stanzas with vertical

¹²¹See Salomon (1998: 14–17) on this characteristic of Indic scripts and on the difficulty to find a suitable term for this type of script which he describes as a ‘diacritically (or alphabetically) modified consonant syllabary’.

¹²²For example, the final *r(a)* character in the Bengali script.

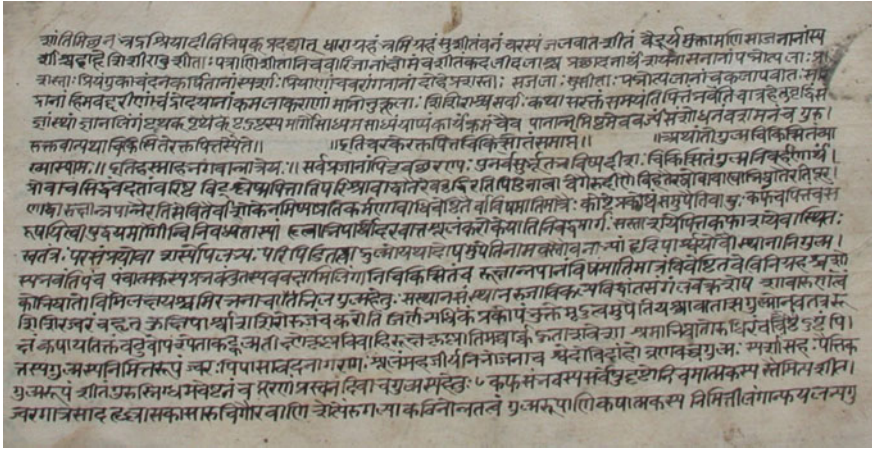


Fig. 7.4 Ms. 1564, Rajasthan Oriental Research Institute, Bikaner

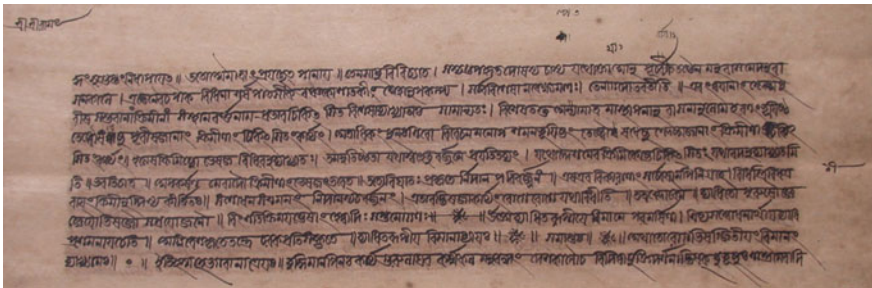


Fig. 7.5 Āyurveda (Vaidyaka) ms. 23, Calcutta Sanskrit College

strokes seems to have been rather prevalent, more than that of prose texts.¹²³ In my experience with manuscripts of medical and philosophical works, a prolific use of punctuation signs, such as vertical strokes, as devices of textual segmentation is in general indicative of a more recent date of the manuscript.

It has to be emphasized, though, that the means of textual segmentation sketched so far are not necessarily employed in a consistent and systematic manner in the manuscripts or perceived by the scribes as genuine elements of the text. By and large, the segmentation goes back to the discretion or interpretation of the scribes who may be identical or not with the users of the manuscripts, be they scholars,

¹²³For the similar punctuation practice in South Asian inscriptions from the Gupta period onwards, see Salomon (1998: 66).

teachers or students of the works contained in them or practitioners who used the texts in performance. In some cases, the apparently meaningless usage of the mentioned textual segmentation devices, which sometimes goes against any reasonable understanding of the text, reveals that for various reasons the scribe was not able to properly follow the text he was copying. He may not have been familiar with the genre and technical language of the work he was commissioned to copy, had insufficient knowledge of the Sanskrit language in general or was a poor student still at the beginning of his study course who had to copy the text for further study himself. Occasionally, however, such inappropriately used means of textual segmentation and any conspicuously identical textual segmentation in a number of manuscripts may confirm, though certainly not prove by themselves, an otherwise already postulated stemmatic relationship between the manuscripts in which they are found because some especially eager scribes copied their exemplars in a painstaking way, including even the means of textual segmentation employed by their predecessors. In rare cases, it may even be possible to reconstruct an individual textual segmentation that must have already been present in the hypothetical archetype of the available manuscripts, for example when the non-observation of the euphonic rules of Sanskrit in special situations is found in all witnesses.¹²⁴ Furthermore, in the unfortunately even rarer cases where a manuscript may be an autograph,¹²⁵ we have, of course, to assume that the segmentation of the text by any means, textual or formal, is that by the author himself.

7.4.5 *Graphical and Linguistic Segmentation Devices—Text, Commentary and Quotation*

After this sketch of several aspects of some common textual segmentation devices employed in manuscripts, including manuscripts of commentaries, I would like to address two special devices for text segmentation at a higher level. In some manuscripts that contain a basic text and a commentary written ‘on’ it, the basic text is placed in the middle of the writing area, with very generous margins. Subsequently, the commentary is written in the four margins around the writing area that is occupied by the basic text. The commentary, which is often written in

¹²⁴ An example can be found in the *Vimānasthāna* of the *Carakasamhitā* in the enumeration of names of medicinal plants in a long nominal compound: *śirovirecanadravyāṇi punar apāmārgapippalīmaricaviḍaṅgaśiḅgruśirīṣatumburubilvājāyajamodavārtākāpṛthvikāḍḍhāhareṇukāphalāni ca* (CS (CE) Vi 8.113, lines 1–2). Here, the rules of internal *sandhi* are disregarded by the scribes in the case of one component or segment within the compound, the plant name *elā* (cardamom), in order to clearly convey this name which would have become practically indiscernible with the application of the required regular vowel coalescence.

¹²⁵ For example, Vamśadhara’s eighteenth-century commentary on the *Nyāyasūtra* preserved in the Mithila Research Institute, Darbhanga, discussed in Preisendanz (2005: 81) and first introduced in Sen (1980).

smaller characters than the basic text, thus encircles or frames the text commented on (see Figs. 7.6 and 7.7). In this way, the two closely related, yet distinct texts are graphically distinguished. Any doubt about the precise boundary between the two texts that may arise later on in its faithful transmission is thus eliminated. Moreover, taken together with the way in which the previously prepared writing area for the commentary has been used and some other clues,¹²⁶ this kind of textual segmentation often suggests that the manuscript is an autograph.¹²⁷ We can assume that the author of the commentary first had the basic text copied or copied it himself, which is easily determined by a comparison of the handwriting. Next he proceeded to compose his commentary on or, rather, ‘around’ the basic text in the literal sense of the word. Furthermore, a basic text may be placed in individual small portions in a graphically set-off manner in the middle of each side of the leaves, with its commentary neatly written above and below, sometimes extending to the next side or leaf.¹²⁸ This sandwich-like textual segmentation is presumably not authorial, that is, not a segmentation designed by the author of the commentary, but rather introduced by the scribe to provide the reader with a conveniently accessible reference text for the commentary he studies.¹²⁹

Mostly, however, commentaries composed on a particular text are not transmitted ‘on’ it, in the sense that their text follows upon the full basic text in the same manuscript or is written section by section after the graphically distinguished portions of the basic text to which they refer, as is very frequently the case in modern printed editions. The regular scribal practice thus reveals an authorial attitude, namely, that the commentators presumed the knowledge of the memorized reference text on the part of their readers or its availability otherwise. The usual practice of the commentators is to refer to the reference text with short quotations of the first word or words of the textual segment on which they are about to comment, the so-called *pratīka-s*. These short quotations of segment-initial words probably

¹²⁶Such clues are the uneven use of the writing space, instances of increasingly tightly written text squeezed into the margins of a particular side of a leaf, the occurrence of copious corrections, modifications and substantial changes to the text, and a rather messy general appearance of the manuscript.

¹²⁷This is the case with some manuscripts of commentaries written by the nineteenth-century Bengali physician and scholar of Āyurveda Gangadhar Ray Kaviraj which are preserved in the library of the Calcutta Sanskrit College. See Chattopadhyaya (1995) for a list of the large number of works composed by Gangadhar.

¹²⁸See, e.g., the reproduction of a folio of a manuscript containing Sāyaṇa’s commentary on the *Ṛgveda*, together with a graphic representation of the architecture of this text in Galewicz (2009: 295–296). On this architecture, with reference to the formal segmentation of the *Ṛgveda*, see Galewicz (2009: 148–151).

¹²⁹In my experience with manuscripts of the medical and philosophical traditions, the two described practices of textual segmentation on the higher level of basic text and commentary are of a rather recent date.

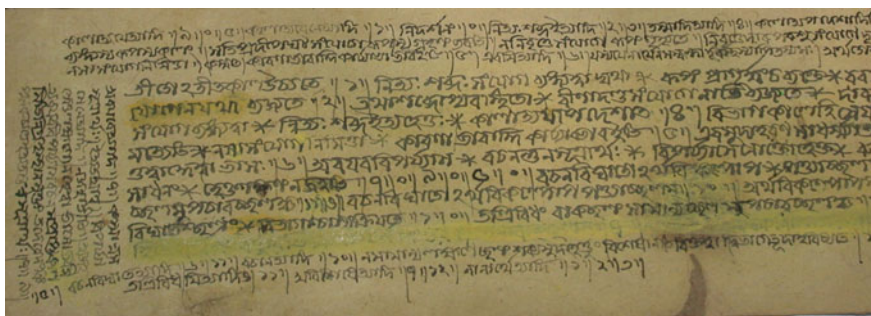


Fig. 7.6 Nyāya-Vaiśeṣika ms. 1372, Calcutta Sanskrit College

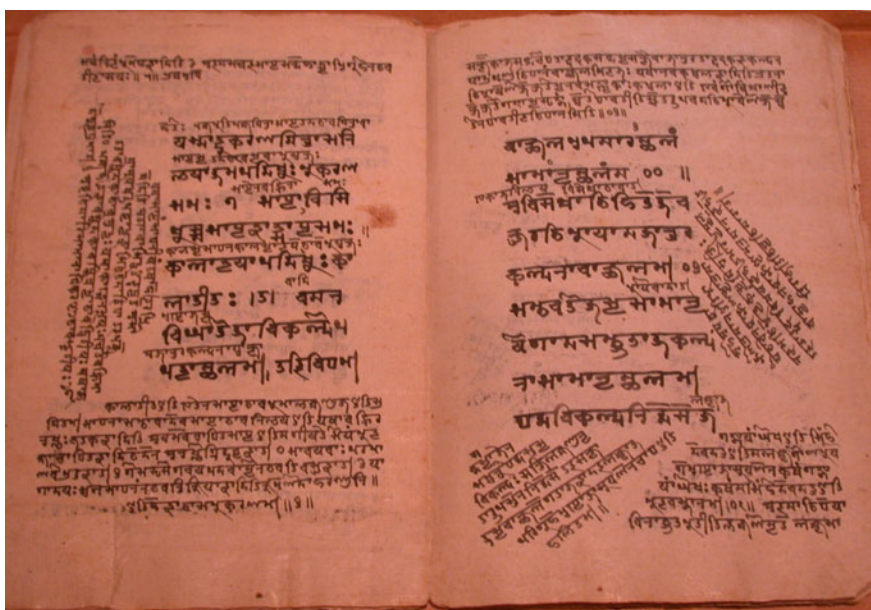


Fig. 7.7 Ms. 57106/416, National Museum, New Delhi

evoked the memorized text segment immediately and were much more efficient in this respect than the reference by means of a numbered generic segment name, complete with an indication of its segment-hierarchical context,¹³⁰ or even by means of some content-related lower-level segment designation. Alternatively, the commentators may quote individual words—literally or grammatically adjusted to the syntactical context of their comments, or extracted from longer nominal

¹³⁰See Karttunen (2011: 9).

compounds—or phrases for comment, explanation or glossing. Both modes of reference to the basic text are seen, for example, with the oldest completely preserved commentary on the *Carakasamhitā* by Cakrapāṇidatta (eleventh century).¹³¹ Even though his *Āyurvedadīpikā* is a rather extensive commentary, only a fraction of the basic text is documented in this way in its text as found in the manuscripts. The same applies to Uddyotakara's sixth-century commentary on the *Nyāyabhāṣya*, and many more examples could be adduced. Sometimes, especially in the case of *sūtra*-s, the complete text commented upon may indeed be quoted in a commentary, but is not necessarily graphically distinguished from the running text of the commentary. This is the case of embedded transmission of a text—graphically and linguistically—addressed above, with the example of the transmission of the *Nyāyasūtra* embedded in the *Nyāyabhāṣya*.¹³²

As already mentioned, the editors of commentaries in modern editions often print the full reference text on top of the page, and beneath it the text of the commentary relating to it, including the partially quoted reference text. Similarly, they insert chunks of the full reference text between larger portions of a commentary on a series of stanzas, *sūtra*-s or other segments of the basic text that are only partially quoted or otherwise referenced in the commentary. These practices, meant for the convenience of the reader, occasionally result in a misleading and confusing picture, which is not always detected as such by the reader, when it turns out upon closer inspection that the commentator does not refer to exactly the same reference text, in terms of its precise wording and constitution, as the one printed along with it. They thus reflect a disregard or ignorance of historical developments of the basic text in the course of its transmission.

7.4.6 Segment Numbers and Numbering—The Case of the *Carakasamhitā*

Next to spaces, punctuation signs and other symbols, ciphers or numerals can sometimes serve as means of formal or textual segmentation in manuscripts.¹³³ They are normally placed after the segment that is numbered in this way, and often enclosed by single or double vertical strokes (see again Fig. 7.7). Individual words, phrases or sentences in regular prose are usually not separated from each other in this way, but numerals may be employed to number the individual elements of lists of terms or topics, individual *sūtra*-s in a basic text compiled for the sake of recitation, memorization and study (*sūtrapāṭha*) or embedded in a commentary, and stanzas in metrical texts or embedded in prose texts. Moreover, they may serve to number larger

¹³¹For this dating, see Meulenbeld (2000: II.A, 92–93).

¹³²See above, Sect. 7.4.4.

¹³³Contrary to the statement in Plofker (2015: 182), I would not consider the use of numbers a 'standard notational mark' even for the segmentation of a metrical text into its component stanzas.

segments of texts. Again, what has been said above about the use of spaces, punctuation signs, etc., by scribes versus authors, also applies to this means of segmentation.

An interesting example is provided by the segment numbering of the text of the *Carakasamhitā* at the lowest level. Beyond the *sthāna*-s¹³⁴ and ‘study portions’ (*adhyāya*-s), and a unique intermediate segmentation into seven tetrads (*catuṣka*-s) of *adhyāya*-s of the Sūtrasthāna,¹³⁵ the first major segment, there are no further types of segments mentioned in the survey of the treatise at the end of the Sūtrasthāna,¹³⁶ in the text in general or in the manuscripts, be it in their segment titles or elsewhere. Cakrapāṇidatta is also silent on such a further segmentation. Nevertheless, the standard printed edition of the *Carakasamhitā* by the influential scholar–physician Jādavaji Trikamji Āchārya (1941) and all later editions contain a further partly formal, partly content-related segmentation of numbered prose portions and stanzas within the *adhyāya*-s. This particular segmentation, however, is obviously the creation of Jādavaji Trikamji, who published several editions of the work from the twenties of the last century onwards. This supplementary low-level segmentation has become canonical and is accepted uncritically as an authentic structural feature of the treatise. Practically all printed editions that were published earlier, starting with Gangadhar Kaviraj’s *editio princeps* of 1867–1868, have their own formal segmentation instead, which was presumably introduced by their editors. None of these segmentations are seen in the available manuscripts. However, some of them do have some numerical formal segmentation of larger prose portions of the text, but stanzas inserted in prose passages, quoted stanzas and the stanzas of the study portions that are entirely written in metrical form are excluded from this segmentation.¹³⁷ In one of these cases¹³⁸ the way the text is structured and arranged on the pages of a booklet suggests that the manuscript is actually a master copy

¹³⁴See below, Sect. 7.5.2.

¹³⁵See Meulenbeld (1999: IA, 93) with reference to CS Sū 30.44–46. The last two *adhyāya*-s of the Sūtrasthāna are designated as ‘summarizing chapters’ (*saṅgrahādhyāya*-s) in CS Sū 30.45. This special designation is not found in the segment titles following the text of these *adhyāya*-s.

¹³⁶See below, Sect. 7.4.10.

¹³⁷Ms. A. 902/1, Oriental Research Institute, Mysore, no. E 41621 in Malledevaru (1986: 70f.), ms. 108221, Saraswati Bhawan Library, Varanasi = ms. no. 108685 in *A Descriptive Catalogue of the Sanskrit Manuscripts* (1996: 84), and ms. 107465 of the same repository = no. 108824 in *A Descriptive Catalogue of the Sanskrit Manuscripts* (1996: 98). The last of these manuscripts was personally written by the editor of the *editio princeps*, Gangadhar Kaviraj; see Preisendanz (2013: 82, note 53). Its segmentation should therefore be compared with that of this printed edition. Inasmuch as the first manuscript of the Saraswati Bhawan Library is closely related to it, its segmentation is also of special historical interest. Sporadic segment numbering is seen in a manuscript of the Asiatic Society of Bombay, Mumbai, ms. 172 in Kulkarni and Desai (1998: 57), and in ms. R. 15. 85, Trinity College Library, Cambridge, described in Aufrecht (1869: 21–24).

¹³⁸Ms. A. 902/1, Oriental Research Institute, Mysore; see the previous note. Individual sections of text of a not yet identified commentary in Kannada language follow after each numbered segment of the basic text in this undated manuscript in Kannada script. Furthermore, the segments containing the basic text are indented on both sides and the scribe has introduced centered headings for them.

meant for the printer. In another case, the stanzas are included in the numbering scheme.¹³⁹ In still another case,¹⁴⁰ only some of the stanzas have numbers, and in one manuscript¹⁴¹ the items in various lists have been numbered. These segmentations are clearly individual attempts of the scribes of the manuscripts to provide some structure to the otherwise unstructured *adhyāya*-s. They still have to be studied in more detail with regard to their criteria and internal logic. As there clearly is no authentic, archetypical segmentation of the text beyond the *adhyāya*-s, we have decided to expressly introduce our own new segmentation in the forthcoming critical edition of *Carakasamhitā* Vimānasthāna *adhyāya* 8, according to a fresh compositional analysis of this segment of the text.¹⁴²

In general, in my experience with the genre of medical and philosophical manuscripts, the use of numerals as a means for segmentation is relatively rare and their frequent use seems to point at a late date of production of the manuscript. This may be different in the case of manuscripts with works belonging to different genres or manuscripts going back to a much earlier period than the late medieval and early modern time. For example, the scribe of the third-century Spitzer Manuscript indeed employs numbers placed after the enumerated items when the unknown author of the work lists the names of the major segments of the *Mahābhārata*.¹⁴³ In inscriptions, the numbering of stanzas is first seen in an inscription of the Gupta ruler Samudragupta (fourth century), and from the medieval period onwards stanzas are commonly numbered, albeit in an inconsistent manner.¹⁴⁴

7.4.7 *Post-positioned Segment Titles, Generic Versus Content-Related Names, and the Role of Scribes and Users*

Formal segmentation in manuscripts is also achieved by inserting segment titles with the names of larger text segments. These segment titles, sometimes also called colophons even if they do not convey any additional information beyond the name of the text segment, the title of the work and its author, normally indicate the conclusion of a textual segment and thus appear after the final word of the particular segment in the same line (see again Figs. 7.3, 7.4, 7.5, and 7.8), in special cases

¹³⁹Ms. 37089, Ganganatha Jha Research Institute, Allahabad, listed under this number in the accession register of the manuscript library.

¹⁴⁰Ms. 2498, Rajasthan Oriental Research Institute, Alwar, no. 5155 in Menaria et al. (1985: 574f.).

¹⁴¹Ms. 5527, Bhogilal Leherchand Institute of Indology, Alipur, listed in volume 4 of the handlist of the manuscript collection of this institute.

¹⁴²See Preisendanz et al. (forthcoming) and the analysis in Preisendanz (2007).

¹⁴³See above, Sect. 7.3.3.

¹⁴⁴See Salomon (1998: 66).

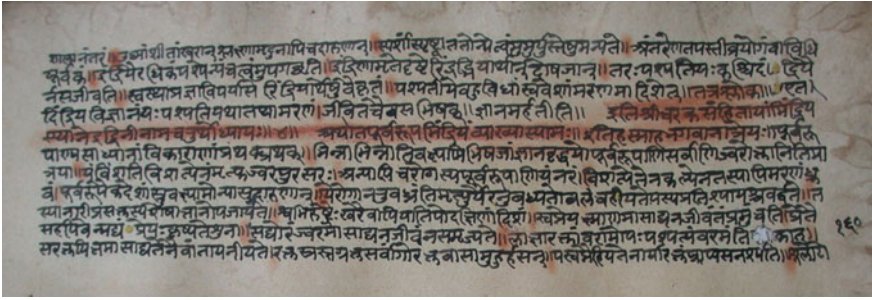


Fig. 7.8 Ms. C 3688, Gaekwad Library, Banaras Hindu University

also in a new line (see Fig. 7.7).¹⁴⁵ They are very frequently separated from the preceding text by the multi-functional particle *iti* which is often translated as ‘thus’, but may also be conceived as a mere verbalized separator of text whose origin should be sought in the context of the oral transmission of continuously recited texts. In the almost continuously written text of the manuscripts, *iti* in a way corresponds, e.g., in the case of the post-positioned segment titles, to the starting of a new line in modern writing practice. *Iti* is also frequently used in this general function by Vātsyāyana, the author of the *Nyāyabhāṣya*, after concluding the discussion of a topic and before starting a new one, or after completing his commentary on a *sūtra*. It is thus justified to call the particle a linguistic segmentation device by itself.

The segment titles regularly contain the chosen generic term for the segment, such as ‘cycle’ (*maṇḍala*), ‘question’ (*praśna*), ‘node’ (*parvan*), ‘portion for recitation’ or ‘study portion’ (*adhyāya*), etc., with the appropriate ordinal adjective ‘first’, ‘second’ and so on, as an attribute to these nouns. This would be the shortest type of segment title, which may be followed by the matching numeral. In the case of segments that are individually and characteristically named, for example with reference to their content, the segment title may merely consist of this designation which often comprises the generic term referring to the segment type within the segmentational hierarchy of the work, e.g., ‘The Node on Peace’ (*Śāntiparvan*). In such segment titles, the individual segment names may be augmented further by ordinal adjectives indicating the place of the segment in the sequence of segments at the same level. Moreover, the specific function of the segment titles may be clarified by the addition of the grammatically appropriate form of the predicatively used past participle *saṃāpta* (‘concluded, finished’). Thus the mere mention of the segment by type and position in the sequence, or by its individual name, is turned into a complete nominal phrase; the formal segmentation in a way becomes a

¹⁴⁵The eleventh-century polymath Al-Bīrūnī, who spent some time in northwestern India, acquired knowledge of the Sanskrit language and closely studied the local culture and sciences, already remarked that “the Indians” place the titles of books at their end, and not at the beginning. See Plofker (2015: 182).

linguistic segmentation. Furthermore, the segment titles may be enclosed by blank spaces, single or double vertical strokes, or such strokes in combination with blank spaces, small vertical strokes or dots, etc., as preferred by the scribes. In this way, the end of a text segment is highlighted. At the same time, the segment titles themselves are highlighted as text segments in their own right, or more precisely, as para-textual elements.

In the case of the basic segment titles, as in the case of the other means of textual segmentation treated above, the manuscripts of a particular work may present us with a variety of usages, not only as regards the graphical and linguistic styles of the segment titles, but also regarding the terms employed for the segment types and their individual designations. The evidence of the manuscripts may also differ in terms of the factual segmentation, that is, the overall number of major segments, their size and content, and their relation to other, minor text segments. This phenomenon has been briefly addressed above in connection with the complicated issue of the segmentation and segment designation of the epic *Mahābhārata*.¹⁴⁶ Only when the evidence of all available manuscripts of a work allows the reconstruction of a particular formal segmentation and particular segment names for the hypothetical archetype, regardless of the precise linguistic style of the segment titles which may vary slightly according to regional, local or individual taste or preference, both the segmentation and the designation can be assumed to have enjoyed an authoritative status at the time of the production of the archetype, and probably for some time afterwards. The formal segmentation as such may thus be rather old. Even so—depending on the approximate date of the work in question—it may go back to a segmentation introduced for the sake of better memorization, study and teaching of the work subsequent to its composition. It cannot be proven to be the oldest and authorial formal segmentation without further, especially text-internal evidence, or datable, more or less contemporary independent evidence. As we have seen, the evidence of a roughly datable independent source for the formal segmentation of the *Mahābhārata*, the Spitzer Manuscript, may provide us with an extremely valuable glimpse of the earliest textually documented state of this epic in terms of its major text segments and their approximate content matter. This state is much older than the one conveyed by the extant manuscripts of the *Mahābhārata* by way of their segment titles and actual segmentation. Even so, this evidence does not reach back to the status of the hypothetical ancient core of the epic or *Urepos*, if there ever was one. If more than one formal segmentation and different segment designations are attested in the manuscripts, however, we should examine this evidence from the stemmatic point of view, to distinguish between an older formal segmentation, possibly found already in the text of the archetype, and further such segmentations that were subsequently introduced for practical purposes in the course of the text's transmission.

¹⁴⁶See above, Sect. 7.3.3.

Starting from the described basic structure of segment titles, further information may be supplied by them. The place of the segment within a larger segment in the hierarchy of the text may be indicated, e.g., in the form of naming the chapter in which a particular smaller section is contained. The name of the work of which the segment is a part may also be explicitly mentioned, complete with the name of its author. This name is often prefixed with honorific additions¹⁴⁷ or titles are attached to it, or it may be combined with essential information on the author, such as the name of his father or teacher, or even on his place of residence and authorial activity. In the case of commentaries, the segment titles may also clarify to which basic work the commentary relates. In this way, segment titles, not only final colophons that conclude the text as a whole, may become quite extensive and turn into segment colophons. When it comes to the question of their being authorial or not—authentic, added early in the transmission of the text, or more recent—, what has already been said on the segment titles conveying only basic information applies *mutatis mutandis*. However, if we can observe a more or less perfect agreement of the text of the segment titles or colophons in all available manuscripts, or at least in the stemmatically relevant ones, and can determine some personal touches, for example, in the reference to the author's father or teacher, who may often have been identical, this may be good evidence for the fact that the segment titles or colophons, and with them the textual segmentation inclusive of the involved segment-type terms and individual designations, are indeed authorial. This is most probably true for the segment titles and colophons of some manuscripts of Navya Nyāya commentaries on the *Nyāyasūtra*,¹⁴⁸ whose evidence for the textual segmentation of the basic text is, however, rather late and therefore historically less interesting.

Marginal indicators matching the intralinear segment titles may serve to refer to the text segment found on the particular leaf.¹⁴⁹ These short indicators normally appear in the margin of each leaf or even side of a manuscript, occasionally even twice, and contain, in abbreviated form, the title of the work. The abbreviation may be followed by a numeral, or abbreviated ordinal adjective, that refers to the ordinal position of the segment whose text is found on the leaf or side.¹⁵⁰ For clarification, the numeral may be preceded by an abbreviation of the segment designation, be it a

¹⁴⁷The word *śrī*, short for *śrīmat* ('glorious'), is the most commonly used honorific prefixed to the name of a person.

¹⁴⁸See, e.g., the colophons and introductory stanzas to the major segments of the basic text of Keśavamiśra's *Gautamīyasūtraprakāśa* treated in Preisendanz (2005: 76–77).

¹⁴⁹Karttunen (2011: 11) considers this type of indication rare.

¹⁵⁰For example, *nyā. bhā. 1* (= *nyāyabhāṣya* [*adhyāya*] 1); *dvi. bhā.* (= *dvitīya bhāṣya*, i.e., second [*scil. adhyāya*], commentary); *bhā. tṛ.* (= *bhāṣya tṛtīya*, i.e., commentary, third [*scil. adhyāya*]); *vā. bhā. pra.* (= *vātsyāyana bhāṣya prathama*, i.e., Vātsyāyana, commentary, first [*scil. adhyāya*]).

generic term, such as ‘study portion’ (*adhyāya*),¹⁵¹ or a content-related name.¹⁵² Furthermore, the number of the segment may be given all by itself in the form of a numeral in the margins. This means of formal segmentation does not have an independent or primary status inasmuch as it is an outflow of the intralinear segment titles in the text. Such marginal segment indicators may have been added either by the scribe himself or his assistant, or by a user of the manuscript, in order to facilitate orientation within the continuously written text. Sometimes, a close examination of the hands allows the determination of their provenance.

7.4.8 Linguistic Segmentation Devices and the Original Structure of a Work

Moreover, there are a number of text-internal linguistic segmentation devices, that is, expressions in the text of the work itself that signal a segmentation of the text. These devices can be minimal ones: the end of a text segment may be indicated by the already mentioned particle *iti* which functions as a separator,¹⁵³ and the beginning of a new segment by conjunctions such as ‘now’ (*atha*)¹⁵⁴ or adverbs such as ‘presently’ (*idānīm*). Furthermore, certain individual linguistic patterns that point to a change of topic may be detected in a specific work or as an element of the style of a particular author. In the *Carakasamhitā*, we see formulaic expressions that expressly mark the beginning of the major text segments (*sthāna*-s) and study portions (*adhyāya*-s), and of some focused expositions that are not formally defined and designated as text segments, such as “‘Now, henceforth we will explain the study portion on ...’—thus spoke the venerable Ātreya¹⁵⁵ or ‘In this connection, we will explain / incidentally explain ...’,¹⁵⁶ ‘It has been said: “...”. We will explain / incidentally explain this now’,¹⁵⁷ ‘We will incidentally explain

¹⁵¹For example, *nyā. bhā. a. 1* (= *nyāyabhāṣya adhyāya 1*).

¹⁵²For example, *tri. bhā.* (= *trisūtrībhāṣya*, i.e., commentary on the unit consisting of the [first] three *sūtra*-s); *pra. bhā.* (= *pramāṇabhāṣya*, i.e., commentary on the means of knowledge [*pramāṇa*]); *vi. mā., vimā.* or *vimāna* (= *vimānasthāna*, i.e., location/foundation of/for stocktaking); *ca. vi., ca. saṃ vi.* or *ca. vi. sthā.* (= *carakasamhitā vimānasthāna*); *cara. śārī.* (= *carakasamhitā śārīrasthāna*, i.e., *Carakasamhitā*, location/foundation of matters relating to the body); *ca ci jvaraci, ca ci jvara, ca jvara ci* (= *carakasamhitā cikitsāsthāna jvara* with some permutations and repetitions, i.e., *Carakasamhitā*, location/foundation of/for cure, [*adhyāya* on] fever [*jvara*]). On the segment designations of the *Carakasamhitā*, see further below, Sect. 7.5.3.

¹⁵³See above, Sect. 7.4.7.

¹⁵⁴See above, Sect. 7.3.2.

¹⁵⁵*athātaḥ* [...] *adhyāyaṃ vyākhyāsyāma itī ha smāha bhagavān ātreyaḥ*.

¹⁵⁶*tatra ... vyākhyāsyāmaḥ/anuvyākhyāsyāmaḥ*.

¹⁵⁷... *itī yad uktaṃ tad vyākhyāsyāmaḥ/anuvyākhyāsyāmaḥ*.

how ...',¹⁵⁸ and 'Next, we will incidentally explain ...'.¹⁵⁹ Inasmuch as they can easily be imitated and repeated, one may argue that they were inserted as segment markers in the course of the text's transmission. In the first example, this may very well have been the case because in the Kashmiri recension of the text, which is usually closer to the archetype, the reference to Ātreya (Punarvasu) as the seer who promulgated the medical knowledge transmitted in the *Carakasamhitā*¹⁶⁰ is only found at the beginning of the *sthāna*-s, whereas in the Eastern recension the full formula is systematically prefixed to all study portions of the work. The full formula may thus have its more or less original place at the beginning of the *sthāna*-s and the reverential reference to the seer was extended from there to the individual study portions in the course of transmission. The second group of text-internal linguistic indications of segments adduced above is most probably authentic or authorial, in the sense that the phrases are part of the original wording of a particular stratum of the compiled and edited work that was still extant at the time when Ḍṛḍhabala restored the *Carakasamhitā*.¹⁶¹ In their unpredictable variations and uneven distribution over the text, they do not convey the impression that they were systematically inserted by later editors to mark content-related segments of the text. In this case, one would expect more linguistic uniformness and a consistent application to such factual segments, such as in the case of the stereotypical phrase 'X spoke',¹⁶² that regularly marks the beginning of portions for recitation, with and without a change of the protagonist speaker, in the *Mahābhārata*.¹⁶³

More explicit formulations may not only be clues to some textual segmentation originally conceived by the author. They may also reveal the specific generic terms for the segments he had in mind and the individual content-related designations for these segments designed by him. In the *Nyāyasūtra*, such telling formulations are not seen. One therefore looks out to the earliest preserved commentary on it, the *Nyāyabhāṣya*. There, a content-related segmentation of the basic text is explicitly expressed in phrases such as 'Hereafter the examination of the means of knowledge, etc.',¹⁶⁴ 'Now the examination of the means of knowledge',¹⁶⁵ 'Perception has been examined. Presently, inference is examined',¹⁶⁶ and 'The means of knowledge have been examined. Presently, the object of knowledge is examined'.¹⁶⁷ However, these and further linguistic segmentation devices, if taken together, do not convey a

¹⁵⁸yathā hi ... tathānuvyākhyāsyāmaḥ.

¹⁵⁹... ata ūrdhvaṃ anuvyākhyāsyāmaḥ.

¹⁶⁰See below, Sect. 7.5.1.

¹⁶¹See again below, Sect. 7.5.1.

¹⁶²[x] uvāca.

¹⁶³The employment of the same segmentational device at the beginning of study portions is also seen in texts belonging to the genre of Purāṇa-s.

¹⁶⁴See NBh 53,4: ata ūrdhvaṃ pramāṇādīparīkṣā.

¹⁶⁵See NBh 58,6: atha pramāṇaparīkṣā.

¹⁶⁶See NBh 80,3: parīkṣitaṃ pratyakṣam. anumānam idānīm parīkṣyate.

¹⁶⁷See NBh 135,4: parīkṣitāni pramāṇāni. prameyam idānīm parīkṣyate.

segmentation of the *Nyāyasūtra* that matches the one into five ‘study portions’ (*adhyāya*-s), with two ‘daily study portions’ (*āhnika*-s) each, seen in manuscripts that contain the *sūtra* text only (*sūtrapāṭha*) and in printed editions, and repeated in the editions of commentaries on the *Nyāyasūtra*, let alone the further segmentation of the *āhnika*-s into a varying number of variously named and defined sections on particular topics (*prakaraṇa*). This latter segmentation is introduced mainly in *sūtrapāṭha* manuscripts and thus also found frequently in editions of the *Nyāyasūtra*, and sometimes adopted even in printed editions of the *Nyāyabhāṣya* even though it is not found in its manuscripts. The words *adhyāya* and *āhnika* do not at all appear in the *Nyāyabhāṣya*; the word *prakaraṇa* is used, but does not refer to a text segment. Thus, besides the post-positioned segment titles which may or may not be original parts of the composition, the text of the *Nyāyabhāṣya* itself does not explicitly attest to the generally accepted major and minor segments of the *Nyāyasūtra* which provide its own structure.

7.4.9 Rubrication and Highlighting

Finally, rubrication and highlighting, most often with red pigment made of iron oxide, are used as means to emphasize other segmentation devices, such as the segment titles or their most essential parts. Less frequently, initial words or phrases that are indicative of the beginning of a new segment of text, such as ‘now’ (*atha*), are marked in this way, as may be any other initial word of some content-defined segment (see Fig. 7.8 above). By themselves, or in combination with other segmentation devices such as blank spaces and vertical strokes, rubrication and highlighting may also be used to set off certain segments of the text from the rest, such as *sūtra*-s or any quotations of the reference text from the running text of a commentary in which they are embedded. It is obvious that these two devices are employed by the users of the manuscripts and may represent their own interpretation of the structure of the text when the marking of segment-initial words or phrases is concerned.

7.4.10 Tables of Contents

Following the tradition of the ancient Vedic Anukramaṇī-s,¹⁶⁸ detailed tables of contents (*anukramaṇikā*) of a work whose text is contained in a manuscript may sometimes be attached to the manuscript, on the last leaf or on a separate leaf. It can be assumed that they were prepared by the users of the manuscript or already by the scribes as part of their job of copying, for the purpose of easier and faster reference

¹⁶⁸See above, Sect. 7.3.1.

to the individual topics treated in the written document. Especially in the case of scientific works, the individual items in these tables of contents may be supplemented with the number of the leaf of the respective manuscript where their beginning is found.¹⁶⁹ Such tables of contents, needless to say without leaf numbers, have sometimes become part of the thus analyzed work itself in the course of its transmission and redaction, for example as its first chapter or part of it, and formulated in simple prose or verse, as in the case of Kauṭilya's *Arthaśāstra*, an ancient Indian scientific treatise on statecraft and economics.¹⁷⁰ The final chapter of a work is also a suitable place for such surveys of content,¹⁷¹ or they were interpolated in some other suitable slot, like the 'Summary of 'Nodes' (*parvan*-s)' in the *Mahābhārata*.¹⁷² Similarly, mere lists of the individually named segments of a work, once it had been systematically structured in such a manner, found their way into the text of the work itself, such as the *Mahābhārata*'s *Anukramaṇī*, that is, the ordered list of its one hundred content-related *parvan* names.¹⁷³ In this way, originally para-textual or even extra-textual supplementary material, be it oral or written, which was designed to clarify and settle the segmentation of a work for the sake of the convenience of the reader and user alike, became itself a more or less clearly demarcated segment of its text.

A list-type survey of the above genre, in prose and in verse, is also contained in the *Carakasamhitā*, which will be treated in some more detail in the following, as an example for both the segmentation and structuring of a scientific work and the practice of a content-related naming of segments.¹⁷⁴ In this work, we furthermore find the special feature of concluding versified summaries of the topics of each individual study portion of the work which appear before the usual segment titles discussed above.¹⁷⁵

7.5 Segmentation of the *Carakasamhitā*

7.5.1 *The Early History of the Transmission of the Carakasamhitā and Its Segmentation*

For an understanding of the significance of this survey of text segments in the case of the *Carakasamhitā*, a glimpse of the earliest history of its transmission will prove

¹⁶⁹See Scharfe (2000: 32), with reference to a paper by David Pingree published in *Journal of the American Oriental Society* 108 (1988).

¹⁷⁰See Renou (1961: 183–184). See also Scharfe (2002: 32) and Karttunen (2011: 10).

¹⁷¹See Karttunen (2011: 10–11) on Varāhamihira's *Brhatsamhitā*, a work on astronomy, and the value such information may have for text-historical research.

¹⁷²See Sect. 7.3.3 above.

¹⁷³See again Sect. 7.3.3 above.

¹⁷⁴For a survey see Meulenbeld (1999: I.A, 93–94).

¹⁷⁵See Sect. 7.4.7.

useful.¹⁷⁶ According to the *Carakasamhitā*'s own testimony at the very beginning of the work, the eternal knowledge (*veda*) of the human lifespan or life-force (*āyus*) (Āyurveda) presented in it was first proclaimed by god Brahmā, who transmitted this body of knowledge to Prajāpati, a creator god, culture hero and the father of all creatures. Prajāpati transmitted it to the Aśvin-s, the twin gods closely associated with healing and physical rejuvenation of gods and humans alike, and the Aśvin-s to Indra, the king of the gods associated with worldly power and physical strength. After this mythological genealogy of Āyurveda in general, the narrative of the *Carakasamhitā* continues with its own legendary genealogy, which at some point turns into a historical account. Once the sages of yore observed that diseases had befallen the human beings and kept them from meritorious activities such as ascetic practices, fasting and memorizing, reciting and studying the Vedic corpus; the diseases also impeded the human life-force in general.¹⁷⁷ Upon this, the sages felt commiseration toward the creatures and sent sage Bharadvāja as an envoy to approach Indra in his heavenly abode, from whom he indeed obtained the Āyurveda.¹⁷⁸ Upon his return to earth, Bharadvāja imparted this knowledge to his assembled co-sages.¹⁷⁹ The sage and physician Punarvasu of the Ātreya clan was one among the crowd of sages who were instructed by Bharadvāja at the time, and he subsequently taught the 'Knowledge of the Human Lifespan/Life-Force' to six students. Agniveśa, the most outstanding among them, first composed a fundamental systematic scholarly treatise (*tantra*) on the basis of his teacher's instructions.¹⁸⁰ The medical teachings contained in the *Carakasamhitā* are said to be those of Agniveśa's treatise.

The work in question is, however, transmitted under the name *Carakasamhitā*, generally understood to mean 'Caraka's Collection', because an early redaction of the treatise is said to have been accomplished by a physician-scholar named Caraka.¹⁸¹ At the end of the work, in the last 'study portion' (*adhyāya*), the job done by this extremely wise redactor (*saṃskartṛ*)¹⁸² is characterized: he expanded on what had been said only partially and summarized what had been said in too

¹⁷⁶The following brief outline is based on Preisendanz (2015: 135–136).

¹⁷⁷See CS Sū 1.6.

¹⁷⁸See CS Sū 1.18cd–26.

¹⁷⁹See CS Sū 1.27.

¹⁸⁰See CS Sū 1.30–32. The other disciples are Bhela, Jatūkarna, Parāśara, Hārīta and Kṣārapāṇi.

¹⁸¹The indigenous tradition that the title's first component, the word *caraka* (literally: 'wandering'; 'a wanderer'), relates to a famous physician and important redactor of Agniveśa's treatise called Caraka, appears rather late in medical literature; see Meulenbeld (1999: I.A, 106 and 109). On the word *caraka*/Caraka in Vedic literature see Witzel (1985: 114–116), on the possible connection between the medical tradition of the *Carakasamhitā* and the Caraka school of the Black Yajurveda Witzel (1985: 120–121).

¹⁸²The underlying verbal root \sqrt{kr} , with the preverb *sa-*, means 'to put together', 'to prepare, make up' and 'to decorate, refine'. This could be taken as a rough description of the tasks of a redactor and editor in the South Asian context.

much detail, and thus made the old treatise practically a brand-new one.¹⁸³ Reference to Caraka the redactor is also found in stanzas that conclude major segments of the work. For example, at the end of the first major text segment, the Sūtrasthāna, it is stated that this entire segment in the treatise produced by Agniveśa and redacted (*pratisaṃskṛta*) by Caraka is concluded, having ‘this extent’, presumably the extent outlined in the immediately preceding summarizing stanzas.¹⁸⁴

The tradition also recalls a second redaction or even reworking of the text by a certain Dṛḍhabala who had realized that the treatise redacted by Caraka was incomplete by a third. This is mentioned in a stanza immediately following the stanza that sketches the way Caraka redacted Agniveśa’s treatise. Dṛḍhabala, a native of the city of Pāñcanada, therefore completed the treatise so that it may be ‘unfragmented’ (*akhaṇḍārtha*). We also learn about his method and which parts of the text were authored by him: having gathered details from many other treatises, like a gleaner, he made the treatise complete through seventeen ‘study portions’ (*adhyāya*-s) on cures, that is, seventeen *adhyāya*-s of the major segment of the text called Cikitsāsthāna, which has altogether thirty *adhyāya*-s in the text as transmitted in the available manuscripts, and through the entire major segments on treatment (Kalpasthāna) and medicinal preparations (Siddhisthāna), which follow upon the Cikitsāsthāna and conclude the work.¹⁸⁵ This would amount to almost exactly a third of the present work if one measures the text supplied by Dṛḍhabala in *adhyāya*-s.¹⁸⁶ The missing third is also identified elsewhere in the work, towards the end of the Cikitsāsthāna. There two stanzas state that in Agniveśa’s treatise, redacted by Caraka, seventeen study portions in this major text segment, the ‘Treatments’ (*kalpa*) and the ‘Preparations’ (*siddhi*) (i.e., all *adhyāya*-s of the major text segments on treatments and preparations), could not be obtained, and that Dṛḍhabala, son of Kapilabala, ‘produced’ them—presumably the text segments mentioned—to truthfully complete this greatly useful treatise.¹⁸⁷

Dṛḍhabala is dated to the period between 300 and 500 CE by G. Jan Meulenbeld.¹⁸⁸ The composition of the work excluding the portions composed by Dṛḍhabala may have taken place during the first two centuries CE. In this rough dating of an obviously composite work with several historical strata, I more or less

¹⁸³See CS Si 12.36cd–37ab and 37cd.

¹⁸⁴See CS Sū 30.90: *agniveśakṛte tantre carakapratisaṃskṛte / iyatāvadhinā sarvaṃ sūtrasthānaṃ samāpyate ||*. See also CS Si 12.54–55 in a sequence of concluding stanzas that are found only in a part of the transmission.

¹⁸⁵See CS Si 12.37cd–41ab. Stanzas 36cd to 40ab have been translated by Meulenbeld (2010: 718). See also the translation of 36cd to 38a¹ and 38a² to 40b by Maas (2010a: 2 and 3).

¹⁸⁶The commentator Cakrapāṇidatta remarks that the figure is an approximate one; thus, the issue that 41 *adhyāya*-s are not a third of the total 120 *adhyāya*-s should not be raised (ĀD 735b, 25–27).

¹⁸⁷See CS Ci 30.289–290, translated by Meulenbeld (2010: 718) and Maas (2010a: 4). On Dṛḍhabala and the problem of the original sequence of chapters of the Cikitsāsthāna, see below, Sect. 7.5.4, and Maas (2010a).

¹⁸⁸See most recently Meulenbeld (2010).

follow Meulenbeld's earlier learned and judicious conclusion 'that the author called Caraka cannot have lived later than A.D. 150–200 and not much earlier than 100 B.C.'¹⁸⁹ Meulenbeld considers Punarvasu Ātreya a fully legendary figure and more recently postulated that Dṛḍhabala actually entirely rewrote an older work on medicine,¹⁹⁰ fancifully attributed by him to a redactor called Caraka. He further assumes that this older work may have contained remnants of a still earlier medical treatise which Dṛḍhabala designated as the treatise of Agniveśa.¹⁹¹ I, for my part, without essentially disagreeing with Meulenbeld, wonder whether in this case the presentation and treatment of topics in the first four major segments of the work should not be more coherent, consistent and systematic. Thus, in a very general way I tend to pay more respect to the tradition in my—certainly less profound—analysis of the work, and to regard at least Agniveśa as a historical figure, much of whose early-classical medical teachings may have been preserved in the pre-Dṛḍhabala *Carakasamhitā*, in spite of the possible interference of an early redactor, no matter whether his name was Caraka or not, and in spite of the obvious addition and interpolation of individual passages in the course of the early, pre-'Caraka' and pre-Dṛḍhabala agglomerative formation and transmission of the text, as can be assumed by means of analyses of individual passages and topics. Until a scientific, methodically sound stratification of the entire work, exclusive of the parts traditionally attributed to Dṛḍhabala, has been attempted by means of a close examination of vocabulary, terminology, style and content, something which may not be completely out of reach, I do not even want to exclude that some especially archaic parts of the work may go back to an earlier medical teacher whom one may call Punarvasu Ātreya.

7.5.2 *The Segmentation of the Carakasamhitā—Major and Minor Segments (Sthāna-s and Adhyāya-s)*

As outlined above, according to its own testimony the work that is commonly called the *Carakasamhitā* obviously had an eventful early history of formation and transmission. This may have been a major reason for the inclusion of a kind of structural survey of its contents, with the clear indication of the different segments of the entire work by name and number. The passage containing this information, which is composed in a series of regular stanzas, occurs in the last 'study portion' (*adhyāya*) of the first major text segment commonly called Sūtrasthāna. Its insertion in the text at this place is occasioned by the exposition of answers to a series of eight questions that may be posed by a physician to another physician, to test his traditional affiliation and knowledge of the science. These questions include asking

¹⁸⁹See Meulenbeld (1999: I.A, 114).

¹⁹⁰See Meulenbeld (2010: 719).

¹⁹¹See Meulenbeld (2010: 723).

him about (1) the issue of the ‘station’, that is, ‘location’ or ‘foundation’ (*sthāna*) of the treatise, (2) the subject matters of such a ‘location’/‘foundation’ or such ‘locations’/‘foundations’, (3) the issue of the ‘study portion’ (*adhyāya*), and (4) the subject matters of such a ‘study portion’ or such ‘study portions’.¹⁹² In the answers provided in what follows, we find that in response to the first question reference is already made to the third one, in that the author not only lists the eight ‘locations’/‘foundations’, or major segments of the *Carakasamhitā* by their individual names, but additionally gives the number of study portions individually contained in them.¹⁹³ Altogether, the study portions number 120.¹⁹⁴ This matches the number of study portions given in a stanza at the end of the work. There it is said that the oral instruction by sage Ātreya consisted of 120 study portions which were proclaimed by the wise Agniveśa.¹⁹⁵ The basic structure and segmentation of the treatise and the names of its major segments are thus unambiguously declared.

Furthermore, there is some important supplementary information given in the straightforward response to the third question. For each *sthāna* all study portions are listed, in the form of keywords that more or less closely refer to their individual names, as found in the respective segment titles of the available manuscripts, or to their major topics. Their numbers per *sthāna* are explicitly and implicitly¹⁹⁶ repeated. Concerning the subject matters of the *sthāna*-s and study portions, which had been inquired about in the second and fourth questions, the reader is referred to the information found in each of these major and minor text segments at their end.¹⁹⁷ Unlike in the case of the *Mahābhārata*’s ‘Summary of “Nodes” (*parvan*-s)’,¹⁹⁸ though, the size of each *sthāna* is not given. It would have been more difficult to achieve this than in the case of the ‘Summary of *parvan*-s’ because the first part and by and large older stratum of the *Carakasamhitā*, that is, its first four *sthāna*-s, is composed in a mixture of prose and verse, with prose passages dominating. The other four *sthāna*-s are either exclusively composed in stanzas or contain only some or very few prose passages.¹⁹⁹ Thus, the syllables of the prose portions would have had to be counted or estimated individually to calculate a total significant number given in the usual *grantha* or *śloka* measure.²⁰⁰ Thus, even though the text informs

¹⁹²See CS Sū 30.30: *atha bhiṣag ādita eva bhiṣajā praṣṭavyo ’ṣṭavidhaṃ bhavati—tantraṃ tantrārthān sthānaṃ sthānārthān adhyāyam adhyāyārthān prāśnaṃ prāśnārthānś ceti*

¹⁹³See CS Sū 30.33. This passage is addressed, e.g., in Basham (1976: 20).

¹⁹⁴See CS Sū 30.35cd: *saviṣṣam adhyāyaśataṃ śṛṇu nāmakramāgatam*.

¹⁹⁵See CS Si 12.34cd–35ab: *itthaṃ adhyāyaśataṃ viṣṣam ātreyamunivāṇmayam || hitārthaṃ prāñināṃ proktaṃ agniveśena dhūmatā |*.

¹⁹⁶Thus in the case of the Śātrasthāna; see CS Sū 30.52ab.

¹⁹⁷See CS Sū 30.35ab and 38ab.

¹⁹⁸See above, Sect. 7.3.3.

¹⁹⁹For prose passages, see especially the focused study portion on life-prolonging practices and therapies, with four ‘quarters’ (*pāda*-s) as minor text segments, at the beginning of the Cikitsāsthāna. For a brief analysis, see Meulenbeld (1999: 93). The issue deserves to be explored further in terms of the stratification of the treatise.

²⁰⁰See above, Sect. 7.3.2.

us here about its larger structure—the names, number and order of the major text segments and the number of minor text segments contained in them—and provides the approximate names and some major topics, as well as their order, of the minor segments of the treatise, it is silent on the size of both types of text segments and their topics, besides some major ones, and the size of the whole treatise.²⁰¹

7.5.3 *The Names of the Major and Minor Text Segments of the Carakasamhitā and the Issue of Reference in the Context of an Oral Tradition*

Among the eight *sthāna* names, the first one, Ślokaśthāna, stands out in the present context,²⁰² inasmuch as it differs from the name usually found for this *sthāna* in the segment titles of the manuscripts and printed editions, namely, Sūtrasthāna. It seems that the former name, which is difficult to explain and cannot be discussed here, is the original one for this major text segment,²⁰³ whereas the second one may have originated from an explanatory stanza at the very end of this *sthāna*.²⁰⁴ After the prose passage with the *sthāna* names and the number of study portions per *sthāna*,²⁰⁵ a summarizing stanza has been adduced, obviously intended as a memorization device relating to the *sthāna*-s and the number of their study portions. Here further alternative designations for the *sthāna*-s are used, most probably only *metri causa*. *Vimāna* (‘stocktaking’), in *Vimānasthāna*, is shortened to the less terminological noun *māna* (‘measuring’)²⁰⁶ and *kalpa* (‘treatment’), in *Kalpasthāna*, is expanded to the equally ambiguous *vikalpa* (‘preparation’). Three names are replaced by other expressions: *cikitsā* (‘cure’), in the *Cikitsāsthāna*, by *auśadha* (‘medicine’), which also occurs in the stanza where it is explained by means of

²⁰¹For information on the total extent of the work given in a spurious stanza at its end, see Meulenbeld (1999: I.A., 93).

²⁰²See also Meulenbeld (1999: I.A., 93, with note 4 in I.B., 157).

²⁰³In the text itself, reference is sometimes made to the Ślokaśthāna, not Sūtrasthāna; see for example CS Vi 8.29 (= CS [CE] Vi 8.25): ‘... has been taught previously in the Ślokaśthāna’ (... ślokaśthāne pūrvam uktam). See also, e.g., CS Ci 7.49 and 10.54.

²⁰⁴See CS Sū 30.89, the last stanza of the Sūtrasthāna: ‘As one uses a string in order to assemble flowers, in the same way the sage made this assembly (i.e., summary) in order to assemble the topics’ (yathā sumanasam sūtram saṅgrahārthaṁ vidhīyate / saṅgrahārthaṁ tathārthānām ṛṣiṇā saṅgrahaḥ kṛtaḥ ||). In the preceding stanza, CS Sū 30.88, *adhyāya* 30 of the Sūtrasthāna is called a summary (*saṅgraha*) of the whole treatise (*tantra*). Inspired by this statement applied to the whole *sthāna*, the tradition may thus have come up with a *sthāna* name meaning ‘Location/Foundation [that Serves] as a String’. It is also used in other early-classical and classical foundational works on medicine. For a different hypothesis see, for example, Renou (1963: 203, note 40). The issue will have to be discussed further on a different occasion.

²⁰⁵CS Sū 30.33 addressed above, Sect. 7.5.2.

²⁰⁶See also the reference to ‘measuring’ (*māna*) in CS Sū 30.50ab: *aṣṭau vimānāny uktāni mārthāni maharṣiṇā*.

which text segments Dṛḍhabala made the fragmented treatise redacted by Caraka complete again,²⁰⁷ *indriya* ('power, capacity'), in *Indriyasthāna*, is replaced by the less ambiguous technical term *ariṣṭa* ('omen'), and *śārīra* ('matter relating to the body'), in *Śārīrasthāna*, is referred to with the word *āśraya* ('foundation, basis'), which is justified inasmuch as the living body is the foundation of all human activity, physical, verbal and cognitive.

The word *sthāna*, which is used as a generic segment designation here, is derived from the verbal root $\sqrt{sthā}$, 'to stand', and refers, if it is not used as an action noun ('staying, remaining'), to where or on what one stands, that is, to a station, place, location or foundation. As a term for a type of text segment, namely, a major text segment, it is special to the early-classical and classical medical treatises, such as the *Suśrutasamhitā*, *Bhelasamhitā*, *Aṣṭāṅgahrdayasamhitā*, *Aṣṭāṅgasanġraha* and *Kāśyapasamhitā*. It may point at some historical connection of the early-classical medical tradition to the Yajurveda, the Veda containing and treating the ritual formulae (*yajus*) that accompanied the ancient sacrifices, inasmuch as the text of an old recension of the Black Yajurveda, the *Kāthaka* or *Kaṭhasamhitā*, which is based on a lost *Carakasamhitā*,²⁰⁸ has three major segments called 'knots' (*grantha-s*)²⁰⁹ which are further subdivided into minor segments called 'little stations' or 'little places', etc. (*sthānaka-s*).²¹⁰ Beyond this typical segment name, there is a further striking connection to this recension. In a parallel text on the issue of the (im)purity of the divine physicians, the *Aśvin-s*, in the *Taittirīyasamhitā*, another, younger recension of the Black Yajurveda, the medical profession is blatantly denigrated. However, precisely in the versions of the *Kāthaka* and the still older, but related *Maitrāyaṇīyasamhitā* the relevant passage is missing.²¹¹

Generally, the individual name of such a segment is a nominal compound with the word *sthāna* as its last member and a word relating to the content of the segment as first member. Thus, the major text segment is designated as the 'place' where specific information can be found and serves as a foundation for the practitioner in

²⁰⁷See CS Si 12.40ab (*saptadaśauśadhādhīyāsiddhikalpair apūrayat*) and above, Sect. 7.5.1.

²⁰⁸On the Caraka tradition of the Black Yajurveda, which is of course a ritual, not a medical tradition, see Witzel (1985).

²⁰⁹See above, Note 63.

²¹⁰See Oberlies (2009d: 633b). See also Karttunen (2011: 7). Renou does not refer to this similar segment name under the item *sthāna* in his survey of more or less isolated names for text segments (1957a: 25). However, he mentions the *sthānaka-s* of the *Kāthaka* in his treatment of the various divisions of the texts of the Black Yajurveda; see Renou (1957a: 7). In a note, he even writes: 'Reflet lointain de l'association traditionnelle entre l'école védique Caraka et la Carakasamhitā?' (1957a: 7, note 19). This somehow contradicts his interpretation of the segment name *sthāna* later on in his paper; see Note 210 below.

²¹¹See Preisendanz (2015: 124–129).

this respect.²¹² For example, the Kalpasthāna is the ‘Location/Foundation of/for Treatment’.²¹³ However, as we have seen in the statement on Dṛḍhabala’s restoration of the *Carakasamhitā*, a major segment of the treatise may also be referred to simply by the word referring to its content, for example, Kalpa, which would literally mean just ‘treatment’, may be considered an abbreviated segment designation ‘The Treatment’.²¹⁴

The passage on the structure and content of the treatise in the Sūtrasthāna presents us with still another way to analyze and understand the names of the treatise’s major segments that involves the generic designation of their study portions. The individual study portions of a certain *sthāna* are all generically named after the content of this *sthāna* as it is referred to in its name, with the notable exception of the study portions of the Sūtrasthāna or Ślokaśthāna. For example, the study portions of the Kalpasthāna are generically designated as *kalpa*-s, that is, ‘Treatments’.²¹⁵ Now, in the more detailed analysis and explanation of the *sthāna* names which follows the summary statement on the structure of the treatise in terms of its *sthāna*-s,²¹⁶ it is stated that ‘it is laid down by tradition that the *sthāna* of the powers/capacities (*indriya*-s) has twelve study portions’.²¹⁷ We can thus understand the name Indriyasthāna, the ‘Location/Basis of Powers/Capacities’, also to mean the ‘Place/Location of the [Study Portions Named] Powers/Capacities’. Furthermore, in an alternative practice of naming the *sthāna*-s the mention of the generic name of

²¹²Renou (1957a: 25) suggests a completely different meaning, namely “‘siège” de la maladie?”, and does not further reflect on it as a name for a text segment. It rather ‘coïncide avec un développement à l’intérieur des Samhitā médicales de Caraka, Suśruta ..., Ātreya, Vāgbhāta, et, par une extension naturelle, dans le Hastāyurveda, le Śālihotra’ (the two last-mentioned works are treatises on elephant and horse medicine). Even so, in a note he also points out the usage of this segment designation in an important scholastic work of the Buddhist tradition, the *Abhidharmakośa* by Vasubandhu.

²¹³See also the sample translations given above in Note 152.

²¹⁴In the statement on Dṛḍhabala’s activity, *kalpa* is changed to *vikalpa metri causa*. The dictionaries do not record a contextually suitable meaning for the latter word which normally has a completely different meaning (ranging from ‘uncertainty, indecision’, ‘option, alternative’ and ‘sort, variety’ to ‘conceptual construction’ and ‘fancy, imagination’). However, *vikalpa* and a further variant of the word, *vikalpanā*, are used as a synonym of *kalpa* in the *Carakasamhitā* itself. See, e.g., CS Sū 10.10: ‘The treatment of curable patients is threefold in terms of being minor, medium or major (i.e., depending on whether the patient may be cured by a minor, medium or major remedy). However, there is no treatment of definitively incurable patients’ (*sādhyanām trividhaś cālpamadhyamotkṛṣṭatām prati / vikalpo na tv asādhyanām niyatānām vikalpanā ||*). Abbreviated reference to the Nidānasthāna merely with the word *nidāna* is found, e.g., in CS Ci 3.14, 27. 30 and 49, and Ci 9.19, to the Vimānasthāna with *vimāna* in CS Si 9.7, to the Cikitsāsthāna with *cikitsite* (see Note 213) in CS Si 9.6, and to the Kalpasthāna with *kalpa* in CS Ci 3.227 and CS Ka 7.9.17. There is also a reference to the Sūtrasthāna with *sūtra* in Ci 28.13.

²¹⁵This is seen in the segment titles following after each study portion. See also, for example, the plurals *śārīrāṇi* in CS Sū 30.52d, *cikitsitāni* in 62a (with a slight modification of the word *cikitsā*) and *siddhayaḥ* in 67c.

²¹⁶CS Sū 30.33.

²¹⁷See CS Sū 30.55cd: *dvādaśādhyaṅgaṃ sthānam indriyāṇām iti smṛtam*.

the study portions of a *sthāna* in the plural may simply refer to the particular *sthāna* as a whole. This special usage can be seen above, in my close paraphrase of the stanza in the *Cikitsāsthāna* that clarifies which parts of the treatise were composed by Dṛḍhabala.²¹⁸ In the summary statement on the structure of the treatise in terms of its *sthāna*-s in the *Sūtrasthāna*, the usual name of the *sthāna* is also replaced in two cases by the generic mention of its chapters in the plural.²¹⁹ Some internal references to *sthāna*-s of the treatise confirm this alternative way of naming the *sthāna*-s.²²⁰

The above discussion of the meanings of the names of the major text segments in the *Carakasamhitā* has already involved the names of the minor segments of the treatise, the ‘study portions’ (*adhyāya*-s). Their generic names that are taken from the general designation of the content of the *sthāna* that comprises them, except in the case of the study portions of the *Sūtrasthāna* which are simply called ‘study portions’, have already been addressed. As for the specific names, the study portions may be individually designated with reference to their first word or words turned into an adjective that can be used as an attribute to their generic name, where the latter may simply be *adhyāya* (in the case of the *Sūtrasthāna*) or match the *sthāna* name, as described above. For example, in the *Sūtrasthāna* the name of the study portion that begins with the words ‘One should not suppress natural urges’ (*na vegān dhārayet*) is called the *navegāndhāraṇīyo ’dhyāyaḥ*, *navegāndhāraṇīya* being an adjective relating to the noun *adhyāya*. Similarly, the first study portion of the *Sūtrasthāna* which begins with the words ‘a long life’ (*dīrgham jīvitam*) is called the *dīrghañjīvitīyo ’dhyāyaḥ*. One may call this additional characterization of a study portion a *pratīka*-based designation, alluding to the traditional way to refer to any text segment by its initial word or words.²²¹ This type of *adhyāya* name is typical for the first *sthāna*, the *Sūtrasthāna*, but a few *adhyāya*-s of the *Vimānasthāna* and *Śārīrasthāna* also follow this pattern, which clearly relates to the oral transmission of the text and is also found in other classical works on medicine. For example, the study portion of the *Vimānasthāna* that begins with the words ‘Threefold, indeed, are the means of in-depth knowledge of the specifics of diseases’ (*trividham khalu rogaviśeṣajñānam*) is called the *trividharoga-viśeṣavijñānīyam vimānam* where the adjective formed from the initial words of the study portion relates to its generic name, *vimāna*, which matches the *sthāna* name. The individual designations of the other *adhyāya*-s of the remaining seven *sthāna*-s are content-related and directly refer to their main content by means of the relevant term or

²¹⁸See Sect. 7.5.1.

²¹⁹See ‘Among them, the *Śloka*sthāna has thirty study portions, ... there is a set of twelve *indriya*-s, a set of thirty *cikitsā*-s ...’ (*tatra triṁśadadhyāyakam śloka*sthānam ...*dvādaśakam indriyāṇaṁ triṁśakam cikitsānām*...) in CS Sū 30.33.

²²⁰See *indriyeṣu* (‘in the Powers/Capacities’, i.e., in the *Indriya*sthāna) in CS Vi 8.124 (= CS [CE] Vi 8.92), *cikitsiteṣu* (‘in the Cures’, i.e., in the *Cikitsā*sthāna) in Ni 1.15, *kalpeṣu* (‘in the Treatments’, i.e., in the *Kalp*sthāna) in CS Vi 8.93 (= CS [CE] Vi 8.79) and CS Ci 21.53, and *siddhiṣu* (‘in the Preparations’, i.e., in the *Siddhi*sthāna) in CS Vi 8.133 (= CS [CE] Vi 8.99) and CS Ci 5.102.

²²¹See above, Sect. 7.4.5.

by an adjective derived from it, like the *vimāna* (‘Stocktaking’) on taste (*rasavimāna*) in the *Vimānasthāna*, the *śārīra* (‘Matter Relating to the Body’) containing the investigation of the body (*śārīravacayaśārīra*) in the *Śārīrasthāna*, and the *cikitsita* (‘Cure’) on fevers (*jvaracikitsita*) in the *Cikitsāsthāna*. Albrecht Wezler has studied this phenomenon in terms of Sanskrit grammar and reminds us of the similar practice observed in some Brāhmaṇa-s.²²² He considers that this ‘formal’ similarity²²³ is a relic from the Vedic period and thus indicates some historical link between the medical and the Vedic tradition.²²⁴

The generic names of the ‘study portions’ (*adhyāya*-s) matching the name of their *sthāna* when combined with a content-related word guarantee that no confusion about the *sthāna* affiliation of a specific individual study portion will arise: when its name is fully quoted, the allocation of a particular study portion is evident and it may be found more easily in a written text of the extensive work.²²⁵ Furthermore, when such designations also appear in the post-positioned segment titles of the *adhyāya*-s, this definitely helps the reader and user of the manuscript to get some orientation within the extensive written text. The described individual content-related components of *adhyāya* names, on the other hand, determine the identity of a study portion beyond its mere *sthāna* affiliation and ordinal position among the other *adhyāya*-s of the *sthāna*.²²⁶ Furthermore, when *pratīka*-based *adhyāya* names are quoted, even without their generic, *sthāna*-matching components,²²⁷ this triggers the recollection of the text by someone who has memorized it, even if he may not know off-hand in which *sthāna* the particular study portion occurs,²²⁸ which is not much of an issue anyhow in an oral context and in medical practice based upon an oral transmission of a text. It should be remembered here that in an oral tradition formal segmentation basically serves to organize memorization and recitation and may be useful for cross-reference in oral instruction, as outlined above.²²⁹ Such a segmentation does not necessarily have to match a thorough organization in terms of content, which cannot be seen in the case of most

²²²See Wezler (1993: 296–302).

²²³See Wezler (1993: 297).

²²⁴See Wezler (1993: 301–302).

²²⁵For example, the *adhyāya* name *jvaracikitsita* clearly indicates that the study portion on the various kinds of fever is to be found in the *Cikitsāsthāna*. The designation *jvarādhyāya*, ‘study portion on fevers’, would not serve this purpose.

²²⁶For example, a designation like ‘third study portion of the *Cikitsāsthāna*’ or ‘third Cure’ would be less informative in the case of the example adduced in the previous note.

²²⁷In an appendix to his paper (1993: 302–304), Wezler provides a list of references to study portions designated by their initial words found in the major commentaries of four foundational medical works of the classical period, i.e., the *Carakasamhitā*, the *Suśrutasamhitā*, the *Aṣṭāṅgasaṅgraha* and the *Aṣṭāṅgahṛdayasaṃhitā*. They all occur without reference to the *sthāna*.

²²⁸See also Wezler’s general remark that the device of segmenting the text into study portions designated by their initial words ‘has nothing to do with the division of the medical texts into *sthānas*, etc.’ (1993: 302).

²²⁹See Sect. 7.3.1.

adhyāya-s of the first four *sthāna*-s of the *Carakasamhitā*, especially the Sūtrasthāna. As has been pointed out by Hartmut Scharfe, such an organization would not be essential in terms of orientation for somebody who has perfectly memorized a complete text; for him, ‘it would be of little concern that he has to move forth and back constantly’²³⁰ within this memorized whole when he reflects upon an issue or follows up some topic. With specific reference to the science of Sanskrit grammar, Madhav Deshpande refers to the epistemological aspect of this phenomenon as the ‘flatland atemporal perception of language’ in an oral tradition.²³¹ ‘Forth’ and ‘back’ and ‘above’ and ‘below’ refer to a written text through which one materially browses,²³² ‘earlier’ and ‘later’ to an oral text at the time of its memorization and recitation.²³³ Similarly, it would not be important for such a person to know the precise place in the text as a whole of the study portion he now recognizes and remembers by its first words; the remembered content matters.²³⁴ This phenomenon may explain the fact that beyond the mention of the name of a particular major or minor text segment or of the name of a whole work, precise references to other passages within a given text and to passages in other texts are mostly absent in the traditional South Asian context.²³⁵

7.5.4 Concluding Observations on the Segmentation of the *Carakasamhitā* and Its Textual History

It is not possible here to further discuss the ways of text-internal referencing and address additional text-internal structuring devices used in the *Carakasamhitā*, such as the formulaic introductions to the study portions and the concise summaries at their end as well as at the end of the *sthāna*-s. However, in conclusion I would like to stress that, as in the case of the Anukramaṇī and the ‘Summary of ‘Nodes’ (*parvan*-s)’ of the *Mahābhārata*,²³⁶ the structurally focused survey of contents in the Sūtrasthāna of the *Carakasamhitā* treated above²³⁷ presupposes the establishment of the structure it relates and refers to as the structure of a written text. The question whether it was Dṛḍhabala who designed this structure or parts of it when he restored the treatise or whether it may go back to Caraka or even Agniveśa has to remain open. In any case, differently from the case of the *Mahābhārata*’s Anukramaṇī and ‘Summary of *parvan*-s’, the survey of

²³⁰See Scharfe (2002: 34).

²³¹See Deshpande (2011: 91).

²³²‘Forth’ and ‘back’ have primarily a spatial reference, and ‘above’ and ‘below’ originally refer to text written on a scroll in horizontal orientation and from top to bottom.

²³³See above, Sect. 7.3.1.

²³⁴See also the remarks in Karttunen (2011: 9).

²³⁵See the observation in Karttunen (2011: 11).

²³⁶See above, Sect. 7.3.3.

²³⁷See Sect. 7.5.2.

the contents of the *Carakasamhitā* at the end of the *Sūtrasthāna* turned out to be authoritative because we see its segmentation in all available manuscripts of the work. That is, even though the names of the study portions, as seen in the introductory formulae and in the post-positioned segment titles, show some minor variation, they basically agree with each other and match the names given in the exposition in the *Sūtrasthāna*. The *sthāna* names that appear in their individual segment titles present an even more homogenous picture, except for the use of the designation *Sūtrasthāna* instead of *Ślokasthāna* for the first, foundational major segment of the treatise.²³⁸ Furthermore, the number of study portions contained in the *sthāna*-s is also uniform and corresponds to the figures given in the survey in the *Sūtrasthāna*. Not surprisingly, the precise text of all these segments in the manuscripts shows an enormous number of individual variants, from which one can reconstruct a number of text versions typical for certain stemmatic groups of manuscripts that are derived from particular hypothetical exemplars, disregarding obvious idiosyncratic creations and errors of the individual scribes.²³⁹ The basic structure and structure-related information, however, is consistently found in all of them. This justifies the hypothesis that the organization of the text goes back to the archetype of the available manuscripts and may thus be rather close in age to the period of Dṛḍhabala's activity, just as the archetypal text itself that can be reconstructed from the manuscripts.²⁴⁰ The main uncertainty that remains in this respect, however, concerns the order of the study portions at the beginning of the sixth major text segment, the *Cikitsāsthāna*, where the Kashmir and the Eastern hyparchetypes differ,²⁴¹ a difference which is also reflected in the order of the names of the 'study portions' (*adhyāya*) listed for the *Cikitsāsthāna* in the survey of contents of the *Carakasamhitā* at the end of the *Sūtrasthāna*²⁴² and indicates that the text was reworked at least in this respect after Dṛḍhabala had done his work.²⁴³

Appendix on the Segment Designation *Paṭala*

The meaning of the word *paṭala* is uncertain. The neuter noun refers to (1) a cover, (2) a lump or mass, but also to (3) a basket and (4) a text segment (also used in the masculine gender).²⁴⁴ Actually, as already suggested by Paul Tedesco,²⁴⁵ the

²³⁸See above, Sect. 7.5.3.

²³⁹See Maas (2010b: 65) for a hypothetical stemma of part of the *Vimānasthāna* of the *Carakasamhitā* based on an analysis of CS Vi 8.67–157(= CS[CE] Vi 8.63–116). For a description of the method employed in this reconstruction, the reader is referred to Maas (2010b).

²⁴⁰See Maas (2010a: 10).

²⁴¹See Maas (2010a: 14).

²⁴²See CS Sū 30.59–61, specifically 59 cd–61a, and Maas (2010a: 4–7).

²⁴³See Maas (2010a: 7–8).

²⁴⁴See the etymological differentiation of the four words in Mayrhofer (1963: 189–190).

²⁴⁵See Mayrhofer (1963, s.v. *paṭālam*³: 190).

second meaning may be derived metaphorically from the third, with the application of the word referring to the container to the contained. Incidentally, this would be a legitimate type of metaphor from a traditional South Asian perspective. The quite heterogeneous and elliptically formulated list of relationships and situations that are responsible for specific types of metaphorical usage of words in the *Nyāyasūtra* (NS 2.2.62), *inter alia* mentions the act of holding or bearing (*dhāraṇa*), in the sense of the function of some kind of support, such as a vessel or container. That is, the word for a particular container may be applied metaphorically to what is contained in it, even though the latter is not the former. As exemplified by Vātsyāyana in his *Nyāyabhāṣya*, in certain contexts the word ‘scale’ may be applied to the sandalwood contained in the scale pan, as when one says, e.g., ‘Bring me the scale!’ and actually means the sandalwood that has just been weighed.

Alternatively, one may consider that the word *paṭala* referring to a lump or mass (2), i.e., a certain quantity of something that has been set apart for a particular purpose, may also be applied to a text segment.²⁴⁶ Manfred Mayrhofer first assumed in a rather tentative manner a derivation of *paṭala* meaning ‘segment, section of a book’ (4) from the verbal root $\sqrt{paṭ}$, ‘to tear apart, tear up, split’.²⁴⁷ Later, however, following Jakob Wackernagel, who also connects the meanings ‘section’ (starting with the Brāhmaṇa-s) and ‘lump’ (Epic usage) and presupposes a single word *paṭala*,²⁴⁸ he held this position more firmly.²⁴⁹ Subsequently, in his etymological dictionary of the Sanskrit language, he refers to the meaning ‘section’ (‘Abschnitt’) under the lemma *paṭala*² (‘Klumpen, Menge’).²⁵⁰ Such an etymology would fit the context of segmentation well.

Louis Renou, who briefly remarks on the appearance of this new term for a text segment in the period of the ritual Sūtras,²⁵¹ considers it ‘a term full of imagery or based on a watered-down image’ (‘terme imagé ou reposant sur une image atténuée’), and refers to Theodor Goldstücker (1861) without clarifying his own understanding of the word. For him, this term may possibly be the earliest instance of the later ‘poetization of techniques’ (‘poétisation des techniques’), scilicet of text composition and segmentation, and the single instance of such a poetization in the Vedic period.²⁵² In his critical discussion of Max Müller’s arguments for the absence of writing in the early period of Indian cultural history including the time of Pāṇini, brought forth in Müller’s *History of Ancient Sanskrit Literature, so far as it illustrates the primitive religion of the Brahmins* (1859), Goldstücker quotes

²⁴⁶See Mayrhofer (1963, s.v. *paṭālam*²: 189).

²⁴⁷See again Mayrhofer (1963, s.v. *paṭālam*²: 189).

²⁴⁸See Wackernagel (1957: 170): ‘Abschnitt’ and ‘Klumpen’; see also Wackernagel (1957: 265).

²⁴⁹See Mayrhofer (1996: 67).

²⁵⁰See Mayrhofer (2001: 299).

²⁵¹See Renou (1957a: 14).

²⁵²See Renou (1957a: 23).

Müller on the word *paṭala* as a term for a text segment in the period after the Brāhmaṇa-s. Müller understood it to refer to a cover and surrounding skin or membrane,²⁵³ also with respect to a tree, i.e., to tree bark. Thus, Müller concludes, the word *paṭala* is practically synonymous with the words βίβλος and *liber*, which originally refer to the inner bark of a tree or of papyrus, and refers to a sheet of paper made from tree bark and hence eventually to a book.²⁵⁴ It seems that Renou is inclined to follow this interpretation up to a point because he adds the word *paṭala*, with a question mark, to other Vedic terms for text segments, such as *kāṇḍa* (see Note 32 above) and *valli* ('creeper'),²⁵⁵ that triggered the naming of Sanskrit works with titles evoking the image of a tree and of foliage which became popular later on.²⁵⁶ The fact that he places the word *paṭala* right after *valli* suggests that he may have had in mind the image of a creeper, perhaps because some creepers may completely cover the stem of a tree, or even the whole tree, to which they cling, similar to the bark that covers a tree trunk. In any case, in the *Dictionnaire sanskrit-français*, co-authored by Renou, we do not find any mention of a specific meaning 'tree bark' or 'creeper', beyond the general meaning 'a thing that covers', among the first set of meanings under the lemma *paṭala* which match those of Mayrhofer's *paṭālam*¹.²⁵⁷ The term *paṭala* became especially popular as a designation of text segments in later Buddhist and non-Buddhist tantric literature.²⁵⁸

List of Illustrations

Fig. 1: Folio 2r of *Nyāyabhāṣya* (Vātsyāyana), Nyāya-Vaiśeṣika ms. 202, Calcutta Sanskrit College. Devanagari script. Nyāya-Vaiśeṣika handlist no. 202 = Birajmohan Tarkavedantatirtha and Jagadish Chandra Tarkatirtha (eds.), *A Descriptive Catalogue of Sanskrit Manuscripts in the Collections of the Sanskrit College*. Vol. 1: *Nyāyaśāstra*. Part 1, Calcutta 1963, no. 138 (p. 115) = Hrishikesh Sastri and Siva Chandra Gui (eds.), *A Descriptive Catalogue of Sanskrit Manuscripts in the Library of the Calcutta Sanskrit College*. Vol. 3: *Philosophy Manuscripts*, Calcutta 1900, no. 414 (p. 247). Photograph by the author.

Fig. 2: Folio 18r of *Āyurvedadīpikā* (Cakrapāṇidatta), ms. 12/18, Dahi Lakshmi Library, Nadiad (Gujarat). Devanagari script. Handlist serial no. 46, Sect. 12, no. 18 (p. 7). Photograph by Philipp A. Maas.

²⁵³See *paṭālam*¹ assumed in Mayrhofer (1963: 189).

²⁵⁴See Goldstücker (1861: 19–20), with reference to pp. 515 and 523 of Müller's book.

²⁵⁵This word is used as a term for text segments of the *Taittirīya* and *Kaṭha Upaniṣad*; see Renou (1957a: 12).

²⁵⁶See Renou (1957a: 26–27).

²⁵⁷See Stchoupak et al. (1972, s.v. *paṭala*:- 398).

²⁵⁸See Renou (1957a: 24).

Fig. 3: Folio 5v of *Nyāyabhāṣya* (Vātsyāyana), ms. 267, Vishrambag Collection, Bhandarkar Oriental Research Institute, Pune. Devanagari script. See Shridhar R. Bhandarkar (comp.), *A Catalogue of the Collections of Manuscripts Deposited in the Deccan College with an Index*, Bombay 1888, Vishrambag Collection no. 267 = *A Catalogue of Sanskrit Manuscripts in the Library of the Deccan College*. Part I, Prepared under the Superintendence of F. Kielhorn, Part II and Index Prepared under the Superintendence of R. G. Bhandarkar, (Bombay) 1884, No. 267. Photograph courtesy of Sheldon Pollock, director of the project “Sanskrit Knowledge Systems on the Eve of Colonialism”.

Fig. 4: Folio 14r of *Carakasamhitā*, ms. 1564, Rajasthan Oriental Research Institute, Bikaner. Devanagari script. Samvat 1856 (1799 CE). See Bhuramal Yati and Padma D. Pathak (eds.), *Catalogue of Sanskrit and Prakrit Manuscripts in the Rajasthan Oriental Research Institute*. Part 20: *Bikaner Collection: Sh. Motichand Khajanchi Collection, Bikaner*. Vol. 1, Jodhpur 1990, no. 1336. Photograph by Ernst Prets.

Fig. 5: Folio 17v of *Carakasamhitā*, Āyurveda ms. 23, Calcutta Sanskrit College. Bengali script. Āyurveda (Vaidyaka) handlist no. 23 = Hrishikesh Sastri and Siva Chandra Gui (eds.), *A Descriptive Catalogue of Sanskrit Manuscripts in the Library of Calcutta Sanskrit College*. Vol. 10: *Medicine Manuscripts*, Calcutta 1906, no. 21 (p. 16). Photograph by Ernst Prets.

Fig. 6: Folio 21r (extract) of an anonymous commentary on the *Nyāyasūtra* with extracts from the *Nyāyabhāṣya* (Vātsyāyana) and its commentary *Nyāyavārttika* (Uddyotakara), *Nyāya-Vaiśeṣika* ms. 1372, Calcutta Sanskrit College. Bengali script. *Nyāya-Vaiśeṣika* handlist no. 1372 = Birajmohan Tarkavedantatirtha and Jagadish Chandra Tarkatirtha (eds.), *A Descriptive Catalogue of Sanskrit Manuscripts in the Collections of the Sanskrit College*. Vol. 1: *Nyāyasastra*. Part 2, Calcutta 1965, no. 252. Photograph by the author.

Fig. 7: Section on *Nyāyasūtra* 1.2.7–14 with an anonymous commentary, Ms. 57106/416, National Museum, New Delhi. Handlist no. 57106/416. Sharada script. Photograph by the author.

Fig. 8: Folio 160v of *Carakasamhitā*, ms. 3688, Gaekwad Library, Benaras Hindu University. Devanagari script. See Rama Shankar Tripathi (ed.), *Descriptive Catalogue of Sanskrit Manuscripts in Gaekwada Library, Bhārat Kalā Bhavan Library and Samskrit Mahā-Vidyālaya Library, Benares Hindu University*, Varanasi 1971, no. 9/5868 (p. 574). Photograph by Ernst Prets.

Acknowledgements

The digital images reproduced in this chapter were taken by the project teams and associates of the FWF (Austrian Science Fund) projects “Die Debattenlehre im Kontext der indischen Medizingeschichte” (P 14451–G03), “Philosophy and Medicine in Early Classical India I–III: Towards a Critical Edition of the Third Book of the *Carakasamhitā*” (P17300–G03, P19866–G15 and P23330–G15), and

“Epistemology and Metaphysics of the Nyāya Tradition I–III—Sources, History, Ideas: A Critical Edition and Annotated Translation of the Nyāyabhāṣya” (P17244-G03, P19328-G03 and P24388-G15). I am grateful to the Rajasthan Oriental Research Institute, Bikaner, the Sanskrit College Calcutta, the Dahi Lakshmi Library, Nadiad, the National Museum, New Delhi, and the Benares Hindu University, Varanasi, for allowing us to take pictures of the manuscripts under their care, and to Sheldon Pollock, Columbia University, New York, director of the project “Sanskrit Knowledge Systems on the Eve of Colonialism” (supported in part with funding from the National Endowment for the Humanities [RZ-20701] and the National Science Foundation [SES-0135069]), for arranging the digitization of manuscript no. 267 of the Vishrambag Collection kept at the Bhandarkar Oriental Research Institute, Pune.

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Part IV
Intertextuality and Strategies
to Bind Parts of Ideas,
Parts of Works and Parts of Texts

Chapter 8

Writing with and from Parts of the Discourses of Others in Chinese Medical Texts: Where Syntax and Layout Matter



Florence Bretelle-Establet

Abstract In this chapter, I explore the notion of text segmentation from the viewpoint of discourse analysis. I examine the organization, in the particular context of Chinese medical texts, of the overall discursive tapestry, made up of a range of textual threads, including the author's own discourse and that of others, in the form of citations and quotations. After a first overview on the practice of citation in a corpus made up of twenty-three medical texts produced between the beginning of the eighteenth century and the beginning of the twentieth century, I focus on how the marks of the heterogeneity implied by the overt incorporation of the words, the ideas or the work of others into the flow of a writer's discourse appear in these texts. Paying attention to the syntax and the layout used by writers to interrupt their own discourse and to give the floor to others, I question whether the ways this heterogeneity is made visible can be a clue in distinguishing the different functions citations and quotations meet in Chinese medical literature. I also question whether using one way to cite or another can help in identifying different genres of medical writings at a time when writing in the medical field was not reserved to a professionalized social group.

The research leading to these results has received funding from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013)/ERC Grant Agreement No. 269804.

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8.1 Introduction

As some linguists have shown recently, discourses or texts are inherently or constitutively heterogeneous by the fact that speakers or writers always use words (and ideas) that are almost never new and often borrowed from others.¹ While this constitutive heterogeneity is almost completely beyond the speaker's or writer's control, in the writing process, another aspect of heterogeneity is more governed by the writer and is made visible through citation. This is, in Jacqueline Autier-Revuz's words, '*l'hétérogénéité montrée*' (overt heterogeneity). Through the practice of citation, writers show that some parts—words, ideas or work—belonging to others have been added and/or incorporated into their own words, thus advertising the heterogeneous nature of their discourse.

In this chapter, we explore the notion of text segmentation, not from the viewpoint of the inner architectural division of a text chosen by its author (parts, chapters, paragraphs) (Dionne 2008) discussed in this volume by Karine Chemla and Zou Dahai, or by Micheline Decorps, nor from the viewpoint of the material constraints that oblige a text to be cut into individual pieces (such as Tablet 1, Volume 2 or Scroll Three), discussed notably by Christine Proust and Mathieu Ossendrijver. Here we investigate the notion of "part" of text from the viewpoint of discourse analysis. We examine how, in the particular context of Chinese medical texts, the overall discursive tapestry made up of a range of textual threads was organized; how the marks of the heterogeneity implied by the process of overtly incorporating the words, the ideas or the work of others into the authors' flow of discourse appear in the materiality of these texts; and finally, we question whether the ways the authors reveal this heterogeneity can be clues to distinguishing different functions of the citation or even different genres of writings. Actually, examining writings not only from their scientific content but also from their textuality has proven to be useful in bringing to light differences between writings that otherwise appear similar, thereby providing historians with some help in better understanding what type of writings they have to hand (Chemla 2005; Chemla and Virbel 2015). We assume that citations are one of these textual elements that can be analyzed, not only for the scientific information they provide, in terms of intellectual influence, for instance, but also for shedding light on the diversity of writing practices and on the reasons that could account for this diversity when, as is the case

¹On the concepts of dialogism and polyphony, attached to Mikhaïl Bakhtine, see Dominguez (2013). Jacqueline Autier-Revuz (2001) invites us to observe the preeminence in oral or written discourse of the space given to the fact of reporting the speech of others or ourselves such as 'she told me...'. To speak, for her, is often to speak from and on what has already been spoken. And to speak is always to make use of words that are not new but that embody the already spoken. (Barthes '*tout est citationnel*'). I thank Julie Lefebvre for having brought to my knowledge the research in this field.

in the corpus of texts under consideration, writing conventions were not fixed by national professional rules.²

Two approaches have been used in this contribution. Firstly, a quantitative one that, from a corpus of twenty Chinese medical texts, searches to shed light on the general practice of citation in medical writings. Then a second approach that goes closer to the textuality of each text and explores the formats and contexts of the citations in order to better understand the different functions this writing strategy has.

8.2 Referring to the Discourse, Ideas, or Work of Others: A Common, but not a Uniform Practice

As many scholars have shown, the act of citing was very common in Chinese writings. For Hartman, citing is the only feature of Chinese literature that is consistent in the long term: ‘The traditional compositional process of crafting previously digested bits of language into new works virtually guaranteed that all new texts were to some extent and in some sense intertextual’ (Hartman 1998: vol. 2, 96). For F. Martin, ‘*la culture chinoise est par excellence une culture de la citation et de l’allusion*’ (Chinese culture is a culture of citation and allusion) (Martin 1995, 11), while for Jean Lévi, ‘*la culture chinoise se caractérise par l’hypertrophie de la citation d’autorité*’ (Chinese culture can be characterized by an over-use of authoritative citation) (Lévi 1995, 43).³ In recent decades, researchers in scientometrics, sociologists of science and linguists have reflected upon citation and the act of citing.⁴ Their work, while confirming Montaigne’s famous statement—‘*Il y a plus affaire à interpreter les interpretations, qu’à interpreter les choses: et plus de livres sur les livres, que sur autre subject: Nous ne faisons que nous entregloser.*’ (Montaigne 1595 (1965), 472) (There is more ado to interpret interpretations than to interpret things, and more books upon books than upon any other subject; we do nothing but comment upon one another)—shows that the act of citing is a basic component of language that often finds its way into writing. It is therefore not specific to the Chinese.

The huge amount of research that has been done on citation, from the perspectives of the question of intellectual influence, as a marker of social belonging,

²Bhatia (2004) shows that while genres of text are far from being static, there is among professional groups (scientists, jurists, etc.) a ‘generic identity’ in their writings (textbooks, public discourse, philanthropic fundraising, commercial advertising, etc.) that professional members tend to respect and maintain, to the extent that, even when they introduce some changes, it still has a recognizable generic character. This generic identity allows professional groups to preserve and recognize their professional or corporate identity.

³See the special issue on citation in the journal *Extrême-Orient, Extrême-Occident* (1995) edited by Karine Chemla, François Martin and Jacqueline Pigeot.

⁴See notably Zuckerman (1987) and Rostaing (1996) for an overview of the field. For a linguistic approach, see Authier-Revuz (1997, 2001, 2004), Vernant (2005), Compagnon (1979), Peynaud (2011).

and as a particular discourse act, has shed light on many aspects of the practice or ‘praxis’ of citation (Lopez Munoz et al. 2004: 10). It helped us in our reflection on the act of citing and quoting in the context of Chinese medical writings.

8.2.1 A Corpus of Twenty-Three Medical Texts Explored from the Issue of Citation

The twenty-three medical texts included in our corpus were written by some seventeen authors between 1739 and 1909, in Guangxi and Guangdong, the two southernmost provinces of the Qing Empire (1644–1911). They constitute the major part of what has survived in academic libraries from a wider set of medical writings produced in these provinces, which were still perceived in the beginning of the nineteenth century as the geographical and cultural periphery of the empire.⁵ These medical writings, like those produced in England between 1500 and 1700, are part of a large and heterogeneous group of writings by authors with varying educational backgrounds, intended for different audiences. Indeed, until the late 1950s when the Communist regime introduced a national curriculum for learning what was then coined ‘Traditional Chinese Medicine’ (often abbreviated as TCM), medical education, for most of the people who were involved in medical assistance, took place in private contexts of learning, with one or several masters, with family members or with books. Moreover, before the publication of the first national textbooks, composed to provide a uniform theoretical base for this newly created national curriculum, writing medical texts was not reserved to a well-delimited professional group.⁶ A wide range of heterogeneous publications therefore freely coexisted that are not easy to categorize and classify today. We have analyzed this corpus of medical writings in order to trace overt citations.

Table 8.1 recapitulates the number of different authors or books cited in each text of the corpus.⁷ An overview of this table shows that the practice of citing, in the strict meaning of overtly referring to another name or another title, was not restricted to literature or historical works, but was also very common in medical

⁵On the consciousness of the cultural periphery of these provinces, see notably: Rowe (2001) and Miles (2006: 1–2). Miles (2006: 1) reports anecdotes showing how Guangdong was still considered a ‘peripheral outpost’ in the beginning of the nineteenth century and how Guangdong intellectuals were often sneered at by Jiangsu and Zhejiang elites, who, conversely, clearly shared the feeling of belonging to the most important cultural center of the empire.

⁶On the institutionalization of “Chinese medicine” and the publishing of the first national medical handbooks, see Taylor (2005). One will find a similar heterogeneity in medical writings in early modern England, see Taavitsainen and Pahta (2011, p. 9).

⁷Since none of these medical texts has been digitalized thus far, I had no other way to trace citations than by reading these texts, page after page. It is not impossible that some citations have escaped my attention. Chinese characters are mentioned at the first occurrence of an author’s name or book’s title.

Table 8.1 Number of different texts or authors cited in the corpus, classified according to convenient blocks of time

Author	Book Title	Date	Author's objective	Total number of references	Unidentified	≤ Song 960	Song, Jin, Yuan (960–1367)	Ming (1367–1644)	Qing (1644–1911)
Liu Yuan 劉淵	1醫學纂要 <i>Compilation of Medicine</i>	1739	To teach	35	6	3	6	12	8
He Mengyao 何夢瑤	2醫編 <i>Stepping-Stone for Medicine</i>	1751	To teach	42	2	10	15	10	5
He Mengyao 何夢瑤	3三科輯要 <i>Essentials on the Three Disciplines</i>	1757	To teach	15	0	5	4	1	5
He Mengyao & Monk Huchan 何夢瑤 & 僧互裨	4樂只堂人子須知 <i>What Sons Need to Know from Palace Lezhi</i>	1872	To teach	25	3	6	11	3	2
He Mengyao 何夢瑤	5醫方全書 <i>Complete Book of Medical Formulas</i>	1751	No preface, no target announced	4	0	3	1	0	0
Yu Tingju 俞廷舉	6金台醫話 <i>Medical Sayings from Jintai Cabinet</i>	1783	To provide a bibliography and teach medical basics	38	2	7	5	13	11
Huang Yuanji 黃元基	7靜耘齋集驗方 <i>Tested Formulas Collected from Jingyun Cabinet</i>	1799	To provide tested formulas	47	12	5	18	6	6
Huang Yan 黃巖	8醫學精要 <i>Essentials of Medicine</i>	1800	To teach	41	1	4	10	16	10
Huang Yan 黃巖	9眼科精要 <i>Compilation in Ophthalmology</i>	1879	To teach ophthalmology	21	2	3	7	8	1
Guo Zhi 郭治	10脉如 <i>About Pulse</i>	1753	To teach the pulses	17	2	4	3	6	2
Guo Zhi 郭治	11伤寒論 <i>Treatise on Cold Damage</i>	1827	No preface, no target announced	16	0	3	4	5	4
Qiu Xi 邱燾	12引痘略 <i>Summary of Smallpox Vaccination</i>	1817	To disclose smallpox vaccination	2	0	0	0	0	2

(continued)

Table 8.1 (continued)

Author	Book Title	Date	Author's objective	Total number of references	Unidentified	≤ Song 960	Song, Jin, Yuan (960–1367)	Ming (1367–1644)	Qing (1644–1911)
Lu Shunde and Miao Fuzhao 路順德 & 繆福照	13治毒新方 <i>New Formulas for Curing Poisons</i>	1823	To help populace deprived of doctors	1	1	0	0	0	0
Wang Xueyuan 王學淵	14暑症指南 <i>Guide for Summer-Heat Diseases</i>	1838	To teach	36	3	6	8	7	12
Chen Huangtang 陳煥堂	15仲景歸真 <i>Back to the True Zhongjing</i>	1849	To disclose the true meaning of the <i>Shang han lun</i>	16	0	4	3	6	3
Pan Mingxiong 潘明熊	16評琴書屋醫略 <i>Summary of Medicine from Pingqin Cabinet</i>	1865	To provide a basis for those ignorant of medicine	16	0	3	4	3	6
Pan Mingxiong 潘明熊	17評琴書屋葉案括要 <i>Compilation of the Clinical Cases of (M.) Ye</i>	1873	To spread the tested knowledge of M. Ye	8	0	2	2	2	2
Mai Naiqiu 麥乃求	18傷寒法眼 <i>True Knowledge on cold damage</i>	1876	To disclose the true meaning of the <i>Shang han lun</i>	7	0	6	0	0	1
Chen Yi 陳義	19醫方不求人 <i>A Medical Vade-Mecum</i>	1877	To disclose the family's experiences	2	1	1	0	0	0
Liang Lianfu 梁庠夫	20不知醫必要 <i>What an Ignorant Person in medicine Should Know</i>	1880	To provide the basis for self-medication	2	0	2	0	0	0
Chen Zhenghe 陳珍閣	21醫網總繩 <i>Pivot of Medical Woven Threads</i>	1892	To disclose an anatomy-based medicine	11	0	4	3	0	4

(continued)

Table 8.1 (continued)

Author	Book Title	Date	Author's objective	Total number of references	Unidentified	≤ Song 960	Song, Jin, Yuan (960–1367)	Ming (1367–1644)	Qing (1644–1911)
Cheng Kangnan 程康南	22兒科秘要 <i>Secrets in Pediatrics</i>	1893	To disclose pediatric knowledge	1	0	1	0	0	0
Huang Weiyuan 黃暉史	23醫學尋源 <i>The Origins of Medicine</i>	1909	To provide a clear explanation of medicine	23	2	7	6	4	4

literature.⁸ All these texts referred to at least other one author or text. However, Table 8.1 also highlights the extent to which this practice differs among the authors. Some (in bold) choose to write their text by limiting the usage of citation. Qiu Xi (邱熺), in his book introducing vaccination against smallpox, the *Summary of Smallpox Vaccination* (*Yin dou lue* 引痘略, 1817) cites only two references, one occurring in the preface and another one in the main text. Lu Shunde (路順德) and Miao Fuzhao (繆福照) in their book *New Formulas for Curing Poisons* (*Zhi gu xin fang* 治蠱新方, 1823) cite only one person who is given as being the transmitter of a formula. Liang Lianfu 梁廉夫 in his medical compilation on self-medication *What an Ignorant Person in Medicine Should Know* (*Bu zhi yi bi yao* 不知醫必要, 1880) cites two references in the preface but doesn't refer to anyone else's words in the main text. Chen Yi (陳義) in *A Medical Vade-Mecum* (*Yi fang bu qiu ren* 醫方不求人, 1877) and Cheng Kangnan (程康南) in his *Secrets in Pediatrics* (*Er ke mi yao* 兒科秘要, 1893) also rarely use citations. Other authors, however, draw on a large range of citations. Liu Yuan (劉淵), in his *Compilation of Medicine* (*Yi xue zuan yao* 醫學纂要, 1739), He Mengyao (何夢瑤), in his *Stepping-Stone for Medicine* (*Yi bian* 醫編, 1751a), Yu Tingju (俞廷舉) in his *Medical Sayings from Jintai Cabinet* (*Jin tai yi hua* 金台醫話, 1764) and Huang Yuanji (黃元基) in the extant part of his *Tested Formulas Collected from Jingyun Cabinet* (*Jing yun zhai ji yan fang* 靜耘齋集驗方, 1799), respectively, cite thirty-five, forty-two, thirty-eight and forty-seven different authors or texts. Of these texts, not only are a large number of different medical writers referred to, but their work is taken into account to a greater extent than in writings with only one or two references.

The comparative overview of this set of medical texts with respect to the extent of their networks of references, and to the frequency of their use of citation, highlights that while the culture of citation was widespread in the production of new texts in China, as many scholars have rightly argued, there was no uniform practice of citation.

The use of citation does not seem to depend on the era. We find both types of texts, those with a lot of citations and texts with very few citations, were written contemporaneously. Nor does the use of citation seem to be influenced by the geographic origins of the writers or the ease of access to earlier sources: we find both types of texts in the two provinces. It must be noted, however, that among the four Guangxi medical writers, the two who cited a very small number of references, Lu Shunde and Liang Lianfu, are not known to have moved from the hinterland of

⁸In French, the verb '*citer*' can be used for both 'to cite' and 'to quote' in English. As mentioned later in the contribution, it is difficult to decide whether one piece of reported discourse in these medical texts is a citation or an exact quotation, even if some tools used by authors can give the reader the impression that it is a quote. While citing or quoting were both used by these authors, in this general overview to the practice of citation, we focus mainly on overt citation. The question of what we today would call plagiarism—to copy without mentioning the source from which the copied text is borrowed—while present in some texts of this corpus, is not addressed here. It is noteworthy that an author could quote and mention his sources in some places, while, in others, he could copy verbatim without citing the source. On the complex question of plagiarism in Chinese medical texts, see Volkmar (2000).

Guangxi, while the other two, Huang Yuanji and Yu Tingju, who refer to a large number of references, had moved in their earlier administrative careers. Huang Yuanji came from the central province of Henan, and Yu Tingju had had bureaucratic functions in the province of Sichuan. It is not impossible that in the case of these Guangxi medical writers, the question of citation has to be linked with the issue of access to books. However, some authors from the Pearl Delta River in Guangdong, where the book market had exploded at the end of the eighteenth century, chose to write their books with little resort to citation. The act of citing does not seem to be linked to a particular social milieu, either. He Mengyao, Liang Lianfu and Lu Shunde, all of whom we have already mentioned, were scholars who had passed imperial examinations. While He Mengyao uses citation abundantly in his *Stepping-Stone for Medicine*, the others—Lu Shunde, in his short book of formulas for curing poisons and Liang Lianfu in his treatise targeted at scholars ignorant in medicine—almost never use citations. Conversely, Wang Xueyuan (王學淵), whose biography does not mention any imperial degree and whose book *Guide for Summer-Heat Diseases* (*Shu zheng zhi nan* 暑證指南, 1838) did not receive prefaces from prestigious scholars, a likely indication of the rather low social circle this author belonged to, makes large usage of citations. Further, an author can cite differently according to his various texts. While He Mengyao in his *Stepping-Stone for Medicine* cites a lot of different references and frequently resorts to citation, his posthumous *Complete Book of Formulas* (*yi fang quan shu* 醫方全書, 1751b) draws on a small network of references. Pan Mingxiong (潘明熊), in his short *Summary of Medicine from Pingqin library* (*ping qin shu wu yi lue* 評琴書屋醫略, 1865), cites sixteen different references, while he only refers to eight different references in his other large volume *Abstract of (M.) Ye's Clinical Cases from Pingqin Library* (*ping qin shu wu ye'an kuo yao* 評琴書屋葉案括要, 1873) which brings together and puts into verse the clinical cases of the famous physician Ye Tianshi (葉天士, 1666–1745) and his own.

Sometimes, book titles could give hints to explain the author's limited or abundant use of citations. The terms 'compilation' (*zuan yao* 纂要), 'collection' (*ji yao* 輯要) or 'sayings' (*hua* 話) used in the titles of Liu Yuan's, He Mengyao's and Yu Tingju's medical texts set the tone on the authors' endeavor: to bring together medical ideas, discourses or techniques from others. Not surprisingly, these three books often use citations and draw on a large network of earlier texts. Conversely, the *New Formulas for Curing Poisons*, by its title, makes it clear that its author is introducing something new, distancing himself from the predecessors he was not obliged to cite. And it is also not surprising that the *Summary of Smallpox Vaccination*, written at the beginning of the nineteenth century and introducing new techniques for smallpox vaccination, does not draw on many earlier texts. But, as we will see later, introducing new ideas, new practices or personal opinions did not exclude the citation of forerunners, notably, in the perspective of a counter-argument. Conversely, writing a text in the field of 'cold damage' (*shang han* 伤寒) or on the *Treatise on Cold Damage* (*shang han lun* 伤寒論) written by Zhang Ji 張機 (styled Zhongjing 仲景 ca.150–ca.219) in the third century, which had attracted thousands of medical thinkers in late imperial times, could be

successful without referring to earlier writers: Mai Naiqiu (麥乃求) in his *True Knowledge on Cold Damage* (*shang han fa yan* 伤寒法眼, 1876) only cites seven references which, moreover, appear essentially in the preface and do not interfere with the flow of the author's discourse. While some of these book titles give hints on what is going on in the textuality of the books, some titles do not speak for themselves. Some others, while promising a similar horizon, are quite different with regards to their use of citation. *What Sons Need to Know from Palace Lezhi* (*Le zhi tang ren zi xu zhi* 樂只堂人子須知) (He Mengyao and Monk Huchan (僧互禪) 1872) and *What an Ignorant Person in Medicine Should Know in Medicine* (Liang Lianfu 1880) presumably written to give sons or ignorant people the basics of medicine, appear quite distinct with regard to the range and frequency of their citations. It is thus necessary to go further in this general survey by investigating the citations from the general issue of "who cites whom or what".

Beforehand, we must note that some citations have been impossible to identify thus far: either because names or titles are abbreviated (e.g. 'The Essential says...'; 'M. Liu says...') or because some titles are so common in Chinese medical literature that it is uncertain which particular book the citation actually refers to; finally, some medical experts or authors cited in these texts are difficult to identify today. Perhaps because they were not famous enough in their time to have been the object of biographical notices or to have their book(s) collected in a library, they have become "invisible actors" on whom we have no information other than a name (Shapin 1989).

8.2.2 *Identification of the Authors and Texts Cited: The Landmark and the Marginal*

The range of authors or texts cited in these medical writings is wide: it includes 177 different authors or texts, from the earliest to the late Qing written sources.⁹ While the majority of the citations refer to medical authors or texts, some refer to texts that are outside the realm of medicine. He Mengyao, in the mid-eighteenth century, refers in his *Stepping-Stone for Medicine* to the *Book of Rites*, of *Changes*, of *Documents* and the *Mengzi*, all belonging to the classic corpus highly valued by Confucian scholars. Huang Huishi (黃暉史), in his text written at the beginning of the twentieth century, *The Origins of Medicine* (*Yi xue xun yuan* 醫學尋源, 1909), also cites the *Book of Change* and the *Zuozhuan*, the main commentary of the *Annals of Spring and Autumn*, an ancient Chinese chronicle recounting the major political, military and social events of the period covering 722 to 481 BC, considered one of the core Chinese classics.

⁹Bretelle-Establet (2017). This work examines the type of cited medical references more deeply to obtain clues about the medical cultural landscape in this part of China about which we know close to nothing.

Table 8.2 The 57 authors or texts cited at least twice in the corpus: landmark versus marginal authors and texts

Text or Author Cited ...	In <i>n</i> texts	Text or Author Cited...	In <i>n</i> texts	Text or Author Cited...	In <i>n</i> texts
<i>Huang di nei jing</i> (c.a.:100)	18	Tao Jieyan (c.a. 1445)	5	Ye Tianshi (1666–1745)	3
Zhang Zhongjing (150–219)	16	Chen Shiduo (c.a. 1687)	4	Zhu Gong (c.a. 1108)	3
Zhang Jingyue (1563–1640)	12	Chen Wuze (1131–1189)	4	Chen Feixia (1736–1795)	2
Li Gao (1180–1251)	12	Dai Yuanli (1324–1405)	4	Chen Shigong (1555–1636)	2
Liu Hejian (1120–1200)	12	Zhang Jiegu (1115–1234)	4	<i>Da sheng bian</i> (c.a. 1715)	2
Zhu Danxi (1281–1358)	11	Li Shicai (1588–1665)	4	<i>Dongui Bogam</i> (Korea, c.a. 1611)	2
Sun Simiao (581–682)	10	Nanjing (c.a. 150)	4	Hua Yuanhua (1368–1644)	2
Li Shizhen (1518–1593)	9	Yang Renzhai (c.a. 1264)	4	<i>Ji yan liang fang</i> (not identified)	2
Wang Shuhe (c. a. 210)	8	Zhao Xianke (1573–1617)	4	Jing Dongyang (c.a. 1695)	2
Yu Jiayan (1585–1664)	7	Cheng Wuji (1063–1156)	3	Li Ji (c.a. 500 BCE)	2
Xue Ji (1487–1559)	7	Gao Gufeng (1623–1670)	3	Nie Jiuwu (c.a. 1616)	2
Zhang Zihe (1151–1231)	6	He Mengyao (1693–1764)	3	<i>Sheng ji zong lu</i> (1117)	2
Wu Qian (c.a. 1742)	6	Hua Tuo (145–208)	3	<i>Tai ping sheng hui fang</i> (992)	2
Wang Haizang (1200–1264)	6	Li Ting (c.a. 1624)	3	Wang Ji (1463–1539)	2
Wang Lun (c.a. 1488)	6	Luo Qianfu (c.a. thirteenth to fourteenth century)	3	Wang Tao (c.a. 752)	2
Hua Boren (1304–1386)	5	Qian Yi (1032–1113)	3	Wu Youke (1582–1652)	2
Gong Yunlin (c. a. 1594)	5	<i>Tai ping hui min he ji ju fang</i> (1151)	3	Xia Yuzhu (c.a. 1695)	2
Wang Kentang (1549–1613)	5	Wang Ang (1615–1699)	3	Xu Donggao (Ming, Qing?)	2
Feng Zhaozhang (c.a. 1694)	5	Yan Yonghe (1200–1268)	3	Xu Shuwei (c.a. 1132)	2
				120 other references	1

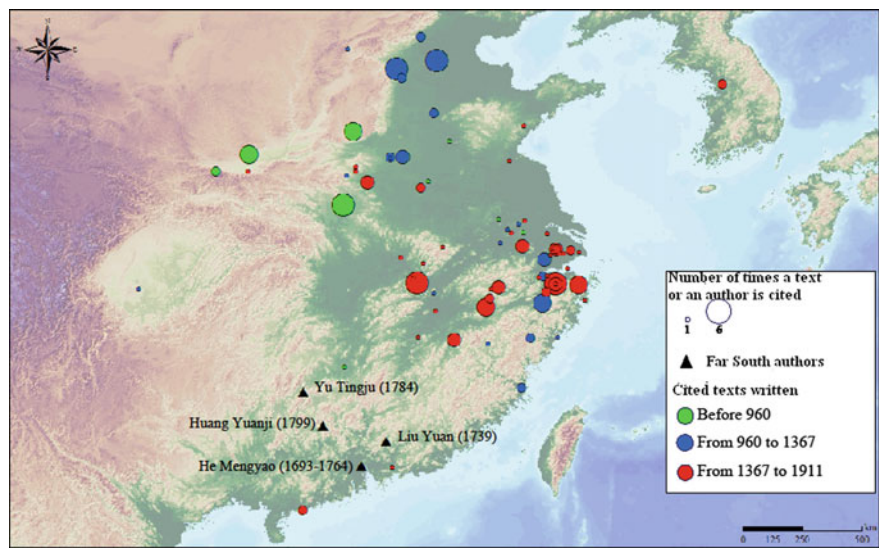
Table 8.2 recapitulates, for the fifty-seven texts or authors cited at least twice in our corpus, the number of times that the text or author is cited.

This table clearly shows that a small number of texts or authors are frequently cited in new texts from the Far South. The *Inner Canon of Yellow Emperor* (*Huang*

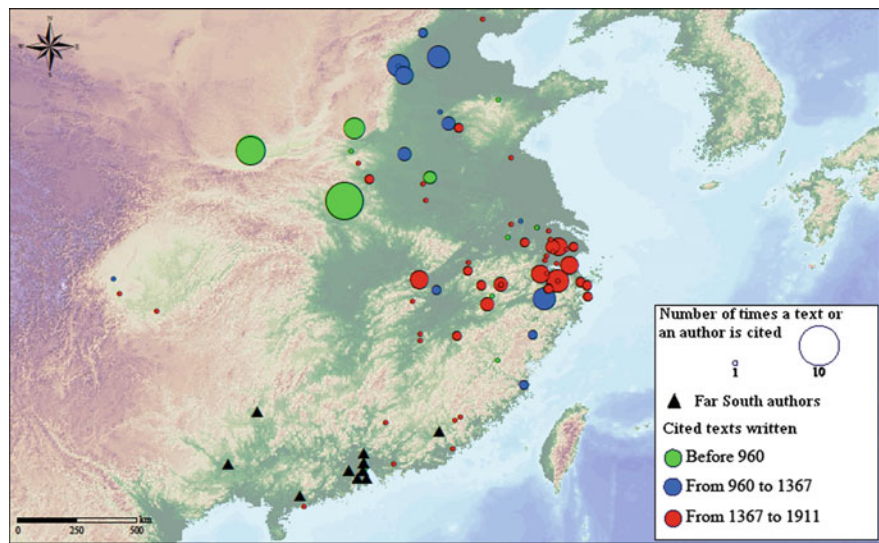
di nei jing 黃帝內經), the first medical compilation transmitted by the written tradition, which gave the theoretical bases of the body, its functions or dysfunctions, is cited in eighteen texts; the *Shang han lun* (*Treatise on Cold Damage*), the aforementioned medical treatise written in the third century by Zhang Zhongjing (張仲景) or Zhang Ji (張機, 150–219 CE), and widely disseminated by the imperial authorities from the tenth century on, is cited in sixteen texts.¹⁰ Some authors who were later called the “Four Masters of the Song, Jin and Yuan Dynasties” (twelfth to fourteenth centuries) and often considered as the revisionists of the ancient medical knowledge, because they wrote on new causes of diseases and new therapies, are also commonly cited: Li Gao (李杲, 1180–1251) and Liu Hejian (劉河間, 1120–1200) are cited in twelve texts, and Zhu Danxi (朱丹溪, 1281–1358) by eleven texts.¹¹ Sun Simiao (孫思邈, 581–682) who, for the first time in history, compiled a gigantic number of medicinal formulas and defined medical ethics, is cited in ten texts. The first treatise on the pulse by Wang Shuhe (王叔和, c.a. 210) is cited in eight texts. Some texts were thus commonly referred to by Far South medical authors, appearing as landmark texts that one could not ignore. With the exception of two Ming authors, who appear to be the flagship authors of the period and are cited by a large number of Far South authors—Zhang Jingyue (張景岳, style Zhang Jiebin, 1563–1640) cited in twelve texts, Li Shizhen (李時珍, 1518–1593) in nine texts—ancient texts are the most commonly cited. In fact, Table 8.2, last line, also indicates that the majority of the authors cited (120 out of a total of 177) are cited only once. Some of these single references could be ancient texts or authors, but most were from what we usually call the late imperial times: out of the eighty-two texts or authors identified and cited only once, forty-eight belong to the last two dynasties. If we consider that citation can give clues as to the intellectual influence of the cited on the citers, we can assume that while the theoretical bases of medicine laid down in ancient texts were shared by nearly all the authors writing in the Far South, the later developments were less commonly shared: the late imperial medical culture to which these authors refer is less homogeneously shared, which, in turn, confirms that medicine in late imperial times was more individualized. However, whatever their era, the authors and texts cited mostly hailed from the great cultural centers of their time. This is what Maps 8.1 and 8.2 reveal.

¹⁰On the *Huang di nei jing*, cf. notably Unschuld (2003); on the *Shang han lun*, cf. notably Goldschmitt (2009).

¹¹On the concept of the four masters of the Jin-Yuan period, see Scheid (2007: 386).



Map. 8.1 Localization of the authors or texts cited in far south medical literature produced in the eighteenth century



Map. 8.2 Localization of the authors or texts cited in far south medical literature produced in the nineteenth century

Black triangles symbolize the authors who practiced medicine in the Far South in my corpus; circles symbolize the cited references, and the different sizes of the circles represent the number of times the same reference is cited. Different colors have been ascribed to the references cited according to a chronological division: green for the references before the Song, (prior to the tenth century), blue for the references from the Song, Jin and Yuan period (tenth to fourteenth century), and red for the Ming and Qing references. Some authors or texts cited could not be represented on the map, either because it was impossible to identify them or because it was difficult to decide their geographical origin and localization; this is the case for the most ancient medical texts, such as the most frequently cited *Huang di nei jing* (*Inner Canon of the Yellow Emperor*) and the *Nan jing* (*Canon of Difficulties*). I am grateful to Antoine Fivel for his help in drawing these maps and to Catherine Jami whose research project 'Itinéraires individuels et circulation des savoirs en Chine' (ANR-09-SSOC-004) allowed us to map the Far South medical authors' references.

Maps 8.1 and 8.2 illustrate the geographical distribution of the authors cited in the medical writings produced in Guangdong and Guangxi in the eighteenth century and in the nineteenth century, respectively. The maps thus take into account the geographical origin of the cited (circles on the maps) and that of the citers (black triangles) as well as the time of the cited (according to a simplified periodization cut into three long periods, before the Song, during the Song–Jin–Yuan, during the Ming and Qing). In a clearer way than Table 8.2, thanks to the size of the circles which translate the frequency an author or text is cited, and thanks to the different colors ascribed to time periods of the cited, these maps highlight that a common cultural background (large circles) existed together with a more individualized culture (small circles). They also illustrate that texts or authors prior to the fourteenth century (blue and green circles) were more commonly cited than texts from the Ming and Qing (red circle), even if some authors from this latter period, as we have already noted, were also cited by a large number of Far South authors.

A very simple cause for the common emphasis on ancient texts was that the number of ancient texts was more limited than the number of medical texts produced during the Ming and Qing Dynasties.¹² But it is also because these ancient writings, selected by the imperial authorities to be studied in the Imperial Medical Bureau (*taiyi yuan* 太醫院) since its foundation, had been given the clear status of medical canons that everybody had to know, sometimes by heart, to be a legitimate doctor, and notably for the physicians appointed to the Imperial Medical Bureau.¹³ Some medical writings from later periods also reached the status of landmark texts, notably through the medical compilations undertaken in the eighteenth century under imperial patronage such as the *Commissioned Golden Mirror of the Orthodox Medical Lineage* (*Yu zuan yi zong jin jian* 御纂醫宗金鑑, 1742) or the medical section of the *Complete Library of the Four Treasuries* (*Si ku quan shu* 四庫全書,

¹²Since Zhang's (1989) pioneering book, the field of book history in China has expanded steadily. See, notably, Widmer (1996), Brokaw (1996), Chia (1996, 2003), Brokaw et al. (2005); McDermott (2006); Brokaw (2007) and Chow (2007).

¹³The most comprehensive study of this institution is Gong (1983). See Goldschmidt (2009), Hinrichs (2003) and Shinno (2002) for a particular focus on the Song (960–1279) and Yuan (1277–1367) dynasties, Chang (1998) for the Qing (1644–1911).

1782).¹⁴ These two editorial projects selected, copied and brought together a bouquet of original and commented texts from the Han to the early Qing dynasties. These imperially commissioned compilations contributed to imposing the authority and legitimacy of the writings or editions selected to be copied for the imperial library and to be disseminated throughout the empire (Hanson 1997: 182–219, 2003). Not unsurprisingly, the authors from the Ming and Qing dynasties who are the most often cited in these Far South medical writings (large red circles), were precisely those whose texts had been selected for these imperial compilations. What Maps 8.1 and 8.2 also make clear is that while the pre-fourteenth century authors cited (blue and green circles) mostly hailed from central and northern China, most of the authors from the two last dynasties cited (red circles) were from the macro-region of Jiangnan (South of the (Yangzi) River). The map of the authors cited by the Far South medical writers according to time illustrates that the geographical origins of the citations follow the chronological shift of the political, economic and cultural centers in Chinese history, notably from the Yellow to the Yangzi Valley.¹⁵ There was no consensus on which Ming and Qing medical authorities to follow, as shown by the great number of late imperial authors and texts cited only once; however, consensus does appear on the geographic origin of their references: for the Far Southerners, Ming and Qing intellectual guides were mostly from Jiangnan.

8.2.3 *Citing the Most Authoritative to Guarantee the Future of New Medical Writings?*

The large space given to ancient canonical sources and to authoritative Ming and Qing authors from Jiangnan in these medical texts invites us to regard the act of citing as partly linked to what sociologists of sciences, after Merton, have called the ‘Matthew effect’ in science. To put it briefly, the ‘Matthew effect’ translates the fact that the more widely read and established a text is, the more it is cited; and once cited, the work employing such a citation is more likely to be rewarded by the recognition of the elite members of the field (Merton 1968: 58). As Suzan Cozzens has shown, in the act of citing there is a kind of predictability: ‘If the author of a document is already well known, the document is more likely to attract attention and therefore be cited than if the author is not as well known,’ which results from the fact that:

¹⁴On these compilations and on imperial patronage of medicine and science in general, see Jami (2003), Hanson (2003).

¹⁵The region of Jiangnan spread over the southern parts of Jiangsu and Anhui provinces, and the northern parts of Jiangxi and Zhejiang provinces. On the cultural centrality of Jiangnan in late imperial times, see Elman (1984: 178–208). While Roger V. Des Forges (2003: 14) writes that ‘during the Ming dynasty, the cultural and political center was presumably in the North, in Beijing, while the social and economic center was arguably in the South, in Jiangnan’, the geographical origins of the Ming and Qing authors cited in these Far South medical writings testify that Jiangnan was more attractive than Henan.

...citations stand at the intersection of two systems, the rhetorical system and the award system...A rhetorical (conceptual, cognitive) system, through which scientists try to persuade each other of their knowledge claims; and a reward (recognition, reputation) system, through which credit for achievements is allocated.... They are both present as impetus and constraint in any given act of citation. (Cozzens 1989: 440)

This partly explains that ‘elite members of the field may be cited to lend weight to the text... rather than because they have influenced the work being reported’ (Cozzens 1989: 440).

Undoubtedly, citing famous and legitimate authors from what were considered the greatest cultural centers of the empire was certainly the best way for a new author to have his writings accepted by the elite members who played an important role in whether or not a written text was printed, particularly, when these authors lived in what was seen as the backwaters of the empire, as was the case for Guangxi and Guangdong provinces. As previously stated, not all the medical writings produced in the Far South survived; only a very small portion of them are extant today (Bretelle-Establet 2010). A series of filters, at the time of the actors themselves, but also later, eliminated most of these medical writings. Let us concentrate on one important filter that must have been crucial for the preservation of texts: printing, which allowed the circulation of one text in far more copies than when copied by hand. If a medical practitioner like Sun Yikui (孫一奎, 1522–1619), from Anhui and thus living in a prestigious area where, furthermore, printing was booming, found it difficult to have his text printed (Zeitlin 2007: 170), one can easily imagine how even more difficult it was for authors living far away from printing centers and in what was considered the cultural backwaters. Several anecdotes, reported in biographies of medical experts and in the prefaces of medical books, show that without connections among the local elite who might recommend a new text by way of a preface, for instance, or among the wealthy, able to open a subscription and provide financial assistance, one had little chance of having one’s manuscript printed. Certainly, one way to draw the elite’s attention to a manuscript, in a context of steady expansion in medical writing, was to display one’s scholarly culture. Citations were one way of doing this. Quoting the Confucian Classics, as was the case in a few texts, certainly met this function: it was a way to present oneself as a learned doctor who had not only mastered medical culture, considered a minor discipline (*xiaodao* 小道), but who had also mastered the Confucian culture necessary for the most highly valued functions and status.¹⁶ Equally, citing the most authoritative sources and experts, the ancient canons as well as the contemporary medical thinkers in Jiangnan, was presumably a way to situate one’s work in the mainstream and to have a greater chance of being printed. While the reasons as to why some texts were printed and others not needs further research, we can assume, on the basis of Bourdieu’s research (1979, 1982) on the process of recognition and legitimacy of intellectual and cultural goods, that the network of authors cited in a

¹⁶On the status of medicine (the small discipline, *xiaodao*) in comparison with the great classical culture, see Hymes (1987), Hinrichs (2003) and Chu (2008).

new writing, in the same way as the prefaces by well-known scholars attached to it, were key elements that contributed to facilitate an author's recognition and legitimacy, notably among publishing houses.

Presumably, one of the functions of overt citation, here as elsewhere, was to frame one's writing as part of a long legitimate tradition in order to be recognized by the elite members of the field. However, there are several clues that the practice of citation may have met other functions. As Table 8.2 shows, the range of authors or texts cited extended well beyond the small core of the most authoritative sources. Moreover, a correspondence analysis, carried out on the twenty-three texts and their networks of citation, reveals a practice of citation that can differ from text to text.

8.2.4 *Different Networks of Citation Revealing a More Complicated Usage of Citation*

Correspondence analysis is a statistical tool that has proven useful for describing and analyzing large volumes of data, and for defining independent axes of differentiation between individuals and the variables associated with them. This type of analysis makes it possible to highlight (on several successive and independent axes) the individuals that are the most different from the others with respect to the variables studied; it also allows some typologies to be carried out by gathering together the individuals who are the most similar to each other. In our present case, the correspondence analysis¹⁷ allowed us to define the axes of differentiation between the twenty-three medical texts in the corpus with respect to the 177 different references cited as a whole. It helped us to see whether some texts differentiated themselves substantially from the others and whether some were close to each other, with respect to their citation networks. An initial analysis carried out on the twenty-three texts gave a first result: two books were so different from all the others that they made all the others appear quite similar. These two texts are the *Summary of Smallpox Vaccination* (Qiu Xi 1817) and the *New Formulas for Curing Poisons* (Lu Shunde and Miao Fuzhao 1823). Their peculiarity, when we examine their citation network in comparison with that of the other texts in the corpus, is that, firstly, these texts do not draw on a large network of citations, a point already seen by a simple reading of Table 8.1; secondly, the references they cite are never or rarely cited by the other writers. Qiu Xi, in his preface to the *Summary of Smallpox Vaccination*, mentions the imperial *Golden Mirror*, which was cited in others texts, but also includes Zhang Yan (張琰), author of a book on smallpox inoculation (1741), who is not cited in any of the other texts. As already mentioned, Lu and Miao in *New Formulas for Curing Poisons* cite only one person: Yang Guangxiong (楊光熊), on whom we have no information other than the fact that he

¹⁷SPAD has been used to carry out these analyses. I thank Roger Establet and Jean-Luc Fauguier (University of Provence) for their suggestion and for their help in using it.

commonly cited authors or texts. *A Medical Vade-Mecum* distinguishes itself from the other by the fact that its network of citation is very small, including only the *Inner Canon of the Yellow Emperor* and another author who is not cited by the others. While the other texts, clustered together at nearly the same place on the graph, differ only slightly with respect to their citation networks, they do, however, appear more conventional in the sense that they share the feature of including the most commonly cited references and ignoring more original texts or authors. Without going further into the description of this analysis, it is noteworthy to stress that the practice of citation, from the perspective of who cites whom, is not as unequivocal as we could have expected: some texts or authors that were not considered landmark were, however, cited in new texts, while some landmark texts—nay, canons—were not always cited by new medical writers. In fact, while many medical writers, citing the most authoritative sources, did align their text with the mainstream, writers could cite minor or less known authors.

The first overview of the overt citations in these twenty-three texts shows that while citing was very common in medical literature, this practice could be reduced to a minimal size and sometimes quasi-ignored. The writing of new medical texts thus did not imply following uniform and conventional rules of writing, perhaps because, as already mentioned, writing in the medical field was not reserved to a professionalized group that would automatically share professional writing conventions. From the analysis on the identity of those cited by the citers, we can derive two other conclusions. Firstly, while medical authors from the Far South seemed to feel bound to explicitly refer to a common cultural background that could not be ignored, their references were not limited to the small core of authors who were raised to the position of the flagship authors by the elite and notably by those who took pains to structure the field of medicine: the Imperial Bureau of Medicine and its off-shoots such as the imperial compilations targeted at imposing a centralized orthodoxy. While Far South medical authors commonly refer to “orthodox” authors or texts from ancient and more recent times, they also draw on many others, less known, often (but not always) located in Jiangnan. This wide range of cited authors invites us to imagine that the medical landscape in late imperial times was diverse. Secondly, that some authors used to cite minor medical writers or even their grandmother or their rural masters, like Huang Yan (黃巖),¹⁸ gives hints that citations answered other needs than only the quest for legitimacy and reward. This is what we are now going to explore by focusing on the form of the citations themselves and by analyzing the context in which they appear and the syntax in which they are embedded.

¹⁸Huang Yan draws on a large number of very famous sources but also on the women in his family as well as on his several masters. j.1:13, j.2:4, j.4:12–13. (j. stands for *juan* ‘scroll’, usually translated ‘chapter’).

8.3 References, Citations, Quotations: The Various Ways to Show the Heterogeneity of a Text

Crafting new texts by overtly incorporating pieces of other people's discourse was not restricted to the Chinese nor to the medical field, even if it appears to have been widely adopted in Chinese medical writings.¹⁹ Relying on the discourse of others was frequent and authorial prefaces usually mentioned this as a necessary feature. Many authorial prefaces state that personal ideas or inventions were not the principal reason for the creation of a new medical book.²⁰ On the contrary, authors very often explained that they had not added anything personal. This statement of humility that refers implicitly to the famous saying of Confucius—'A transmitter and not a maker' (Analects 7.1)—and to the advice later formulated by the Song scholars Su Dongpo (蘇東坡, 1036–1101) and Kou Zongshi (寇宗奭, c.a. 1116), to avoid introducing new ideas and formulas when good ones already existed, may appear to be rhetoric (see Unschuld 1986a: 44, 1986b: 87). A medical author gained more authority and legitimacy when he could frame himself as an heir and as a conveyor rather than as an author who so despised his heritage that he brushed it off and displayed only his own points of view. But, as we saw, most of the texts that survived took pains to cite their predecessors, testifying that the self-effacement often emphasized in authorial prefaces was less a rhetorical argument than a general agreement that the enterprise to know was a cognitive collective enterprise, implying a somewhat polyphonic staging.

8.3.1 The Practice of Citation Explained by Some Authors

A certain number of authors in this corpus explain the reasons for their use of citation. Liu Yuan (c.a. 1739), in his *Compilation of Medicine* (1739), explains:

'Books from the past and from today are so abundant that those who devote themselves to medicine are disappointed (in front of such abundance). While my knowledge is limited, I wrote this book, punctuated it, by bringing (all these books) together, so that medical doctors can easily learn them by rote. 古今醫書甚多。業醫者未免有浩繁之嘆。予不揣鄙陋。編輯篇句。使業醫者易爲紀誦之學' (Liu Yuan 1739: *fan li* 凡例 "reading guidelines", 1).

Huang Yan (c.a. 1800, 1871), in his *Essentials of Medicine* (*Yi xue jing yao* 醫學精要, 1800), justifies citation in these terms:

¹⁹On crafting new texts by compiling quotations, see notably Blair (2007) on the Latin *Florilège* in Europe from Medieval times up to the seventeenth century. This process was also used in music in Europe, see Clark and Leach (2005). Van der Eijk (1999) offers a very interesting survey of this practice in Greek and Latin medical texts.

²⁰For a deeper analysis on medical prefaces, see Bretelle-Establet (2011).

For each illness, I was obliged to give as proofs the classical sayings or the theories of famous wise men [...] If there was no citation and that I speak as the main speaker, who would believe me? 每門辨證之下。必引証經語。或諸賢名論。[...] 不有引據。主家豈吾信耶 (Huang Yan 1800: *fan li*, 6).

Three decades later, Wang Xueyuan, in his *Guide for Summer-Heat Diseases*, written in 1838, reports:

Because I know that my knowledge is very basic, I gathered together the important points from other masters to make this book that I entitled *Guide for Summer-Heat Diseases*. It will allow beginners in medicine to know that summer-heat is a hot evil, and to avoid the confusion that there could be Yin and Yang summer-heat diseases. 因不揣孤陋並采諸家之長彙成一帙名曰暑症指南使初學得知暑爲熱邪不致有陰暑陽暑之眩惑耳 (Wang Xueyuan 1838: authorial preface, unpaginated).

These three authors—Liu Yuan, Huang Yan and Wang Xueyuan—explicitly link the act of citing to the activity of learning. But while Liu Yuan justifies his practice of citation as a way to gather knowledge and facilitate the process of learning that implied memorizing, the two others justify it as a way to provide proofs to their own words or beliefs.

Bringing together scattered medical knowledge to facilitate its reading and memorization, and providing the reader with proofs are thus two explicit motivations that led these authors to resort to citations, and quite freely, as Table 8.1 shows. These targets ascribed to citations are by no means specific to China or to medicine, if we think of the long tradition in Europe of the Latin *Florilège* or the doxographical practices among Greek and Latin philosophers.²¹ However, as the majority of the writers who do resort to citation do not explain why they do it, it is through an analysis of the contexts and of the form of the citations that we can try to infer the motivations for citing and the consequent functions citation meets.

Before highlighting the differences between the various ways authors have chosen to introduce the words, the ideas or the work of others into their own discourse, a common point needs to be emphasized. Whatever the format used for citations in all these texts, there is rarely precise reference of exactly where words, ideas or formulas are borrowed from. One will almost always find the name of an author or the title of a book, often abbreviated, without more detail. Exceptions can be found when the citation comes from the most ancient and authoritative canon, the *Huang di nei jing*, for which writers often take care to indicate from which chapter the citation is taken. We can assume that we are more likely in the register of an exact quote when the classics are mentioned (either because they have been memorized or because of their prestige), and in the register of approximate paraphrasing for the other cited texts. However, the objective here is not to check whether authors respect the constraints of quotation or citation as we define them today. It is rather to provide a description of the different ways in which authors have emphasized the heterogeneity of their discourse, and to see whether certain formats for introducing the words, ideas and techniques of others were specific to some medical writers or fulfilled different functions.

²¹See notably Blair (2007) and Van der Eijk (1999).

8.3.2 *Reporting, Speaking from, Directing to the Discourse of Others: A Matter of Syntax...*

A first survey of all these texts highlights that the ways the citations are presented are different. Firstly, all the citations do not appear with the same syntax. The most common way to cite is to report the discourse of others, in direct (or/and indirect) speech, with the name of an author or the title of a book, followed by a verbal verb such *yue* (曰) or *yun* (云) ‘to say’, and then the presumably exact words of the source. Before the introduction into Chinese of modern punctuation, there was no marker for isolating a fragment of reported discourse. Moreover, Chinese syntax did and still does not allow direct or indirect speech to be distinguished easily: the complimentizer ‘that’ (in ‘X says that...’) does not exist; moreover, verbs do not undergo morphologic changes. The sentence ‘Jingyue says: “the pulse in children is not as varied as it is in adults”’ will be written exactly the same way in Chinese for ‘Jingyue says that the pulse in children is not as varied as it is in adults’ (景岳曰小兒之脈不比大人之多端). While it is impossible to distinguish from syntax alone whether the reported discourse introduced in this way is in direct or indirect speech, however, as the following examples will clearly show, introducing pieces of others’ discourses by a verbal verb gave the impression that the discourse thus reported was the exact wording of the quotation. We will thus speak of direct speech and of direct quotation for this way of overtly representing someone else’s discourse in a text. Huang Yan (1800), for instance, in his first section dealing with medical generalities, reports the words of the famous Ming author Zhang Jingyue in this way:

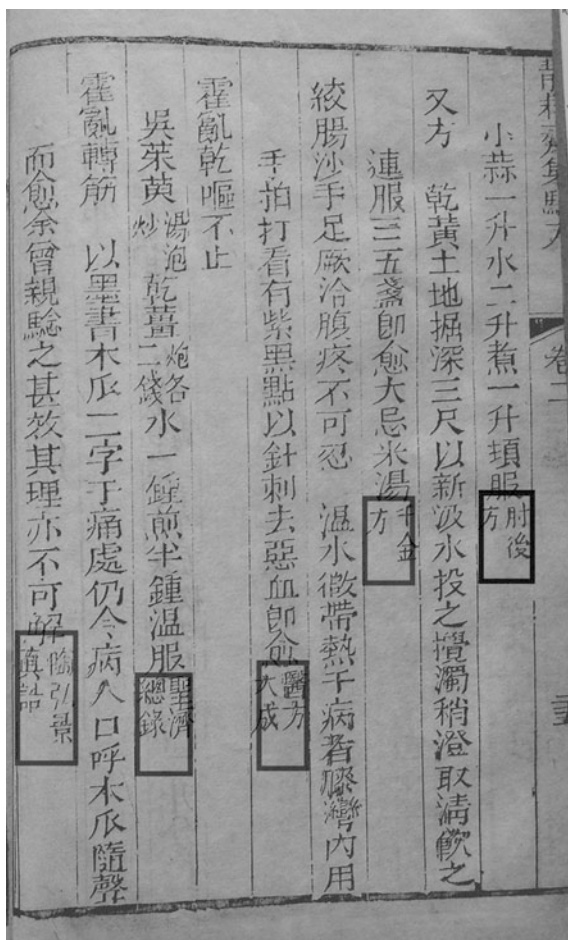
Jingyue says the pulse in children is not as varied as it is in adults. Only check whether it is strong, weak, empty, full, calm or agitated, is enough. By determining if it is strong or weak, you can see whether there is deficiency or excess; by determining whether it is calm or agitated, you can see whether there is upright or evil [*qi*]. (Huang Yan 1800: j. 1: 9. For Chinese text, see Fig. 8.4, second alinea)

Another way to cite—rather rare and reserved to certain contexts, as we will see below—happens at the end of a sentence, or at the end of a heading, without a verbal verb but with typographical markers (small-sized characters written in a double column) as a simple bibliographic reference. Huang Yuanji, in his book of formulas (preface in 1763), reports a formula attributed to Sun Simiao’s *Prescriptions Worth a Thousand Pieces of Gold* (*Qian jin fang* 千金方), a medical treatise from the seventh century:

Another formula: dig a hole in dry yellow earth, three inches deep, put recently drawn water and agitate; when the troubled [water] becomes clear, take the transparent [water], drink it three to five times, slowly, and [you are] cured. Rice water is highly forbidden. *Prescriptions Worth a Thousand Pieces of Gold* (Huang Yuanji 1799, j.2: 25. For Chinese text, see Fig. 8.1, second alinea)

A third frequent way to cite is introduced in the writer’s discourse by formulas such as ‘according to X’s sayings’, ‘it is what X calls y’, ‘for X, it is’, which can introduce indirect speech, free indirect speech, narrative discourse or what the

Fig. 8.1 Citation at the end of a sentence, after each formula, in a double column, without verbal verbs. Huang Yuanji, *Tested formulas collected from Jingyun Cabinet* [1763]1799. See under the first formula, in double column, *Zhou hou fang* (Formula from Zhouhou); under the second, in double column, *Qin jin fang* (Thousand Golden Essential Prescriptions), etc



French linguist Jacqueline Authier-Revuz has defined as a ‘modalization of discourse in second discourse’ (*modalisation du discours en discours second*), ‘a modalized assertion by reference to another discourse, namely, which characterizes itself as “second”, relying on, depending on this other discourse’ (*c’est une assertion modalisée par renvoi à un autre discours, c’est-à-dire se caractérisant elle-même comme ‘seconde’, appuyée à, dépendante de cet autre discours’*; Authier-Revuz 1992: 39) or, finally, an autonomic modalization. The two first examples come from He Mengyao’s *Stepping-Stone for Medicine*, while the third is taken from Huang Yan’s *Essentials of Medicine*:

The six *Qi* are wind, heat, summer-heat, humidity, dryness and cold. Wind belongs to Wood, summer-heat and heat both belong to Fire, but heat belongs to the Fire Sovereign, while summer-heat belongs to the Fire Minister. [...] Humidity belongs to Earth, dryness belongs to Metal, cold belongs to Water. It is what the *Nei jing* says. 六氣、風、熱、暑、

濕、燥、寒也。風屬木，暑、熱皆屬火，而分熱屬君火，暑為相火[...]濕屬土，燥屬金，寒屬水，此‘內經’之說也。(He Mengyao 1751a: 21)

When the *Nei jing* says (that) the back is yang, it is to say that it is the opposite of the abdomen, which is yin‘內經’言背為陽，是對腹為陰說。(He Mengyao 1751a: 35)

About intermittent fever: Yan Yonghe [嚴用和, c.a. 1253] clearly designates it as mucus. Zhang Zihe [張子和, 1151–1231] calls it fire. [...] There are also Chen Wuzi [陳無澤, 1131–1189] with his three causes, Zhu Danxi [1281–1358] and his accumulation of mucus and food in wet summer-heat. (Huang Yan 1800: j.2: 13. For Chinese text, see Fig. 8.5)²²

Whatever the exact name for these ways of reporting the discourse of others, it gives hints that the words or ideas thus reported were presumably paraphrased or summarized by the new writer. This is what He Mengyao, adept in this way of reporting the discourse of others, explains in his authorial preface:

I took the sayings of the physicians I had learnt by rote when I was young, I suppressed the complicated and obscure points, I added my own opinions to write this book, which can be used as a stepping-stone for beginning the study of medicine 爰取少日所誦岐黃家言，芟其繁蕪，疏其湮鬱，參以己見，泐為一書，用以階梯初學 (He Mengyao, 1751a: 47).

Here again, the citation is linked to the cognitive activity of learning. But later, in his reading guidelines (*du fa* 讀法), He Mengyao gives more details on why he preferred this latter way of making others' viewpoints known:

The conclusions of the Ancients that are cited in the treatise, I wanted the reader to understand them easily, there are places where I changed them; these are therefore not the original words of the Ancients, and this is why in many places, I did not mention the masters' names. 論中所引古人成說，欲令讀者易曉，不无修飾之處，即非古人原文，故多不著其名氏 (He Mengyao 1751a: 54).

The analysis of He Mengyao's text actually shows a preference for this syntactic mode of citation: while he sometimes introduces the discourse of others in direct speech, most of the time he prefers incorporating a summary or the most important points of the discourse of another author in his own discourse. Recalling only some words of the discourse of someone else suggests, firstly, that we are more likely to be in the register of the citation or the simple summary (Authier-Revuz 2001); it also allows a kind of distance (to express doubts, precautions, uncertainties, etc.) to be introduced between the author and the discourse thus reported.

Finally, another more directive way to cite appears in a few texts; it does not introduce the exact nor the main points of another's discourse, but only the reference that, according to the new writer, has to be read. In his chapter dealing with the question of how to differentiate a true from a false hot or cold, Yu Tingju (c.a. 1780) explicitly invites his readers to read some particular parts of a number of books:

In the *Zhuan zhong lu* by Zhang Jingyue, there is a 'How to differentiate between true and false cold or hot'; in the *Yi zong bi du* by Li Shicai, there is a 'Discussion on how to differentiate

²²Here and below, dates set off in parenthesis after a cited author or text are mine.

between similar things', 'Some Yin syndromes of cold disease that look like yang, and some yang syndromes that look like yin syndromes', that you have to read [...] In the *Clinical Cases of Master Ye*, *Golden Mirror Record*, there are thirty-six [images, descriptions of the] tongue, and in *The Correct Eye in Diagnosis* by Li Shicai, there is an entry about tongue examination; you have to read both of them 張景岳'傳忠錄'有寒熱真假辨, 李士才'醫宗必讀'有'疑似之間須辨論', 並'傷寒有陰症似陽陽症似陰辨', 皆當參看。[...] 薛氏醫案'金鏡錄'有三十六舌, 李士才'診家正眼'有舌診一條, 所當參看 (Yu Tingju 1783: 298)

Different ways implying various syntactic strategies thus existed in citation in order to do different things: to report, in direct speech, the exact words of another writer; to point out the original references of borrowed formulas; to recommend some readings; or to introduce the reformulated discourse or summarized ideas of others. As several linguists have shown, the ways to represent the discourse of others, in direct, indirect style, free indirect style, or by modalizing one's discourse by reference to a second discourse, not only imply syntax differences but also specific relations between the writer's discourse and the discourse of others. According to Jacqueline Authier-Revuz, indirect speech or the modalization of discourse in a second discourse introduces a relation between the writer and the other's discourse that is very different from the direct style: it's a discourse *from which* the author speaks and not a discourse *about which* the author speaks (Authier-Revuz 2004: 35–53). Before focusing on the different communicational properties these different ways to show the heterogeneity of the text imply, let us first focus on another difference in the representation of the discourses of others: the layout. The different layouts used for citing in one way or another, as they emerge from this comparative analysis, reinforce the differences in intention that stand behind the act of citing. It is the second significant difference that emerges from this comparative analysis.

8.3.3 ...And of Layout: Juxtaposition Versus Imbrication of the Citation

Three different places can be chosen to report someone else's sayings, ideas or formulas: at the beginning of a paragraph, at the end of it or in the course of the paragraph.

The least commonly used format of citation is to cite at the end of a paragraph or at the end of a heading, often in small characters and in double columns, in the shape of a simple bibliographic reference. This is the case in the *Tested Formulas Collected from Jingyun Cabinet* (Huang Yuanji 1763), where after nearly all the formulas, the author mentions, in smaller characters, the reference from which they have been extracted (Fig. 8.1). We find the same form of citation in chapter two of He Mengyao's and Monk Huchan's *What Sons Need to Know from Palace Lezhi*. Here, the authors present a collection of formulas and, after giving the name, usually indicate the formula's authorial origin (Fig. 8.2). Wang Xueyuan does the same when he brings together his formulas at the end of his *Guide for Summer-Heat*

Diseases. In fact, this citation format does not seem to occur in contexts other than when an author provides his readership with the origin of drug formulas and seems to correspond to a usage began in the first compilations of formulas: it was notably used in the *Wai tai mi yao* (外臺秘要), written by Wang Tao (王焘, 670–755). These citations, which take the form of a simple reference, very likely acted to show that the formulas mentioned by the author did not come from his own imagination, but that they had a pedigree and were therefore reliable. The danger of using drugs, sometimes very toxic, was well known by doctors and often feared by lay people. In one of his medical books, Pan Mingxiong reminds us of this fear:

This *Summary of medicine* (*yilue*) is convenient for those who are not well versed in medicine. It has chosen the most appropriate drugs [...] It has selected common drugs and does not praise extraordinary ones [...] It could not but include highly warming and pungent and highly cold and bitter substances to avoid making one disease worse. Those who read this book must be careful 此醫略爲未涉醫者巾箱便用, 選藥尤宜[...]祇取平淡不尚神奇[...]又不得不選入大辛熱大苦寒之品以防劇恙倘看書者能小心. (Pan Mingxiong 1865: *fan li*, 2).

Citation, in the shape of a simple bibliographic reference, can be seen as a way to show that the author respected earlier advice of not introducing new formulas when

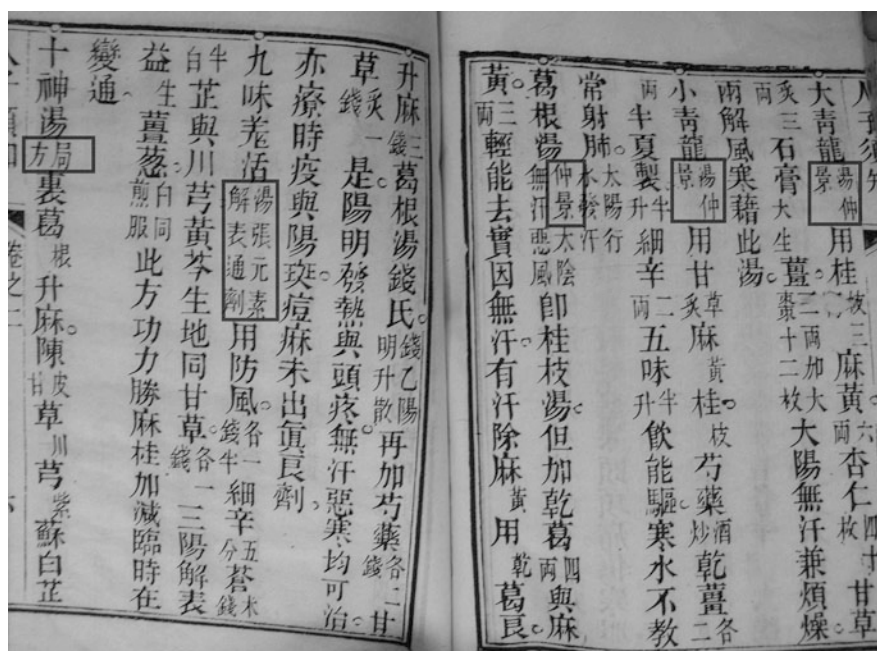


Fig. 8.2 Citation after the formula's title, in a double colum

He Mengyao and Monk Huchan, *What Sons Need to Know from Palace Lezhi*, j. 2, p. 6. Below the first, second, third formulas, (right page), see 仲景 Zhongjing, below the fourth (left page), see Zhang Yuansu 張元素, and below the last one, see Jufang 局方, abbreviation for *Tai ping hui min he ji ju fang* 太平惠民和劑局方.

tried and tested ones already existed, and also as a way to protect himself from the possible threat of reprisals in case of drug misuse.

The most common way to report the discourse of another author is placed at the beginning of a paragraph, introduced by a verbal verb such as *yue* (曰) or *yun* (云) 'to say'. Very often, such a quotation, introduced in direct speech, is followed by a series of quotations of the kind that systematically begin a new paragraph. The discourses thus reported are autonomous bits, put side by side, not linked with the author's own discourse. The following excerpt, extracted and translated from Liu Yuan's *Compilation of Medicine*, provides a long but illustrative example of this way of quoting authors or texts. In his second chapter, Liu Yuan deals with the question of cold damage disorders (*shang han* 傷寒) that were known to be diseases induced by attack from an outside pathogenic evil (*xie* 邪), cold or wind, that invaded the inner body through the skin and later developed more and more deeply in the whole body through a progressive course along the channels. Liu Yuan, in these paragraphs, explained that these diseases required specific treatments, either the Cinnamon or the Ephedra Decoction. These decoctions which included ingredients other than cinnamon or ephedra had been promoted by Zhang Zhongjing in his *Treatise on Cold Damage*. As shown in Fig. 8.3, after the title 'Differentiation between Ephedra and Cinnamon Decoction', two clearly separate parts can be distinguished: a first corresponds to the author's own discourse, referring in passing to the 'Canon', and the second, longer part, is a juxtaposition of quotations, beginning with the name of the author or text cited followed by the verbal verb *yue* 'to say'.

Excerpt 1 (Fig. 8.3).

Differentiation between Ephedra and Cinnamon Decoction

He who does not sweat and has a tense pulse has cold damage. Ephedra Decoction must be used. He who sweats and has a slow pulse has wind stroke. Cinnamon Decoction must be used. This is how we distinguish them. The Canon says: when the disease is in the *Taiyang*, the disease is in the outer and it has not developed further. He who has a superficial and weak pulse must sweat to disperse [the disease]. Cinnamon Decoction fits. When the disease is in the *Yangming*, that fever appears between 3 and 5 p.m. and that the pulse is superficial and empty, sweating must be induced. To make sweat, Cinnamon Decoction must be used. How is it that the Cinnamon Decoction could induce sweating? Ephedra Decoction does not contain peony but ephedra. Cinnamon Decoction does not contain ephedra but peony. In fact, cinnamon has the property to disperse. Peony has the property to gather. If peony accompanies cinnamon, then cinnamon is not violent. If cinnamon accompanies peony, then peony is not cold. Moreover, peony can nourish the *Camp Qi*. It is thus the first to help cinnamon to make sweat. This is why Cinnamon Decoction is also a prescription that can disperse. Only Ephedra Decoction is violent while Cinnamon Decoction is slow. When cold evil is firmly rooted, Cinnamon Decoction is not able to disperse the surface. On the contrary, it contributes to heat. This is why the one who has a tense pulse and who does not sweat needs Ephedra Decoction and not Cinnamon Decoction. If the pulse is superficial and slow, or if it is superficial and weak, it is because the wind evil is already in the surface. It is the cinnamon that is suitable and not ephedra. Ephedra Decoction must be used in the first instance to disperse [evil] of the surface, and then Cinnamon Decoction is used to disperse the surface.

Li Dongyuan [李東垣, c.a. 1251] says: cold first takes refuge in the surface. It blocks the skin structure, and the enclosed yang *Qi* becomes hot. If acrid and hot drugs are not used, it

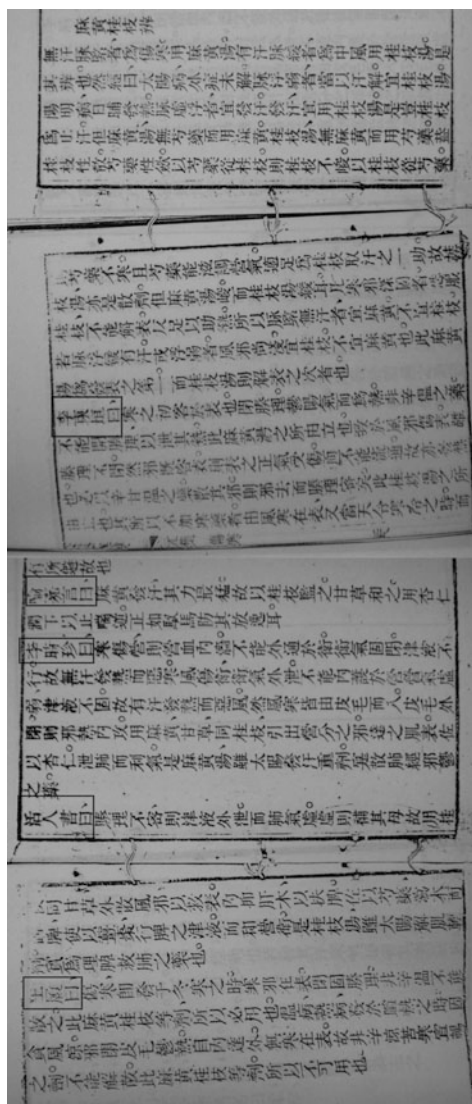


Fig. 8.3 Range of citations/quotations beginning a paragraph, introduced by a verbal verb Liu Yuan, *Medical Compilation* (1739), j. 2, p. 38–39. In the first ten columns (right of the picture), after the title “Differentiation between Ephedra and Cinamomum decoction”, the author speaks first, afterwards, he reports, in a clearly segmented layout, side by side, the discourse of five different authors.

is impossible to open the structure of the skin to drive the heat out. This is the reason why Ephedra Decoction is needed. Now, wind evil hurts the surface. Since the structure of the skin is not blocked, the evil finds refuge in the surface. Consequently the upright *Qi* of the surface is hurt and cannot circulate. This is why heat develops. By using acrid, sweet, and

warm drugs, we disperse this evil. When it leaves, the structure of the skin becomes tight. This is the reason why Cinnamon Decoction is needed and why no cold drugs are added. Because cold and wind are in the surface, we get them when we are exposed to the cold of the weather.

Yu Jiayan [喻嘉言, c.a. 1664] says: Ephedra induces sweating; its force is very violent. This is why cinnamon is needed to contain it, liquorice to moderate it, almonds to moisten and stop hiccups. It is exactly like the coachman who holds back his horse so that it does not bolt.

Li Shizhen [c.a. 1593] says: Cold hurts *Camp*, this is why *Camp* blood stagnates and cannot reach the defensive surface and why the defensive *Qi* is blocked. Liquids no longer circulate, inducing no perspiration, heat increase and cold dislike. Wind hurts the defense, the defensive *Qi* is driven out, it cannot remain in the *Camp*, the *Camp Qi* becomes deficient and weak, and liquids are not firmly contained. This is why there is sweating, heat, and fear of the wind. Wind and cold enter by the skin and hair, the skin gets closed from the outside; this is why hot evil attacks the inside. By using ephedra and liquorice together with cinnamon, we extract the evil which is in the *Camp* part. To reach flesh and muscles, we must add almonds as an assistant which purges lungs and make *Qi* circulate. While Ephedra Decoction is a heavy prescription allowing sweating in the *Taiyang*, it also allows evil enclosed in the lung channel to disperse.

The *Saving Book* [Lei zheng huo ren shu 類證活人書, 1108] says: if the structure of the skin is not closed, bodily liquids can flow out and the *Qi* of the lungs becomes deficient; a deficit requires that we supplement its mother, this is why cinnamon and liquorice are needed to disperse the wind evil and to disperse the surface. Internally, we reinforce the Wood of the liver and consolidate the spleen, by using the assistant peony. To purge the liver and [character impossible to read] the spleen, we use ginger and jujubes to circulate the spleen liquids and to pacify *Defense* and *Camp* [*Qi*]. While Cinnamon Decoction is a light prescription good for dispersing the flesh of the *Taiyang*, it is also a drug that regulates the spleen and sustains the lungs.

Wang Lu [王履, c.a. 1391] says: cold damage happens during the cold of the winter. The evil cold is in the surface and the structure of the skin is tightly blocked. If acrid and hot drugs are not used, it is impossible to disperse it. This is why decoctions such as cinnamon or ephedra must be used. Warm and hot diseases happen when it is hot, and when we want cool wind. The evil blocks the skin and heat increases. From the inner, it reaches the surface. There is no cold in the surface, this is why, if prescriptions containing acrid, cool, bitter and cold are not used, it is impossible to disperse. This is why prescriptions such as Ephedra or Cinnamon Decoction must not be used. (Liu Yuan 1739: j. 2: 38a/b–39a/b. For Chinese text, see Fig. 8.3)

This way of citing which dominates the entire book by Liu Yuan is the one mostly adopted by Huang Yan (1800) in his *Essentials of Medicine*, as is illustrated by the following short excerpt, taken from the first chapter that introduces the basics of medicine. In this second example, the author takes the floor after the authors or text cited, but most of the time, the author uses another order: like Liu Yuan, in the first excerpt, he introduces his sayings first before providing the reader with a range of juxtaposed direct quotations.

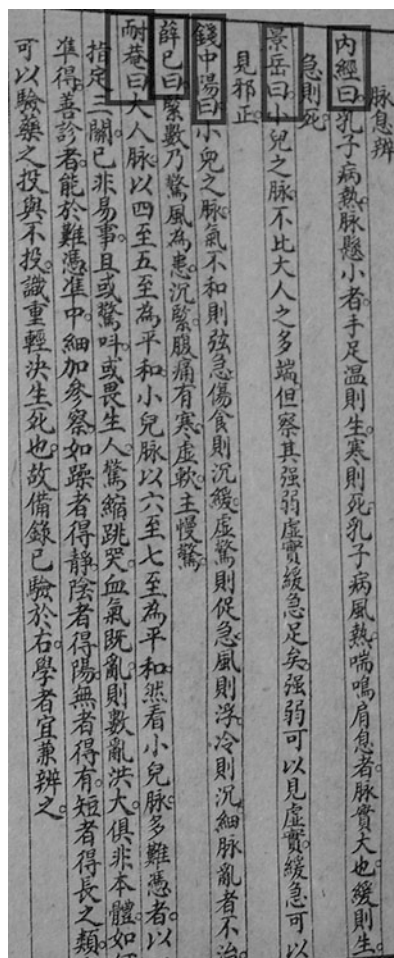
Excerpt 2. (Figure 8.4)

Distinctions in pulse and respiration

The Canon [200 BCE–100 CE] says: when an infant is sick with fever, with a pulse distant and little, if hands and feet are warm, he will survive; if they are cold, he will die. When an

Fig. 8.4 Another illustration of this way of citing. Huang Yan, *Essentials of Medicine* (1800), j. 1, p. 9,

“Distinctions in pulse and respiration” (in infants). The author first quotes several masters, in a clear segmented layout, before taking the floor



infant is sick with wind and fever, breathes heavily, he has a full and big pulse. If it is slow, he will survive, if it is quick, he will die.

Jingyue [c.a. 1640] says: the pulse in infants is not as varied as it is in adults. Only check whether it is strong or weak, full or empty, calm or agitated is enough. By [distinguishing if it's] strong or weak, you can see if there is excess or deficiency. By [distinguishing if it's] calm or agitated, you can whether there is evil or upright [Qi].

Qian Zhongyang [錢仲陽, c.a. 1113] says: concerning the pulse in infants: When the Qi is not peaceful, then [the pulse] is tense and quick. If the damage comes from food injury it is deep and slow. In cases of fear/convulsion, it is short and quick. In cases of wind, it is superficial; in cases of cold, it is exhausted, and the one who has a messy pulse is incurable.

Xue Ji [薛己, c.a. 1559] says: a tight and quick pulse comes with convulsions. A deep and tight pulse comes with abdominal pain and cold. Empty and soft is the pulse of infants having chronic convulsions.

Nai'an [in fact, the author Huang Yan's style, 1800] says: A four to five [beat] pulse in adults is normal. A six to seven [beat] pulse in infants is normal. It is difficult to rely on pulse in infants. [Observing by] the three phalanges of the forefinger is not an easy thing either. Moreover, because of fear, because of fear in front of unknown people, they can be panicked and cry. The *Qi* and blood are thus messy, and therefore [the pulse] is quick, messy, ample and big. They are not in their normal constitution at all. How can we estimate it? The one who is good at diagnosis overcomes this difficulty and is successful. One has to examine even more carefully. There are different situations, such as the one who has an excited [pulse] requiring peace; the one who has a yin [pulse] requiring yang; the one who has an empty [pulse] requiring supplementation. The one who has a short [pulse] requiring to be lengthened. Accordingly, you can give or not tested drugs. By knowing if it's serious or benign, you know if he will survive or die. This is why I have brought together the experiences by Qian Yi just before. Students must differentiate well. (Huang Yan 1800: j. 1: 9. For Chinese text, see Fig. 8.4)

This way of citing brings out different features. Firstly, a particular layout which provides the reader with the different viewpoints chosen by the writer on a particular question in the most visible way: each citation is introduced in direct speech and begins a new sentence and a new paragraph. This way of representing the discourse of others thus takes the shape of an exact quotation which, while quotation marks did not exist, is clearly delimited by the layout. Secondly, a particular representation of the heterogeneity of the whole text, in which the author chooses not to mix his voice with that of the others. In these particular layout and syntax, all the discourses are clearly separated: on the one hand, there is the author's own speech and, on the other, a range of other discourses that precede or follow the author's words. In Huang Yan's *Essentials of Medicine*, the author reinforces the boundaries between his own discourse and those of others, by adding, very often, after his own words, the subtitle 'beican' (備參, preparatory notes), in which he gathers together quotations as well as clinical cases or formulas.

While this mode of reporting the discourse of others, to which we will soon return, was thus clearly and quasi-systematically favored by some, not all authors used this format. By contrast to this way of citing with its particular layout that, in the most visible way, brings together the discourses of different authors and distinguishes them from the new writer's discourse, a third way was to blend the ideas of others with those of the new writer in the flow of the paragraph. The following excerpt of the *Stepping-Stone for Medicine* by He Mengyao (1751a) illustrates this:

Excerpt 3.

Fire

Fire: All diseases come from Fire. Danxi [Zhu Danxi] says that the overabundance of *Qi* transforms itself into Fire. This is one Fire. To cure it, it is appropriate to cool. If the *Qi* is not sufficient and moreover incubated, then it transforms into Fire. It is what Dongyuan [Li Gao] calls the yang deficiency which provokes heat. Again, it is one Fire. To cure it, it is appropriate to use sweet and hot drugs to supplement the *Qi*, and to add a small amount of sweet and cold drugs in order to purge Fire. One can contract a summer-heat and dry *Qi* from outside, which increases the heat of the inner *Qi*; this is one Fire. To cure it, it is appropriate to use acid, moistening, purifying and cooling drugs. One can contract a cold, windy and humid *Qi* from outside which blocks and makes the surface *Qi* hot; this is one Fire. To cure it, it is appropriate to use acid and sweet drugs to disperse. One can have inside injury by

eating things that are acrid and hot, leading Fire and heat to increase; this is one Fire. [...] When people are not cold, they are hot; when they have no excess, they are deficient. So, cold, heat, excess and deficiency can all provoke Fire; this is why all diseases come from Fire and this is what Hejian [Liu Hejian] and Danxi used to say. Why wouldn't we trust them? Nevertheless, Zhang Jingyue and his generation do not agree with this point. They criticize it very harshly, and surpass the limits [...] Because they decided not to consider Fire [as the source of disease], people now do not dare use cooling [drugs], not knowing that the doctrines have lost their truths, and the later disciples have become confused. They ride bad horses and lose the game. This is very well known. Frankly speaking, everybody still trusts these bad and losing horses. But we must tell people they are not horses but vulgar animals. Who would still trust them? If people don't trust [me] and still ride them, they will lose. Let us make it known that the doctrine according to which Fire is not [the source of all disease] is untruthful and that people still must use cold and cool [drugs]. 火。凡病多屬火。丹溪謂氣有餘便是火。此一火也，治宜清涼。氣不足以鬱而成火，東垣所謂陽虛發熱也，又一火也治宜甘溫補其氣，少加甘寒以瀉其火。外感暑熱燥氣，增助內氣成熱，此一火也，治宜辛潤清涼。外感風寒濕氣，閉鬱表氣成熱，亦一火也，治宜辛溫發散。內傷飲食辛熱之物，致火得熱益熾，此一火也[...]夫人非寒則熱，非實則虛耳。今寒熱虛實皆能生火，然則凡病多屬火，河間、丹溪之言，豈不信哉。而張景岳輩不達其旨，極力譏訛，亦已過矣[...]彼意以爲必目之爲非火，而後人不慎用寒涼，不知立論失實，徒起後人之疑也。今夫驚馬之驚而敗，盡人而知之矣。真言此爲驚馬不可駕，未有不信者也。必謂之非馬也。鹿也，誰則信之乎？不信則有駕之而敗者矣。是非火之說，固將使人不信而用寒涼也。(He Mengyao 1751a: 194)

In this excerpt, the writer first quotes in direct speech without starting a new line and then continues reporting some doctrines or main points of other authors using the strategy of modalizing his discourse by reporting another discourse (it is what X and Y, say, call...). As this excerpt shows, it is quite difficult to know where the discourse of others starts and ends and where the writer's own discourse begins. The following excerpt from *Medical Sayings from Jintai Cabinet* (Yu Tingju 1783) gives another illustration of this layout. After having provided the readership with a medical bibliography, in the shape of a long and commented census of books or authors that should be read, Yu Tingju (pr. 1764) reports the discourses of others concerning the use of ginseng in cases of blood deficiency. While the excerpt starts with a quotation reported in direct speech, the discourses of others, mostly reported in direct speech, are embedded in the paragraph, in a continuous way, and finally merged with the author's own voice:

Excerpt 4.

Supplement *Qi* in massive hemorrhages

Li Shicai [c.a. 1665] says: To the question of whether when blood is deficient, we should supplement blood by prioritizing drugs for the *Qi*, the answer is: when blood is deficient, the correct method is to give drugs for blood, but if we use only these drugs and in great quantities, then the center can be damaged. It could seem contradictory to prioritize the use of drugs for the *Qi*, but don't we know what the *Su wen* says [c.a. 200 BCE–100 CE]: Without yang, the yin cannot grow. Zhongjing [c.a. 219] says: [in cases of] hot body losing blood, cold body with a tense pulse and blood deficiency, add ginseng, because he who has a blood deficiency must have his *Qi* increased; since blood cannot increase by itself, it needs yang and pacifying drugs to develop; if yang develops, then yin increases. Thus if we use only drugs for blood, then blood will have nothing from which it can develop. Dongyuan [Li Gao, c.a. 1251] says: ginseng is sweet and hot, it supplements the spleen; if the *Qi* of the spleen is prosperous, the *Qi* of the four other organs [*zang*] will be

prosperous, the spiritual will live and the physical will be prosperous. Bai Feixia [c.a. 1522] says: if a lot of ginseng is given, the primordial *Qi* goes where it was missing. It must be given after any disease when the *Qi* is deficient, when lungs are deficient with panting and coughing; if *Qi* is deficient but that there is Fire, it must be used together with monkey grass. Yang Qi [Ming] says: ginseng is among the most excellent drugs, everybody knows it. Ancient formulas used to treat cold lungs with warming lung decoctions; hot lungs with cooling lungs (decoctions); central (stomach) fullness with decoctions for digestion; blood deficiencies with decoctions that nourish *Camp*; all use ginseng. Quacks who say that ginseng must not be used even in small quantities are really quacks. Since the Ben(cao) Jing, all authors have the same words: drugs for *Qi* have the merit of nourishing blood, but drugs for blood cannot increase *Qi*. This is something completely clear. How is it that some could still ignore it!

血脫益氣。李士才曰，或問血虛自應補血，專以氣藥為主，得無左乎？答曰：血虛應投血藥本為正法。但專用多用中州有礙，至於以氣藥為主似乎相左，不知‘素問’云，無陽則陰無以爲生。仲景曰，身熱亡血，身涼脈凝，血虛，並加人參，蓋血脫者須益氣，爲血不自生，須得陽和之藥乃生，陽生而陰長也，若只用血藥，則血無由而生矣。東垣云，人參甘溫補脾，脾氣旺則四藏之氣皆旺，精自生而形自盛也。白飛霞云，人參多服，回元氣於無何有之鄉。凡病後氣虛及肺虛喘嗽者，並宜用之，若氣虛有火宜與麥冬同服。楊起云，人參功載本草，人所共知，古方治肺寒以溫肺湯，肺熱以清肺湯，中滿分消湯，血虛養營湯皆用人參。庸醫每謂人參不可經用，誠哉庸也，自本經以至諸家諄諄言之，以氣藥有生血之功，血藥無益氣之理，可謂詳切著明，奈何人不悟耶！(Yu Tingju 1783: 300)

As these excerpts show, with this third format, which dominates He Mengyao's medical writings and was also systematically adopted by Pan Mingxiong in his *Summary of Medicine from Pingqin Library*, and by Chen Huantang [陳煥堂] (1849) in his *Back to the True Zhongjing* (*Zhong jing gui zhen* 仲景歸真), the different reported voices were mixed. The mixing appears on two levels: on the level of the layout, since the reported discourses are truly embedded into the writer's own flow of discourse; and, on the level of the syntax, since the discourse of others is often reported according to formulas such as 'for X, it is...', and where it becomes unclear whether the discourse belongs to the author or to the writer being cited, and where the two instances merge.

These excerpts, and more widely, the analysis of the citations in these twenty or so medical treatises, clearly highlight that there were many ways to report the discourse of others, thanks to the different possibilities offered not only by syntax but also by layout. What this comparative analysis shows is that while the different ways to emphasize the heterogeneity of a text can be used interchangeably in some writings, as in Guo Zhi's (郭治) *Treatise on Cold Damage* (*Shang han lun* 傷寒論, 1827) or in Mai Naiqiu's *True Knowledge on Cold Damage* (1876), some authors clearly adopted one way or another. While, as we have already noted, He Mengyao mostly reports the discourse of others using what Jacqueline Autier-Revuz has called a modalization of discourse in second discourse (according to X, Y), like Pan Mingxiong in his *Summary of Medicine from Pingqin Library* (1865), others prefer citing using the direct speech format, like Huang Yan, in his two books *Essentials of Medicine* (1800) and *Compilation in Ophtalmology* (1879), Liu Yuan in his *Compilation of Medicine* (1739) or Wang Xueyuan in his *Guide for Summer-Heat Diseases* (1843). What accounts for these differences?

8.3.4 *Writing Conventions, Generic Identity, Communicational Targets*

It seems that some usages and some writing conventions existed for medical treatises even before the professionalization and standardization of medicine. For instance, reporting predecessors' therapeutic formulas could be done without the new writer mentioning the source from which they were extracted. However, when a new author found it important enough to mention, it was always according to the same format: either at the end of the formula or just after its title, in a double column of small characters, according to a typology often used for canon commentaries and that had been adopted quite early in the history of books of formulas. This particular layout was specific for reporting the therapeutic formulas borrowed from other texts or authors, but never used for citing their doctrines or ideas. There were two ways for reporting the words, the ideas or the works of others: to separate the author's discourse from the discourse of the others and juxtapose the different voices, (the 'citation-monstration', according to Jacqueline Autier-Revuz's formula, 1992) as in Excerpts 1 and 2, or to embed all the voices into one discourse, as in Excerpts 3 and 4.

Compiling a series of speeches or direct quotations in a very clearly fragmented way, such as in Excerpts 1 and 2, brings to mind another writing convention: that of the textbooks written after the Song Dynasty for candidates preparing for the civil service examinations (Drège 2007). As Hilde De Weerdts has shown, these textbooks, themselves modeled on the *lei shu* (類書, encyclopedias, or better translated as 'classified books'), were organized in two parts for each entry: one brought together quotations from primary documents and the other included an explanation. This organization, she writes, 'reflects what may have gone on in classes [...] the section on primary sources relates to the secondary text like a handout to a lecture.' (De Weerdts 2007: 82–83). According to De Weerdts (2007), this format, which allowed students to have all the relevant excerpts of the primary documents to hand to be learned for examinations, was clearly linked to a learning context. Chinese pedagogical practices (of the time) put large emphasis on 'archives' of the past: for teachers, to speak about something or to do something needed a justification from the archives, which therefore had to be brought together and reported in new texts. This convention was thus clearly adopted by some medical authors as well. The medical texts by Liu Yuan (Excerpt 1), Huang Yan (Excerpt 2) and by Wang Xueyuan clearly favored this mode of writing. As the prefaces to these medical texts recall, they were specifically written for students: 'This book was prepared to teach my students 是編, 本爲授徒而設,' writes Huang Yan in the first point of his reading guidelines, while Liu Yuan's and Wang Xueyuan's books address beginners in medicine. The transfer of teaching methods and didactic tools from one field to the other was probably facilitated by the fact that many medical authors had first followed the classical curriculum and had first-hand experience of the pedagogical methods and tools used in classical studies. Moreover, many of those who practiced medicine and who wrote medical texts often had functions either in officialdom or

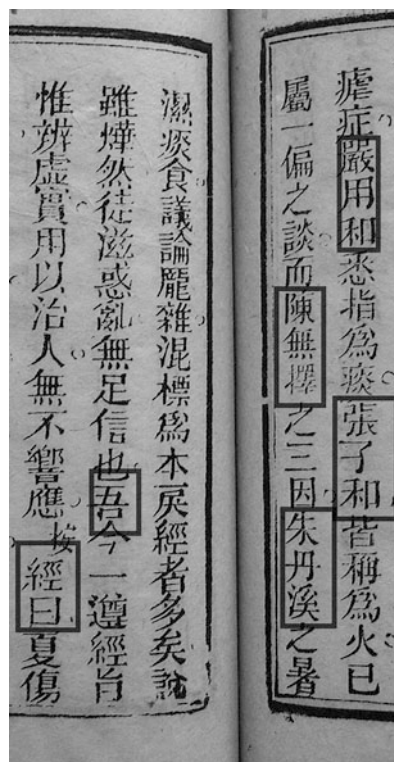
in the private training of the young elite for the civil service examination (Bretelle-Establet 1999: 562). They were thus familiar with textbooks for the civil service examinations and presumably wrote medical textbooks according to the same format. In return, the gathering of autonomous quotations with an accompanying explanation by the author was likely to be one textual mark which allowed any reader of the time to distinguish a particular style of didactic text from other medical writings that flourished at the time, such as writings for self-medication.

Besides writing conventions that a new writer may have chosen in order to have his book recognized by his contemporaries as sharing a certain generic identity, we assume that the author's communication target was another key element in the choice of one format or another for reporting pieces of others' work. The different ways used in reporting words, ideas or work from others, highlighted in these four excerpts, implies differences on semantic and communicational levels. To report the discourse of others either in the form of a juxtaposition of direct and thus untransformed quotations, clearly separated from the author's own words, or in a more imbricate form, with reformulation, gives a very different aspect to the links between the writer's discourse and that of others. While the first two excerpts gather autonomous pieces of direct discourses to justify the discourse of the author but that also extend beyond it on a semantic level, in the last excerpts, the reported words are reformulated or edited in order to fit with the new writer's main points. Furthermore, in the first two excerpts, the authors' goal seems to have been to gather bits of knowledge on one issue, in a neutral and cumulative way, whereas, in the last excerpts, there is a real effort by the new writers to stage an argumentation in order to convince the reader of their point of view, be it theoretical or practical. In Excerpt 3, He Mengyao, in fact, urges people not to blindly believe in Zhang Jiebin's doctrine and his therapeutic preferences for supplementation but to consider the benefits, in particular circumstances, of the cooling therapy promoted by earlier masters; Yu Tingju, in Excerpt 4, wants to convince his readers of the suitability of his clinical choices, which could appear inconsistent at first glance: to prescribe a drug which was usually conceived good for *Qi* and for yang to cure hemorrhages considered as a yin deficiency which should therefore require drugs to supplement the blood and yin. The following excerpt gives more evidence of the link between the format for introducing the discourse of others and the communicative function sought. It comes from Huang Yan who, as we saw earlier, in all his books, had clearly favored reporting the discourse of others by adopting the format of the compilation of quotations clearly separated from his own words. However, in this part of his *Essentials of Medicine*, he uses the other format: namely, he cites in a continuous writing layout where his own voice is mixed with that of others, and he does not cite using the direct speech format but rather uses the modalization of discourse in second discourse format.

Excerpt 5 (Fig. 8.5)

About intermittent fevers: Yan Yonghe [c.a. 1253] clearly designates it as mucus. Zhang Zihé [1151–1231] calls it Fire. Ah! Their words are biased. There are also Chen Wuzi [1131–1189] with his three causes [and] Zhu Danxi [1281–1358] with his accumulation of

Fig. 8.5 Citations incorporated in the author's own discourse. Huang Yan, *Essentials of Medicine* (1800), j. 2, p. 13, "How to diagnose and cure intermittent fevers"



mucus and food in wet summer-heat. All these opinions are confused. They mix up causes and consequences; they are all against the Canon. They can be brilliant, they complicate wastefully; there is nothing there to believe. For my part, I respect the essential truth of the Canon, I only diagnose whether there is excess or deficiency, and accordingly, I treat people and I get efficiency. (Huang Yan 1800: j. 2: 13. For Chinese text, see Fig. 8.5)

As this last excerpt clearly shows, Huang Yan's target here is not to gather knowledge in a neutral and cumulative way, but to convince his readership of the mistakes of the authors cited.

Representing the discourses of others in the form of a simple reference, as in the case of drug formulas, in the form of a compilation of autonomous pieces of direct discourses, or finally, in the form of continuous writing mixing all the voices together, allows an author doing very different things.²³ By using different syntax or layouts, one could protect oneself, one could direct to bibliographical references, or one could frame oneself as a simple gatherer, conveyer and interpreter of knowledge, or as one voice emerging and distancing itself from a particular chorus. Since,

²³To adopt the viewpoints of speech act theoreticians such as Austin (1962) and Searle (1969) for written discourses. For these theoreticians, language is not only used to describe or to give some statements about the world; to speak is to act with or against someone to transform our world.

indeed, citing, as we will now see, did not mean consensual adhesion to the authors (and texts) cited.

8.3.5 Citations and Quotations Beyond Legitimation, Demonstration and Reverence of the Past

Citing or quoting in these Chinese medical texts answered different needs and functions that seem universal: to legitimize a new text by aligning it with mainstream lineages, as the general emphasis on the most ancient and the most famous authors and texts shows; to protect oneself; to gather together scattered pieces of knowledge; to improve the persuasiveness of one's text by providing evidence relevant to one's claim, be it on a theoretical or a clinical level. Whatever the format they used to report the discourse of others, authors shared the general agreement that advancement of knowledge was a collective cognitive enterprise which implies knowing the discourses and experiences of one's predecessors. However, having knowledge of something does not necessarily mean agreeing with it. As many examples in these texts show, authors can cite or quote cognitive material that they find outdated and no longer reliable. Guo Zhi (1827), in his treatise on cold damage, cites the recommendations for treating the 'easy transformation of yin and yang 陰陽易' disease by Tao Jieyan (陶節菴), a fifteenth-century medical author, and concludes: '...These are the words of Jieyan, but this sort of disease is very rare [or I rarely saw it]. Furthermore, I am afraid that the reasons [*li*] behind this disease are not exact. For the moment, I note it to check it 節菴之說如此, 但此症少見且於理恐未必然, 姑錄之爲驗' (Guo Zhi 1827: 75). He Mengyao, in his *Stepping-Stone for Medicine*, provides many examples of this usage of citation. The following excerpt is taken from a long discussion on the disease *nüe* (瘧, usually rendered as 'intermittent fever'):

The *Divine Pivot*, in the chapter 'Disclosures of the year', speaks about this accumulation. When it starts from 11 p.m. to 1 a.m., from 11 a.m. to 1 p.m., from 5 to 7 a.m., or from 5 to 7 p.m., it is an intermittent fever which is in the Shaoyin channel. When it starts from 7 to 9 a.m., from 7 to 9 p.m., from 1 to 3 a.m., from 1 to 3 p.m., it is in the *Taiyin* channel. When it starts from 3 to 5 a.m., from 3 to 5 p.m., from 9 to 11 a.m., from 9 to 11 p.m., it is in the *Jueyin* channel. Ancient doctrines are like that; we must not be stubborn. '靈樞.歲露篇'所謂蓄積乃作也。發於子、午、卯、酉、日爲少陰經瘧;發於辰、戌、丑、未日爲太陰經瘧;發於寅、申、巳、亥日爲厥陰經瘧。舊說如此,不必泥 (He Mengyao 1751a: 152)

In another part of the text, He Mengyao discusses the question of obstructions and after bringing to mind the therapeutic and physiological principles that the Canon had given for each kind of obstruction, he ends with the same formula: 'we must not be stubborn *bu bi ni* 不必泥.' (He Mengyao 1751a: 152, 198). In his *Essential on the Three Disciplines*, in the chapter on women's ailments, this same author recalls another doctrine from Master Chao, very likely Chao Yuanfang (巢元方, c.a. 616), describing the development of fetus according to months and the

influence of channels. After having recalled the whole doctrine, He Mengyao ends the citation with these words: ‘This doctrine is absolutely not classic/orthodox and we should not be stubborn.’ (此說最不經,不可泥也) (He Mengyao 1757: 50). He Mengyao was not an exception. Yu Tingju (1783), who, in his book, provides a list of the medical texts that any beginner in medicine should read, cites Zhu Danxi, one of the ‘four masters’ of the Song–Jin–Yuan dynasties, but with reservations: ‘Zhu Danxi [...] has written another book, *Danxi’s Techniques*, which specializes in the cooling therapeutics to cure syndromes of Yin deficit. It’s a book with formulas, everybody admires it, but it is only good for yin deficit and Fire excess; otherwise, we must not be stubborn 朱丹溪[...] 又著‘丹溪心法’專以知柏寒涼之藥治陰虛等證,此有方之書,人多宗之,然唯陰虛有實火者宜之,否則斷不可膠柱也.’ And when he cites Li Shizhen, author of a landmark text in *materia medica*, cited in nearly all texts of the corpus, it is not only to laud Li Shizhen’s knowledge of plants and his versified text on the pulse but also to inform the readership on its limitations: ‘Most of the ancient formulas when we use them today do not prove effective; we thus must not be too stubborn 但古方用於今日多無驗,此又不可膠柱也.’ (Yu Tingju 1783: 288).

In fact, this expression ‘we must not be too stubborn,’ appears frequently after a citation, clearly revealing that citation also could assume the other function of keeping a historic memory alive even when the authors find it outdated. For some authors, the acquisition of knowledge included knowing things that had been said in the ancient or more recent past but did not hold true in their time. This is what Chen Huantang, a mid-nineteenth century author, explicitly states in his *Back to the True Zhongjing* (1849), a medical treatise in which he invited his readership to reexamine the doctrines and formulas included in the *Cold Damage Treatise* (*Shang han Lun*) written by Zhang Zhongjing in the third century CE. After devoting an entire chapter of his book to cite and criticize ideas from the *Six Books on Cold Damage* (*Shang han liu shu* 傷寒六書) written by Tao Jieyan, a fifteenth-century medical thinker also cited in Guo Zhi’s text (1827), he also mentions Tao Jieyan’s book as one of the two books that every student should read:

I often say that to learn cold damage, one must read two important books. One is the *Golden Mirror on the Orthodox Medical Lineage*²⁴; the other is the *Six Books on Cold Damage*. The *Golden Mirror on the Orthodox Medical Lineage* distributed by our court is the model for medicine. One must absolutely read it. But the *Six Books on Cold Damage*, frankly, I really criticized it. Why, then, do I teach people to read it? I answer: those who want to learn must know the correct, but to learn implies to know the bad.

故嘗謂欲學傷寒者,亦須先讀過要緊之書二種。一日醫宗金鑒,一日傷寒六書。或曰醫宗金鑒乃聖朝分發是為醫學之宗,誠不可不讀者矣。但傷寒六書。予既極情詆謗。何又教人必讀乎。予曰予既欲學考識其正。亦須學考識其邪。

Confucius said ‘When you meet someone better than yourself, turn your thoughts to becoming his equal. When you meet someone not as good as you are, look within and examine your own self’. [...] This is why if you want to learn, by reading the *Golden*

²⁴The *Golden Mirror on the Orthodox Medical Lineage* (*Yu zuan yi zong jin jian*, 1742) included one commented edition of the original treatise of the *Shang han lun* by Zhang Zhongjing.

Mirror, you get Zhongjing's original bases; by reading the *Six Books*, you become conscious of (Tao) Jieyan's mistakes. If you read them side by side, you distinguish the black and the white clearly, as well as who is the wise man

孔子曰兼賢思庸焉。見不賢而內自省也[...] 故欲學者讀金鑒可知仲景之根源。讀六書可知節菴之背謬。兩兩對核。黑白立分。賢否辨矣。(Chen Huantang 1849: j. 2: 7)

While the practice of citation and quotation in these medical writings can be considered as evidence of what Hilde de Weerdt has called 'an archival mentality' among scholars, it does not, however, necessarily mean that one had to agree with the content of these archives. Yu Tingju, after having reported the discourse of eight authors to justify his viewpoint on drugs use in cases of massive hemorrhages, finally concludes: 'As regard the use of drugs in the treatment of diseases, saving formulas must take into account concrete and living individuals, we must not be too limited by the past' (至於治病用藥, 活法在人, 原不可拘泥) (Yu Tingju 1783: 299–300). As we will now see, citing could be a way for the author to make totally new points of view and to show harsh opposition to what was cited.

He Mengyao, in a paragraph of his *Stepping-Stone for Medicine*, dealing with the question of whether pulses in men and women differed, cites the ancients' words to oppose them:

The Ancients used to say that the pulse in men was bigger in the left side than in the right side, while the pulse in women was bigger in the right side than in the left side, but experience shows that it's not like this. In fact, people have a right hand which is generally bigger than the left hand, and the pulse, as an answer, is also bigger in the right than in the left; it's the same for men and women 古謂男脈左大於右, 女脈右大於左, 驗之不然, 蓋人之右手, 比左手略大, 脈亦應之而右大於左, 不論男女皆然也。(He Mengyao 1751a: 501).

Critics were not only directed to the most ancient texts. In the chapter dealing with coughs, the same author reports the sayings of a great master of the Yuan dynasty (c.a. 1264) to criticize it: 'Wang Jiezhai said: those who have drunk too much alcohol and whose true yin is damaged should not be given ginseng and astragalus. These words caused great mistakes among people 王節齋云, 酒色過度捐傷真陰者, 不可服參耆。此說大是誤人' (He Mengyao 1751a: 162).

Cheng Huantang from Gaoming, in his *Back to the True Zhongjing*, provides the best example of such use of citation. In his attempt, very fashionable at his time, to recover the true meaning of the Han *Treatise on Cold Damage* to access the ancient and most effective ways to cure certain diseases, Chen Huantang recapitulates the different ideas that had been produced in the long course of Chinese history on 'cold damage' and on the Han treatise devoted to this category of diseases. He focuses notably on two famous authors from the Ming dynasty, the already-mentioned Zhang Jingyue and Tao Jieyan. According to Chen, the treatises by these two Ming authors were among the most widely read at that time. However, and as he explains at the beginning of his book, he cites them to provide an answer to what he diagnoses as very serious errors and misunderstandings that have had a great damaging impact on his contemporaries: 'Today, I take the two books written by masters Zhang [Jiebin] and Tao [Jieyan], and I focus on those of their doctrines that have misled people. I make a report so that people from Gaoming and

elsewhere know how to avoid the mistakes of these two masters 予將陶張二子之書，有誤人之說者，辯論以後，呈教高明並歷天下後世，無受此二子之誤可也’ (Chen Huantang 1849: j.2: 2). Chapters 2 and 3, with clearly accusing headings such as ‘*The Six Books* by Tao Jieyan should not have been handed down 論陶節菴六書不應傳世’ or ‘[Tao] Jieyan did not read [Zhang] Zhongjing 論[陶]節菴未讀仲景書’, are thus devoted to methodically reporting words or ideas of Tao Jieyan and Zhang Jiebin in order to criticize them, one by one. After an orderly and very violent criticism of these two masters that he sometimes qualifies as quacks, killers or idiots, he finally concludes: ‘I do not regret to have harshly criticized my forbears 予不惜口過。謗議前人者.’ (Chen Huantang 1849: j.2: 1, 7, 9–11; j. 4: 28).

Reporting the discourse of others through citations or quotations did not necessarily mean adhesion to them. Reporting the discourse of past authors or texts did not mean a complete adhesion to the past.²⁵ What this comparative analysis of citations highlights is, in fact, the importance of the syntax and layout used by an author to do different things. Interestingly, if, in his new text, the writer is critical of or advises against being too attached to the past citation, the citation always appears embedded in a special layout and syntax, imbricate in the author’s flow of discourse.

8.4 Conclusion

The analysis of these 23 medical texts shows that it was a very common practice to visibly incorporate pieces of discourses, ideas and techniques from earlier authors or texts through the process of citation. A first quantitative approach to the act of citing in the whole corpus gives evidence that citation allowed new writers to align their texts with the most legitimate and authoritative existing works. However, a second approach, more focused on the contexts in which citations were used, and their form, highlights a wider range of functions for this writing strategy. This

²⁵The order in which pieces of discourse are reported in the different excerpts translated here, to which I have added dates, reveals something on the idea that authors had on the value of their past. This order rarely follows a chronological order. Two assumptions can be derived from this observation. Firstly, among many authors, there was not a clear sense of a chronological progress that authors were expected to recapitulate to allow a reader/student to understand how things came to be understood. Secondly, while some of these authors, like many of their contemporaries in the country, had the conviction that ancient formulas or doctrines were not fit to treat the diseases of their times, this conviction was not sufficient to erase all the past, or to implement a clear-cut boundary between the modern and the ancient. While words existed to make a distinction between ancient and modern (notably in the field of formulas attested by expressions such as *xin fa* (新法 new principles) and *xing fang* (新方 new formulas), attributed notably to Zhang Jiebin, in opposition to *gu fang* (古方 formulas of the past) and *jing fang* (經方 formulas of the Canons), there is no clear cut boundary. In fact, the ancient past as well as present times could just as easily be sources of inspiration or proof as targets of criticism.

comparative analysis highlights different ways used to report the words, ideas, practical knowledge or works of other people.

By using specific syntax—direct quotations, modalized discourse and references—and a specific layout—juxtaposition of new lines, continuous writing, and the use of typographical tools—writers could do different things. We assume that in choosing one format or another in which to include elements from the works of others in their own discourse, new writers hoped to accord particular generic or communicational features to their text. Authors who used citation abundantly often claimed for their writing a didactic purpose for beginners in medicine. We can assume that texts that did not use this textual practice were more targeted at self-medication. However, in the writings that claimed a didactic target, different formats of citation were possible: the compilation of a wide or narrow range of direct quotations clearly distinguished from the new writer's explanations, and the mixing of direct, indirect or reformulated citations into the writer's continuous writing. In both cases, these didactic texts obey the implicit rules linked to any learning activity which takes as given that the acquisition of knowledge is a collective cognitive enterprise. However, in the first type of text, to teach seems to have meant to hand down consensual knowledge; in the second, it seems to have meant to argue and convince the reader of one's particular truth. And indeed this second approach also highlights that there were as many reasons to cite in these texts as in non-Chinese texts: to link one's text to the most authoritative and legitimate sources, to demonstrate, to protect oneself, to direct the readership toward particular sources, to criticize, to denounce viewpoints or to keep a historic memory alive. Perhaps what should be emphasized here is the use of citation in the perspective of a counter-argument and criticism. In their rich comparative study into how scientific investigation was carried out in ancient Greece and China, Lloyd and Sivin (2002) came to several conclusions as to why the Greeks and the Chinese produced the science they did. One of the many points of contrast was the 'question of the uses of rhetoric'. To persuade their public, 'Ancient Greek culture encouraged disagreement and disputation in natural philosophy and science as in every other field; the Chinese emphasized consensus.' (Lloyd and Sivin 2002: 247). As many of the examples translated above show, in late imperial Chinese medicine, citation was a way to link a new text to others in the process of making a sort of synthesis of what had to be known. However, many examples clearly show that authors referred to the discourse of others, not to align themselves with this scholarship but in a clear and violent opposition. The expression '*bu bi ni*' (one must not be stubborn) that often follows a cited doctrine, and the invocation of predecessors who are then harshly criticized and sometimes even described as "killers", invites us to assume that a critical approach had developed since ancient times. In fact, the recurrent use of citation to stage a debate in which the new writer challenges the ideas of the cited predecessors also invites us to see the 'archival mentality' at the heart of Chinese pedagogical practices as something different from a systematic adhesion to past masters and past doctrines.

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(s.l., *sine loco*; s.n.*sine nomine*).

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Chapter 9

Epigraphs as Parts of Text in Natural History Books in the Eighteenth Century: Between Intertextuality and the Architecture of the Book



Stéphane Schmitt

Abstract This chapter investigates the practice of employing epigraphs in eighteenth-century natural history books. It examines, quantitatively and qualitatively, the significance of these very special parts of text, which are elements of both paratext and intertextuality, and which are very widespread in every kind of literature during the Enlightenment. We aim to describe their origin, their role in the architecture and the organization of the book, as well as the ways they establish connections with other works. We attempt to understand their various functions and, in that respect, the differences between the uses of epigraphs in several European languages are considered. We argue that besides their aesthetic role, epigraphs were often endowed with a diversity of other functions by authors as well as publishers and readers, in connection with the content of the book, the other elements of the paratext (title, front illustrations, etc.) and the context. Accordingly, epigraphs make sense, for example, of the aims of the authors, the patronage networks, and the intended targeted and real audience of scientific works.

In 1987, Gérard Genette introduced the notion of paratext to designate a set of elements in a book that accompany the text and provide it with a framework, making its sense clearer or in some way directing its reading (Genette 1987).¹ These elements are very diverse and include, for example, material features of the book (e.g. the format, the binding, the layout of the title page, etc.) as well as parts of text

The research leading to these results has received funding from the European Research Council under the European Union's Seventh Framework Programme (FP7/2007-2013)/ERC Grant Agreement No. 269804.

¹On paratext in general, see also Maclean (1991), Lane (1992), Kinser (2004) and Retsch (2000).

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such as the title and subheadings, the dedication, the preface and other introductory texts, the tables and indexes, etc.² As Genette has shown, the study of paratext, though often neglected by scholars and historians, is very important for the understanding of the production of texts and of the intentions of the author, the editor and the publisher, and it can give information on the ways a book was received and read. This notion has brought new stimulating perspectives in literary studies but it has mainly been applied to works of fiction. The rare recent exceptions, however, show that it is interesting to use this tool in other non-fiction fields (see e.g. Berger 2004; Covington 2006; Bretelle-Establet 2011). The present paper aims to make such a contribution in the case of the history of the life sciences in the eighteenth century.

Here, we focus on epigraphs. These paratextual elements have been particularly overlooked, even by historians of literature. The reasons why they have been poorly studied are probably that they do not have the strategic position and visibility of the title nor the length and diversity of prefaces and other introductory texts, and they are not so immediately redolent as frontispieces and other front illustrations. Furthermore, as we shall see, they became widespread later than most other paratextual elements and, in non-fiction, they sometimes have the reputation of being rather conventional and pedantic. However, as we argue in this paper, they have a diversity of functions that often make sense, they throw light on the aims and audience of a given work and, accordingly, they deserve special attention. In the particular case of the scientific literature of the Enlightenment, which was very diverse and addressed a number of different audiences,³ and whose boundaries (for example with philosophy, history or travel literature) were rather vague, since science was less specialized and professionalized than today, the epigraphs can prove to be, in association with other elements, invaluable tools in understanding the aims and status of a given book.

Epigraphs as parts of text participate in participate to the architecture and organization of the book, like title, subtitles, or typography. Furthermore, given their position at the beginning of a book, or at least at the beginning of a part of the book, they represent “thresholds” in Genette’s sense: they have an introductory function and act as announcements or advertisements, like other paratextual elements (e.g. titles and prefaces) or illustrations (frontispieces⁴). But, at the same time, they are, in most cases, quotations (i.e. parts of text borrowed from other

²According to Genette’s terminology, the paratext has two components: peritext, that is, elements that are inside the book, and epitext, which includes elements of similar functions but external to the book, such as advertising leaflets.

³We take the notion of “science,” which is not as precise in the eighteenth century as today, in a very wide sense, including popularization works (even in verse).

⁴On the significance of frontispieces in scientific books, see Remmert (2005; 2006).

works), whether this borrowing is explicitly indicated or not.⁵ They have thus a very particular status, between paratextuality and intertextuality.

Here, we have investigated epigraphs in a corpus of about seven hundred scientific books published from 1700 to 1800, concerning, above all (but not exclusively), life sciences and medicine. We have been able to draw quantitative and qualitative information from this study, in order to characterize both epigraphs and their relations with other paratextual elements more precisely, to describe how epigraphs were used in eighteenth-century scientific literature and to gain a better understanding of their functions.

9.1 Determining the Boundaries of Epigraphs: Problems of Definition

Most epigraphs are easily identifiable as such, even though, as we shall see, their exact definition and delimitation can raise problems, especially for earlier periods, since they sometimes have close similarities with other parts of text, from which they cannot always be distinguished.⁶

Eighteenth-century dictionaries, in France at least, give clear definitions of epigraphs, which are largely unchanged today. For example, according to the *Dictionnaire de l'Académie Française* (1762), epigraphs are ‘short maxims [*sentences*] or mottos [*devises*] that some authors put at the beginning of their work, and which indicate the subject of these works.’ In 1755, Edme-François Mallet is more specific in the article ‘Épigramme (*Belles-Lettres*)’ of the *Encyclopédie* (Alembert and Diderot 1751–1765, 5:794):

Epigramme (*littérature*). It is a word or a maxim, in prose or in verses, generally taken from some famous writer, which the authors put in the front of their works in order to announce their intention. These *epigraphs* have become very fashionable in recent years. M. de Voltaire put the following at the beginning of his *Méropé*, where he banished the passion of love:

Hoc legite, austeri, crimen amoris abest.

⁵In the main text of the book, we can establish a distinction between explicit quotations, which are parts of text borrowed from other works with a clear indication of the borrowing (such as quotation marks or a special typography), even if the origin of the text is not indicated, and implicit quotations, which are borrowed parts of text without any indication of this borrowing. But the form and position of epigraphs, which are always distinguished clearly from the main text as well as other paratextual elements, make it difficult to consider them “implicit quotation” when no evidence of the borrowing is given. That is why, in this chapter, we use the term ‘quotation’ for every borrowing of a part of text from another work, whether it is specified or not. On epigraphs as quotations, see Compagnon (1979: 337–339). The title can also refer to another text, but this reference is implicit.

⁶Our attempt to characterize epigraphs concerns, above all, printed books from the seventeenth and eighteenth centuries. It might be possible to extend the scope of the notion of epigraph to other kinds of documents, such as manuscripts in European and non-European traditions.

Epigraphs are not always accurate, and sometimes promise more than the author delivers. One runs no risk by choosing those that are modest.⁷

Thus three main criteria define epigraphs: (1) they are parts of text (sometimes just a word) located at the front of the book; (2) they are generally (but not necessarily) short quotations from another work; (3) they are ‘maxims’ giving information or ‘promises’ on the spirit of one particular book (rather than all the author’s work). Indeed, these criteria can be used to identify epigraphs in eighteenth-century books but, in practice, there is a diversity of cases, so that the boundaries of the epigraph are not so clear.

Firstly, the position of epigraphs is always at the beginning of something⁸ but it is not necessarily the beginning of the whole book. They can also be before a part or a chapter or a single article in a journal. This kind of epigraph, concerning only a part of the book, is rare before 1750⁹ but becomes widespread in the second part of the eighteenth century.¹⁰

Furthermore, even at the beginning of a book, an epigraph can have different positions: before the title page, on the title page, on the verso of the title page, on a special page after the title page, before or after introductory texts, or immediately before the main text. We shall see in the following section that, in that respect, different traditions may have existed in Europe in the eighteenth century, bestowing different meanings on epigraphs.

But in some borderline cases, it is not even clear if we are faced with an epigraph or not. For example, it is not always easy to distinguish between an epigraph which is placed just before the main text and an introductory quotation that belongs to the text itself. In Beaumont’s *Apologie des Bestes* (1732), a work written in verse, there is, at the beginning of the preface (just after the title ‘Preface’), a Latin quotation

⁷‘Epigraphe, s. f. (*Belles-Lettres*.) c’est un mot, une sentence, soit en prose soit en vers, tirée ordinairement de quelqu’écrivain connu, & que les auteurs mettent au frontispice de leurs ouvrages pour en annoncer le but: ces *épigraphes* sont devenues fort à la mode depuis quelques années. M. de Voltaire a mis celle-ci à la tête de sa *Méropé*, d’où il a banni la passion de l’amour: *Hoc legite, austeri, crimen amoris abest*. Les *épigraphes* ne sont pas toujours justes, & promettent quelquefois plus que l’auteur ne donne. On ne court jamais de risque à en choisir de modestes.” Two other sub-articles of the *Encyclopédie* are devoted to alternative meanings of the word ‘*épigraphe*’: the first one, by Diderot, is about a sort of clerk in ancient Greece; the second one, by Jaucourt, about epigraphs as inscriptions on monuments or buildings.

⁸Etymologically, an epigraph is an inscription ‘written on’ something. If ‘something’ is a book or a text, ‘on’ means ‘at the beginning of’. The word already existed in classical Greek, with the meaning of an inscription on stone, statues, etc., or at the beginning of a book (which corresponded more or less to the meaning of ‘title’: see e.g. Polybius III, 9, 3). In seventeenth-century Latin, English and French, it was used, above all, to designate inscriptions on monuments. The meaning of ‘inscription at the beginning of a book’ apparently became common in French only after 1700 and in English only in the nineteenth century. In German, the word ‘Epigraph’ itself seems to have been very rare in the period under consideration.

⁹An exception is Vol. I of Buffon (1749–1765): see above.

¹⁰We have found, in one case (Klein 1751), a full-page quotation at the end of the book, with the same typography as the epigraph, which is on the verso of the title page in the same book. Such ‘hypographs’ were apparently rare in the eighteenth century.

from Lucretius which could be considered an epigraph, since it is written in italics (as opposed to Beaumont's text in French), with the exact reference given, and since it seems to give a general indication on the meaning of the text which follows. But as we read the preface, we find other quotations from Lucretius and Horatius, with the same typography and layout as the first. This preface consists of Latin quotations in verses alternating with Beaumont's own verses, which are more or less an imitation (or a fairly free rendering) of those of Lucretius. As a consequence, whereas the first quotation appears at first sight to be an epigraph according to the *Encyclopédie* definition, and is undoubtedly endowed with some of the common functions of epigraphs (for example, it suggests a comparison of Beaumont's aim with Lucretius' work and it justifies the use of verse for a philosophical and scientific book), it can also be considered as one simple quotation among many others in the preface.

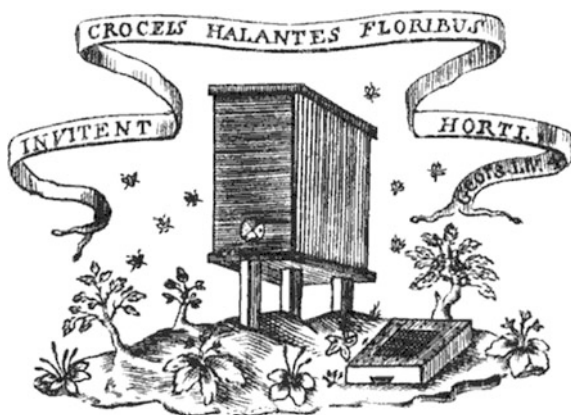
Secondly, if we accept that an epigraph has to be specific to a given book, rather than the author's entire work (Genette 1987:147), we must admit that this criterion is not always satisfied and that many intermediary cases exist. For example, on the title pages of two works written by Jean-Baptiste Robinet, we find the same quotation from the *Suda*, in Greek, the meaning of which, '[He] was the clerk of Nature, steeping his pen in intellect,' ('Τῆς Φύσεως γραμματεὺς ἦν τὸν κάλαμον ἀποβρέχων ἔνουν') is general enough to concern Robinet's plan for a philosophy of nature rather than a particular book on it (Robinet 1761–1766; 1768). Similarly, many treatises on microscopy by Henry Baker share the same quotation from Pliny the Elder, 'Rerum natura nusquam magis quam in minimis tota est.'¹¹ Here, the epigraph appears as a motto concerning all the scientific works carried out by Baker, and not only one or two of his publications.

Distinguishing between epigraphs and more general mottos is even more complex when the text under consideration is somehow connected with iconographic elements. For example, we find on the half title page of Formanoir de Palteau's *Nouvelle construction de ruches de bois* (1756) an ornament representing a beehive under the Latin sentence: 'Invitent croceis halantes floribus horti' (Let gardens breathing with saffron flowers invite them), which is a quotation from Virgil (*Georgics* IV, 109) (Fig. 9.1). This quotation (the origin of which is not indicated), like the illustration, is closely connected to the subject of the book and could be seen as an epigraph in the common sense, although its aspect and position are reminiscent of a heraldic motto.

Similarly, on the title page of Linck's *De Stellis Marinis* (1733), there is an ornament representing a starfish with the obscure sentence 'Viscera poscit' (It needs viscera), with no indication of its origin but possibly extracted from Commodian's *Instructiones* (XIX). On the title page of Vincent's *Catalogue* (1726), the ornament bears a quotation (with a reference) from Psalms ('Disponit in thesauris abyssos,' i.e. 'He layeth up the depth in storehouses'), alluding to a collection of natural

¹¹'Nature is nowhere as great as in its smallest.' See e.g. Baker (1743a, b, 1753).

Fig. 9.1 Ornament on the half title page of *Nouvelle construction de ruches de bois* (1756). The Latin inscription means ‘Let gardens fragrant with saffron flowers invite them.’



marine objects. In both cases the quotation, although on an ornament, specifically refers to the subject of the book and is not different from a simple textual epigraph.

In other cases, the status of the text is even less evident, especially when it is not a quotation.¹² In Lange’s *Methodus nova et facilis* (1722), on the top of the first page of the preface, there is a vignette bearing a Latin sentence, apparently composed by the author (Fig. 9.2). This sentence can be understood as his own motto or as the book’s epigraph.

The ornament on the title page of Kaempfer’s *Amœnitatum exoticarum* (1712) bears the sentence ‘Virtuti nihil invium,’ i.e. Nothing is impervious to valor) with the initials ‘E.K.D.’ (for ‘Engelbertus Kæmpferus Doctor’), suggesting that Kaempfer appropriates this rather banal motto that could apply to his work in general or to this book in particular (Fig. 9.3).

In some cases, the mottos on the ornaments of title pages do not even belong to the author, but to the publisher: for example, many books published by Laurent Durand (c.a. 1712–1763) from the 1740 s bear the sentence ‘Fides et concordia ad laborem concitant’ (‘Faith and concord rouse to work’). This sentence is not an epigraph chosen by the author, but readers cannot recognize that it is the publisher’s motto unless they have the opportunity to see many books by the same publisher: thus they could think that this sentence is the author’s personal motto or the epigraph of the book they have in his hands.

Frontispieces can also bear texts of ambiguous status. Some of them seem to be very similar to epigraphs; for example, in Boreman’s *Description of a great variety of animals and vegetables* (1736), there is one quotation from the Bible on the title page and two others on the frontispiece, all concerning the greatness of Creation, and there is no reason to consider only the first to be an epigraph. In other cases, the text on the frontispiece seems to be more like a general motto, as in Rzączyński’s

¹²Although most epigraphs are quotations, this is not necessary the case, as the *Encyclopédie*’s definition shows, and we find some examples of self-written epigraphs in the scientific literature of the eighteenth century (see below, Sect. 4).



Fig. 9.2 Lange (1722). Vignette before the preface. The Latin inscription means ‘He will strike only air if he is not guided by his objective itself.’



Fig. 9.3 Kaempfer (1712). Ornament on the title page

Historia naturalis curiosa Regni Poloniae (1721): ‘Vita brevis ars longa’ (Life is short; art is long). In Beaumont’s *Apologie des Bestes* (1732), the frontispiece consists of a quatrain (written by the author himself) under a plate, both concerning the superiority of man over animals: this quatrain functions not only as a legend for the plate but also as a motto, a summary of the book’s main thesis (i.e. as an epigraph).

Similarly, the frontispiece of Roesel von Rosenhof’s *Historia Naturalis Ranarum Nostratium* (1758) shows a quotation from Virgil written on a ruined monument surrounded by frogs and other amphibians (Fig. 9.4). The text and the picture together indicate the subject of the book and justify it: they suggest that even though frogs are tiny creatures, it is wonderful to study them. It is striking that, in this case, the text can also be considered an ‘epigraph’ in the sense of an ‘inscription on a monument’ as well as ‘a motto at the beginning of a book’. Thus etymologically and in practice, the epigraph is closely related to the tradition of



Fig. 9.4 Roesel von Rosenhof (1758). Frontispiece. The Latin inscription is borrowed from Virgil (*Georgics* IV, 3) and means ‘regard with wonder the spectacle of minute things’. The pronoun *tibi* (‘for you’) has almost completely disappeared, making the inscription more general

“monument of paper” described by Armando Petrucci, who studies similar representations of monuments with epigraphic inscriptions in many Italian books in the seventeenth and eighteenth centuries (1993:114–115). In the case of Roesel’s frontispiece, the function of the quotation is typical of an epigraph in the strictest sense—namely, a means of legitimating the books (see below, Sect. 4)—but this function is made more official and solemn, more permanent, as it were, by the evocation of the antique monuments on which rulers proclaimed their exploits and their laws.¹³

Thus, there is a whole range of possibilities with the parts of text connected with iconographic elements in the front matter of books: some are more mottos of the author (or even the publisher), others are explanations or legends of the image; but as they become more specific to the book, or more independent from the image, we can consider that they acquire the character of an epigraph, according to the definition and criteria given above: ultimately, their functions are no more distinguishable from those of epigraphs that are totally separated from any figure.

9.2 A Hypothesis on the Origin of Epigraphs

The previous borderline cases show the close connection between epigraphs and other elements of the paratext, and they may throw some light on the origins and functions of epigraphs. As a matter of fact, epigraphs in the strictest sense, independent from any illustration, appeared and developed relatively late in printed books, when compared with other elements of front matter such as the title page, frontispiece or preface (Genette 1987: 147). The earliest example we have found in natural history books is a quotation from Galen on the title page of Gaspard Bauhin’s *Pinax* (1623). Such examples remained rare in scientific books (as well as in other kinds of literature) before 1650 but they became a little more frequent in the second part of the seventeenth century. They were generally on the title page, although epigraphs appear on the verso of the title page at the end of the century.¹⁴

By contrast, other textual elements connected to front matter illustrations appeared far earlier and were much more widespread in the seventeenth century. Engraved or etched frontispieces were very common at that time and bore a

¹³Antoine Compagnon emphasizes this relationship between epigraphs in books and epigraphs engraved on monuments: ‘The epigraph is the quotation par excellence, it is the epitome of quotation, that which is carved into stone for eternity on the pediments of triumphal arches and on the pedestals of statues. (It is when imitating the Latin inscriptions that the printers draw the Roman character.)’ (Compagnon 1979:337) [‘L’épigraphie est la citation par excellence, la quintessence de la citation, celle qui est gravée dans la pierre pour l’éternité, au fronton des arcs de triomphe ou sur le piédestal des statues. (C’est en imitant les épigraphes latines que les imprimeurs ont dessiné le caractère romain.)’].

¹⁴The earliest example we have found of such a position is a quotation from the Bible in Harvey (1674).



Fig. 9.5 Detail of the frontispiece in Harvey (1651)

diversity of inscriptions, quotations or not, with various functions (Remmert 2005). Just to take one example, the frontispiece of Harvey's *Exercitationes de Generatione Animalium* (1651) shows Jove opening an egg from which different creatures jump, and on which is written the motto 'Ex ovo omnia,' (Everything [comes] from an egg), which is not a quotation but Harvey's main thesis in this book. This tradition of parts of text written in frontispieces endured throughout the eighteenth century, as the aforementioned example by Roesel shows (Fig. 9.5).

Title page ornaments appeared as early as the first decades of the sixteenth century, and at that time, some were already connected to short texts. These texts were often the publisher's motto but they were sometimes specific to the book, but it is difficult to ascertain if they were chosen by the author or the publisher. In some cases, there is a complex textual apparatus in and around these ornaments. For example, the Parisian edition of Alessandro Alessandri's *Genialium Dierum Libri Sex* (1532) shows a fabulous creature surrounded with five quotations in Latin, Greek and Hebrew, of which the meaning is rather general but fits this scholarly book in particular.¹⁵

From a genealogical standpoint, it is possible that epigraphs originated, at least partly, from these textual elements linked to iconographic front matter which had developed during the sixteenth and seventeenth centuries. In any case, there was no clear structural or functional boundary between epigraphs and these various elements, and epigraphs began being more widespread precisely when the iconographic front elements tended to become less frequent, in the late seventeenth century. The rise of epigraphs may thus have been the result of the separation and

¹⁵Alessandri (1532). The same ornament is also on the last page of the book. The quotations were probably not chosen by Alessandri (who died in 1523) but by the publisher.

individualization of textual components from frontispieces and title page ornaments. This evolution permitted the author to better control this text to the detriment of the publisher and the illustrators. Furthermore, it allowed the migration of epigraphs, initially on the title page or before it, to other positions closer to the main text of the book (on the verso of the title page or just before the main text). This possibility was not exploited to the same extent in different contexts, and it led to a certain diversification of functions.

9.3 Frequency, Distribution and Evolution of Epigraphs in Scientific Works in the Eighteenth Century

In order to get an idea of the frequency of epigraphs and the general evolution of their use during the eighteenth century, we have studied a corpus of 715 books published from 1700 to 1800 in different European languages (English, French, German, Italian and Latin) and totally or partially devoted to natural history.¹⁶ We have considered different kinds of works, written by scientists and amateurs and intended for a wide or targeted audience. Two hundred and twenty-two books (i.e. 31%) showed one or more epigraphs.¹⁷

If we examine the evolution of this proportion decade by decade (Table 9.1), we find a regular increase from 1710 to the 1740 s, then a stabilization or a slight fall in the second part of the century.

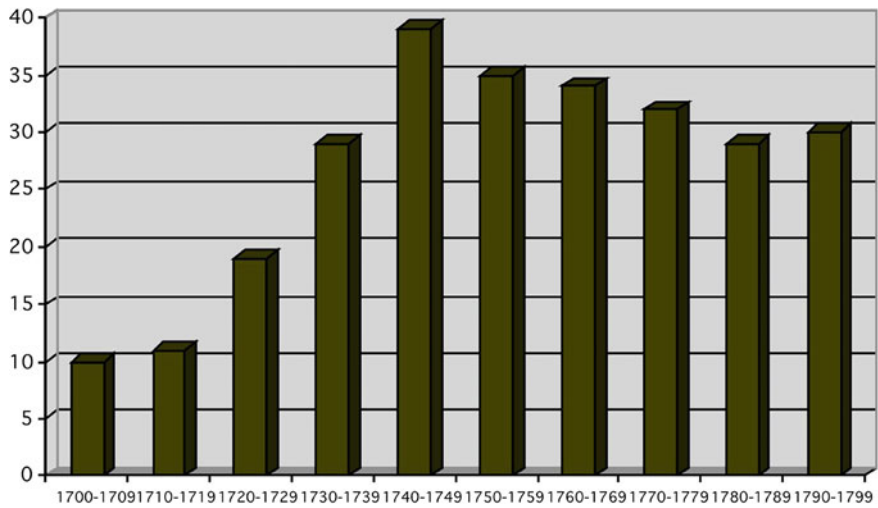
Thus epigraphs are by no means rare in scientific books in the eighteenth century since, after 1730, they concern about a quarter to a third of such works.¹⁸ In most cases, there is only one epigraph, but sometimes there are two or more, located together or not: for example, Monro's *Essay on Comparative Anatomy* (1744) has two epigraphs occupying nearly one half of the title page, and White's *Natural*

¹⁶This corpus was established from several bibliographical tools such as Dryander (1796–1800). Even if it is not, of course, exhaustive, we consider it representative enough of the different kinds of publications (except periodicals) in the field of natural history in the widest sense during the eighteenth century, written by professional scientists (physicians, members of scholarly societies such as the Parisian Académie des Sciences) or by amateurs, addressed to scholars or to a wide audience. It includes, among others, general treatises such as Linnaeus' and Buffon's, monographs on a single species or category of animals or plants (e.g. Réaumur's *Mémoires* on insects), utilitarian handbooks (e.g. on apiculture), editions or commentaries on ancient works (Aristotle, Pliny, etc.), catalogues of collections and popularization books (e.g. Pluche).

¹⁷We have encountered difficult cases such as those mentioned in the previous section, in particular, texts in title page ornaments and frontispieces. As a general rule, we have accepted as epigraphs those cases which could reasonably be considered different from general mottos and which were independent enough from iconographical elements. In practice, most parts of texts closely associated with figured elements have been excluded for this quantitative analysis.

¹⁸This phenomenon also affects journals, where epigraphs may concern the whole volume or single articles. In this paper, we study only monographs.

Table 9.1 Evolution of the proportion of books with epigraphs in the studied corpus from 1700 to 1800 (in %). For example, 10% of the books in our corpus that were published from 1700 to 1709 have an epigraph

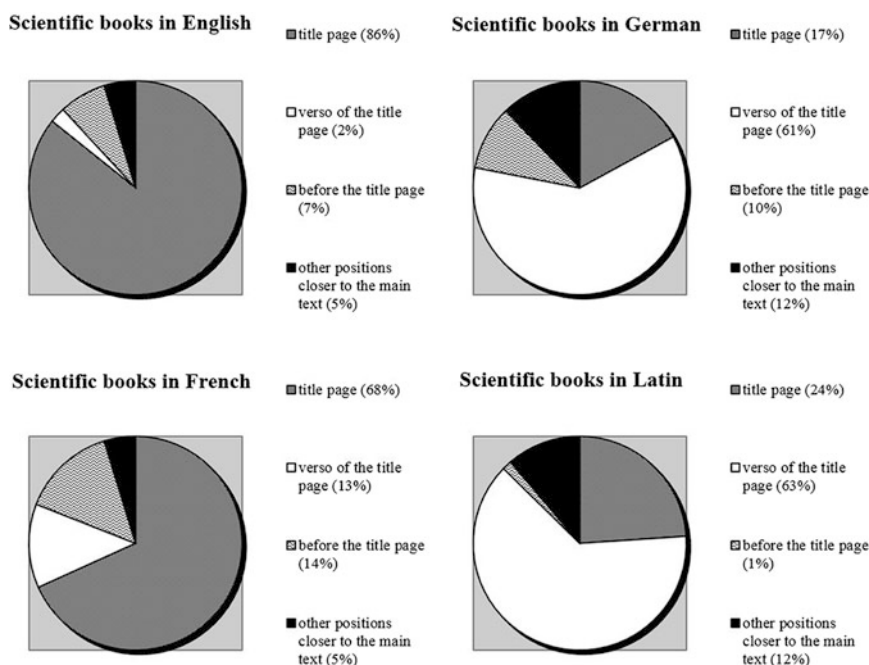


History and Antiquities of Selborne (1791) has two epigraphs on the half title page and two others on the title page.

We have found epigraphs in books written in all the languages under consideration but with significant differences. Their frequency is lower (22%) in books written in German, higher (39%) in books written in English and average (30–32%) in books written in French, Italian and Latin. By contrast, we have not noticed obvious differences between the different genres of books in our corpus (e.g. scholarly vs. popularization literature, or monographs vs. general treatises): epigraphs are present in every kind of scientific work, those for scientists or those for a wider audience (Table 9.2).

These epigraphs can have various positions, as we have seen in the previous section, and if we examine the frequency of every kind of position, we find significant differences among the scientific literature written in English, German, French and Latin.¹⁹

¹⁹The number of books in other languages was not significant enough. We have classified the books according to language. For books in English, French, German and Italian, this distribution roughly corresponds to the classification according to the countries where the books were published. As to the Latin books in our corpus, they were published in all European countries, but a majority came from Germany. Nevertheless, our results are not significantly different between Latin books published in Germany and those published in France, the Netherlands, etc., suggesting that the language is more important than the place of publication in accounting for differences in the use of epigraphs.

Table 9.2 Position of epigraphs in the books in the corpus

The epigraph can be on the title page, generally after the title itself and the name of the author, and before the information on the printer and/or the publisher. This is the most frequent position in scientific books in English (86%) and in French (68%), but it represents less than one quarter of the epigraphs in books in Latin and German. By contrast, on the verso of the title page is the most frequent position in books written in Latin and German, but it is rare in books written in French and English. Other positions, before the title page (i.e. on the half title page or frontispiece) or after the verso of the title page (i.e. closer to the main text or inside the book, at the beginning of parts or chapters) are less common, but we can note that the latter is more frequent (12%) in books written in German and Latin.

From these results, we can draw the following conclusions. Firstly, the epigraph is placed rather far from the main text in natural history books (in every language) in the eighteenth century. It is mostly on the recto or the verso of the title page, sometimes before this page but rarely further inside the book, on the first page of the preface or in the main text, for example. In particular, epigraphs concerning only one part or one chapter of the book are exceptional. Thus the use of epigraphs in the eighteenth century is significantly different from current practices, since most epigraphs in modern books are physically closer to the main text and almost never on the title page. As a consequence, the part they play is not exactly the same:

today's epigraphs tend to be more integral to the main text; in the eighteenth century, they are clearly more separated (like a subtitle as it were), they label the book as a whole and they tend to have a status different from the main text. In association with other paratextual elements, they participate in establishing the level of expectation or *Erwartungshorizont* of the book.

Secondly, the practice of using epigraphs in our corpus is different in books written in English and French, on the one hand, and in books written in German and Latin, on the other. In the first case, it is more visible and outward looking. When an epigraph is on the title page, the half title page or the frontispiece, it is seen as soon as the book is opened, even if we do not read further. It bears information the author or the publisher wants to give immediately, just like the title, and, in part, it has similar functions (e.g. advertising). It is noteworthy that in some journals giving reviews of recently published books, such as the *Journal des Savans*, the epigraph is mentioned as well as the title or the name of the author and the publisher. In some cases, epigraphs are even used to identify essays proposed anonymously for competitions in academies, etc.²⁰

On the contrary, epigraphs in books written in Latin and German tend to tend to look rather inwards and it is necessary to turn at least the first page to see them. Thus, by comparison with epigraphs in books written in English or in French, they lose an important part of the function of advertising but they acquire a closer connection with the content of the book. In that sense, rather than 'catchlines', they represent introductions to the main text, and the meaning of the epigraph by itself seems to be considered more seriously by the authors. This difference appears clearly when a book originally written in German or Latin is translated into French or English. For example, a treatise published by the Prussian naturalist Jacob Theodor Klein, *Naturalis Dispositio Echinodermatum* (1734), has an epigraph (a quotation from the Bible) on the verso of the title page but in the French translation of this work, the *Ordre naturel des oursins de mer* (1754), the same quotation has been shifted towards the verso of the half title page (i.e. facing the title page), which gives it a different status.

The reason for such a difference between the languages is difficult to establish and we cannot exclude that the tendency revealed by our corpus results from local practices of particular publishers rather than national traditions. In that respect, a more ambitious study, including a comparison with other kinds of literature, would be needed. We can suggest, however, that books written in Latin, being intended more for scholars or scientists, did not need to attract the attention of readers as much as books written in vernacular languages (French and English) for a wider audience and that the 'catchline' function of epigraphs was less important. But in the case of German books, the question remains open.

²⁰See e.g. Anonymous 1779, 1781, 1787.

9.3.1 *The Sources of the Epigraph's Text*

While the position of an epigraph can be meaningful itself (e.g. as regards the target audience), as we have seen, its content is obviously of prime importance for its interpretation and the understanding of its functions. In fact, two elements have to be considered: the piece of text itself and, if it is a quotation, the work from which it is borrowed.

In the corpus studied, we have examined the origin of epigraphs quantitatively. We have found that in most cases, these epigraphs are quotations (i.e. parts of text borrowed from other works). As a general rule, their origin is indicated with some detail: the quoted author, the quoted work and the exact reference (chapter or page, even the edition in some cases) are given in about 50% of the epigraphs in the corpus; at least the quoted author or the work in 90%. The reference generally appears just after the quotation.²¹ Thus the practice of employing epigraphs is mainly conceived as a practice of quotation, and an explicit one.

When no reference is given (i.e. for 10% of epigraphs in our corpus), the epigraph may be (1) a quotation whose origin seems to be evident enough for the readers, for example a quotation from a famous Latin author, or from the Bible (i.e. works every educated person is supposed to know); or (2) a quotation whose origin is not obvious but which the author, for one reason or another, found preferable to leave unclear; these cases are rare and have to be explained individually: for example, we have found in Ledermüller's *Nachlese seiner Mikroskopischen Gemüths- und Augen-Ergötzung* (1762) one such epigraph, of which the meaning is very general but which is borrowed from an epic poem by Girolamo Frascatoro (1478–1553) on syphilis: possibly Ledermüller did not want to mention a venereal disease on the frontispiece of a work intended for a wide audience²² or (3) the epigraph is not a quotation but has been written by the author him/herself.

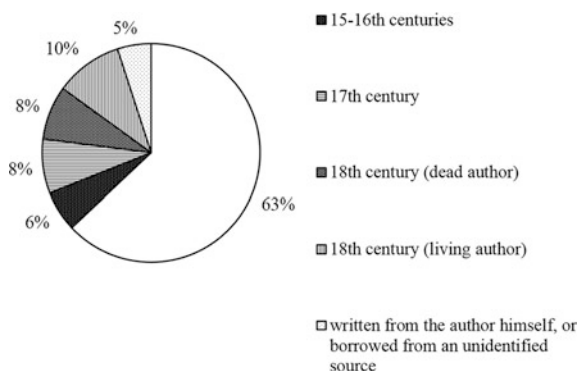
Table 9.3 show the distribution of epigraphs according to their origin and the period of the works quoted. We have not distinguished between quotations with or without a reference, since the latter are rare (5%).²³

Epigraphs written by the author him/herself or borrowed from an unidentified source differ from quotations in that their meaning lies entirely in themselves. This kind of epigraph is rather rarely used (less than one case out of twenty) and authors generally prefer to borrow parts of texts from other works. Even if the epigraph is not a quotation, but an original part of text written by the author of the book, it can

²¹We have found, in one case, the reference of an epigraph given in a footnote in Lettsom's *Naturalist's Companion* (1774), one of the rare English books with an epigraph just before the beginning of the main text.

²²The epigraph is 'Et parvis quoque rebus in est sua sæpe voluptas' (Even in small things, there are often peculiar pleasures). It is on the frontispiece.

²³Out of 10% of epigraphs with no reference, we have been able to identify quotations in 5%. We consider the rest as epigraphs written by the author him/herself, although we cannot exclude that some of them are, in fact, quotations we have not been able to recognize. But this does not alter significantly our conclusions.

Table 9.3 Origin of the epigraphs in our corpus

refer to another text by imitating a turn of phrase: for example, the epigraph in Edwards' *Natural History of Birds* (1743–1751), 'Natura semper eadem, sed artes sunt variae' (Nature is always the same, but the arts are diverse), is an implicit reference to Spinoza's *Ethics* ('Natura semper eadem,' i.e. 'Nature is always the same,' in the Preface of the Third Part). Thus even when epigraphs are not quotations in the strictest sense, the practice of epigraph is almost always a practice of intertextuality, as if authors felt obliged to appeal to someone else's authority at the beginning of their book.²⁴

The interpretation of quotational epigraphs in the strictest sense (by far the most frequent case) is more complex, since their significance lies not only in their intrinsic meaning but also in the choice of the work and author quoted: for example, they may be a mark of gratitude, or reveal scientific, philosophical, political or institutional patronage (see the following section).

These quotations are mostly verbatim, although, in some cases, the text is slightly modified, which is a usual practice in every kind of quotation in the eighteenth century. If the quoted work is in another language, it is rarely translated, except in books clearly intended for a wide audience, like Arnault de Nobleville's *Aëdologie, ou Traité du rossignol franc ou chanteur* (1751), whose epigraph, borrowed from Aldrovandi, is given in Latin and in French.

About one fifth of quotational epigraphs are borrowed from contemporary authors (i.e. from texts published for the first time after 1700). In these cases, living authors are quoted a little more frequently than dead authors; this proportion is a little greater in books written in German and Latin books. Among the authors quoted, we find about two thirds are "scientists" in the widest sense of the word (i.e. authors, be they professional or amateur, dealing with scientific topics). The frequency of quotation is an indication of an author's scientific or institutional

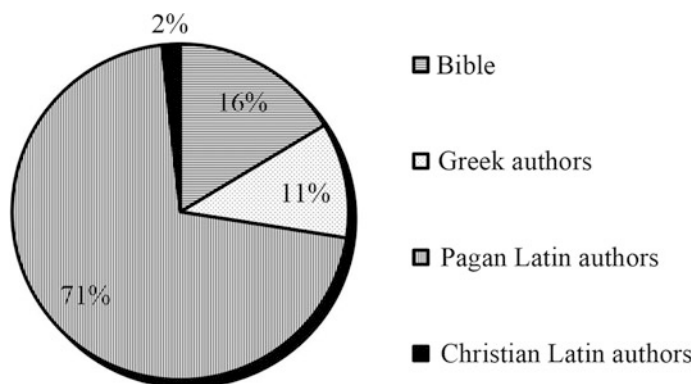
²⁴See also Bretelle's article in this volume.

influence: for example, for epigraphs in books dealing with natural history, the Swedish naturalist Linnaeus is by far the most frequently quoted contemporary author. Besides “scientists”, fiction writers, poets and, more rarely, philosophers also appear in epigraphs. It is noticeable that whereas scientists from different countries are quoted in scientific books of all languages, the nationality of the writers or poets quoted is generally the same as the author’s: e.g. Christian Fürchtegott Geller or Barthold Heinrich Brockes in German books, Alexander Pope in English books, Voltaire in French books, etc. This suggests that authors or publishers considered science more universal than other fields and that, accordingly, the target audience would be more sensitive to the prestige of foreign scientists than to the fame of foreign writers or poets.

The proportion of epigraphs borrowed from works of the Renaissance and the seventeenth century is a little smaller (14% of all epigraphs). A few poets are represented, in particular in books written in English (Milton, Dryden), but most authors quoted from this period are scientists or philosophers who, in the eighteenth century, were considered important in the foundation of modern science: for example, the Italian botanist Andrea Cesalpino, who was generally held at that time to be a forerunner of Linnaean systematics and nomenclature; the Italian physician Giorgio Baglivi, famous for his physiological works and often considered a “forerunner” of Haller, etc. Francis Bacon is often quoted in epigraphs (for example, by Linnaeus (1736)) since, in the age of the Enlightenment, he was considered, rightly or wrongly, as a key figure of modern epistemology and empiricism.

But the most widespread epigraphs (63%) are, by far, those borrowed from ancient works (including the Bible and early Christian texts), which suggests that Antiquity is thought more capable than any other period of fulfilling the main functions of epigraphs (Table 9.4).

Table 9.4 Ancient works quoted as epigraphs in the books in our corpus



Biblical epigraphs make up 10% of the total (in our corpus); they are generally in Latin or in the vernacular (especially in Protestant contexts) and rarely in Greek. Greek authors are less frequent (about 7% of all epigraphs); they include poets (Homer, Hesiod) and philosophers such as Plutarch and Aristotle; they are quoted in Greek, Latin or (rarely) the vernacular. The rest (about 45% of all epigraphs) almost exclusively consists of quotations from Latin classical authors of the Golden and Silver Ages, in particular Seneca, Virgil, Cicero, Lucretius and Horace. Pliny the Elder is very well represented in natural history books.

We have observed the popularity of classical Latin literature in the epigraphs in our corpus, but a glance at other kinds of fiction or non-fiction books suggests that this is a general feature of publications in the eighteenth century. There are many reasons for this. On the one hand, epigraphs borrowed from classical Latin works gave a flavor of scholarship and gravity to the book, but, on the other, readers were more familiar with these works, unlike the classical writings and language of Ancient Greece. Classical Latin writers were the main cultural reference for educated people in the eighteenth century; these people, even those who were not able to read an entire book in Latin, were familiar enough with such authors as Cicero, Virgil or Horace to read and appreciate a short sentence borrowed from their work. Furthermore, this literature was an unending source of short, elegant and striking turns of phrase that could be easily used when one had to express general ideas with few words; for example, in mottos or epigraphs.

These reasons explain why many writers of fiction chose such epigraphs; interestingly, many scientists and philosophers did the same, although classical Latin authors were not a major reference for them from a scientific or philosophical standpoint, if compared, for example, with Greek or modern authors. They seemingly favored aesthetic and stylistic rather than purely scientific criteria for their epigraphs. In this respect, there is a certain unity in the practice of epigraph in the eighteenth century in all kinds of books, fiction or not.

9.4 The Functions of Epigraphs

The position of epigraphs, at the beginning of the book, make them an important step when the reader is entering the book, like other parts of text (e.g. title, preface, etc.) with which they share some features. However, epigraphs have special characteristics: they are much shorter than prefaces and other introductory texts, so they cannot have a similar explanatory value; furthermore, while they have, to some extent, to represent or symbolize the book, they are not as connected to its content as, for example, the title; moreover, they are mostly quotations, so they connect the book directly with other works. That is why epigraphs display a specific variety of functions in scientific books as well as in fiction (Compagnon 1979, 337–339; Genette 1987, 159–163).

Firstly, in scientific as well as non-scientific books, aesthetic considerations play an important part and, as we have said, the beauty of classical Latin sentences partly

explains their frequency as epigraphs. Even some non-quotational epigraphs are imitations of classical Latin poetry.²⁵ Thus epigraphs are often an elegant way to evoke the main topic of the book and to bring a touch of amenity, especially on the title page, if the title itself is rather dry. For example, the epigraph in Amoreux's *Notice des insectes de la France, réputés venimeux* (1789) sums up in two short verses (apparently written by Amoreux himself) the five ways of being affected by venomous insects.²⁶ In Klein's *Tentamen herpetologiae* (1755), a book on the classification of snakes, there are two epigraphs: the first one is a Latin poem, probably composed by Klein himself, on the title page, which has no other ornament (it praises the wonderful nature of snakes); the second one, on the verso of the title page, consists of two verses borrowed from Ovid about the poisonous blood of the Lernaean Hydra (*Fasti* V, 405–406). Both offer colorful visions of real or fabulous reptiles that enliven a rather dry topic. Similarly, Bracken's *Farriery Improv'd* (1738) has a quotation from Horace on its title page about the way to judge good horses: a learned reference to the subject of the book. This kind of epigraph has a function similar to iconographic ornaments.

The short description of the book's content suggested by the epigraph sometimes brings a touch of legitimacy to the subject, for example to emphasize its usefulness: in another treatise on venomous animals, Amoreux (1762) quotes a sentence from Linnaeus to underline that the knowledge of poisonous substances is very useful in medicine. In particular, many works dealing with insects, worms or other small animals show epigraphs stressing the importance of such studies. One of the most frequent epigraphs of this kind is taken from or imitates Pliny's *Natural History* and asserts that the whole of nature can be found in the smallest things.²⁷

The description and justification of the content is one of the functions that are common to epigraphs and other paratextual elements, in particular prefaces and other introductory parts of text. Another such common function is to give information on the author or the circumstances of the publication. For example, in Artdi's *Ichthyologia* (1735), published posthumously and edited by Linnaeus, the epigraph—a quotation from Virgil, which may have been chosen by Linnaeus or by the publisher—refers to the author's death and fame.²⁸ In the same vein, the epigraph in Klein's *Quadrupedum Dispositio* (1751) hints at the author's old age, a

²⁵E.g. in Jean-Baptiste Simon's *Le Gouvernement admirable, ou la République des abeilles* (1740): 'Gens virtutis, belli, pacis, laborisque perita,/Nescia quietis.' (People of virtue, skilled in war, peace and work/Ignorant of rest).

²⁶'Morsu et punctura,/Contactu, exhalatione et haustu' (By bites and punctures,/Contact, vapors and spears). There is a similar epigraph in Laurenti's *Specimen Medicum* (1768).

²⁷See Note 11. We find similar epigraphs, for example, in Geoffroy (1767): 'In minimis maxima sapientia' (In the smallest, there is the greatest wisdom); in Wulff (1765): 'In contemplatione Naturæ, nihil supervacaneum' (from Pliny XI, 4); in Gesenius (1786): 'In his parvis et minimis, ut fere nullis, quae ratio! quanta vis! quam inextricabilis perfectio!' (from Pliny XI, 2); etc.

²⁸'Stat sua cuique Dies, breve & irreparabile tempus/Omnibus est positum: Famam extollere Factis/hoc Virtutis opus...' (*Aeneid*, X: 467–469) (To each his day is given. Beyond recall/Man's little time runs by: but to prolong/life's glory by great deeds is virtue's power [transl. Theodore C. William]).

rhetorical device commonplace in prefaces to excuse the weakness of the work in advance.

Besides such information, epigraphs often give general principles underlying the book. These principles are frequently very banal and conventional ideas; for example, that the book is a contribution to the quest for truth,²⁹ or that this research is a mere sketch and has yet to be pursued,³⁰ etc. In this respect, ancient Latin authors are an abiding source. But as these sentences are quoted separately from their original context and in positions where they are more or less isolated from other textual elements that could throw light on them, the words themselves can, more easily than quotations in the main text, be appropriated to express more subtle, modern ideas. For example, in his *Essai phisique sur l'æconomie animale* (1736), under a frontispiece representing two women in a natural history cabinet, Quesnay quotes a sentence from Horace which originally means that two things, art and nature, are required to make a good poet: in Quesnay's book, it is rather an allusion to the importance of both empiricism and theory in science, as it appears from the introductory text ('Discours préliminaire sur l'Expérience & la Théorie en Médecine'). Here, we have a complex paratextual apparatus composed of three interacting elements (frontispiece, epigraph, introduction) proclaiming an epistemological option.

More specifically, epigraphs can announce the adherence to a scientific theory or the position adopted in a scientific debate. The strategy can be very clear when the epigraph is borrowed from a protagonist in the debate itself: for example, if the epigraph is borrowed from Linnaeus, it suggests that the author accepts the ideas of the Swedish naturalist on the classification and nomenclature of species; if it is borrowed from Albrecht von Haller, it may indicate that he accepts the physiological theory of irritability. But more often, the authors prefer to use, as epigraphs, quotations from ancient texts which can acquire new meanings in this context. For example, Filippo Pirri (1776) quotes three verses from Lucretius on the cycle of nature on the title page of his book on the theory of spontaneous generation, suggesting some connection between Lucretius' views and his own ideas on nature and the cycle of generation, although this relationship is rather superficial. Thus, Pirri gives to Lucretius' verses a specific, "modern" sense that can be understood only in connection with the content of his book. Similarly, the sentence from Pliny the Elder put on the title page of Adanson's *Familles des plantes* (Adanson 1763) praises the multitude of plants yet to be identified: while Pliny's aim is just to emphasize the marvelous fecundity of nature, Adanson wants to promote his own "natural method" of classification, which permits the inclusion of new plants as soon as they are discovered.

In the same vein, the two epigraphs in Klein's *Summa Dubiorum* (1743) have to be understood in the context of a controversy with Linnaeus: the first, from Aristotle, says that we must praise human wisdom that is able to distinguish

²⁹For example, a sentence from Seneca in Boddaert (1784).

³⁰For example, a sentence from Quintilian in Siemssen (1794).

between very similar things; the second, from Augustine, that it is better to be blamed by grammarians than misunderstood by the people. Taken together, these epigraphs can suggest that classification and nomenclature are very important in natural history, but that they should avoid complex and unfamiliar terms, which is precisely the reason for which Klein criticizes Linnaeus. Thus each epigraph in Klein's book functions in connection not only with its source (Aristotle or Augustine's work) and the contents of the book itself, but also with other paratextual elements, including the other epigraph and the title (which, by itself, suggests a strong criticism), and with external elements such as Linnaeus' books, which are criticized by Klein.

Religious orthodoxy (whether sincere or not) is also proclaimed by epigraphs borrowed from the Bible or from ancient or modern Christian apologists or poets (e.g. Milton, Akenside or Brockes). One famous example is Linnaeus' *Systema Naturae*, of which most editions have a quotation from Psalm 104 (103 in the Vulgate) as an epigraph, praising the works of God. These religious references may have a general value, as in Linnaeus' case, or they can concern a particular point of the book. In that respect, the sacred texts can be used to serve the author's own doctrine. For example, in the *Physique des corps animés* (1755), a work published anonymously by a Jesuit, Laurent Béraud, the epigraph on the title page, consists of two quotations in French from the Bible, saying that the fundamental components of life are the air and the blood. Since Béraud's main thesis, as summarized in the preface, is precisely that every physiological function can be explained by the movement of the air and the blood (rather than '*esprits animaux*'), the epigraph can be read as showing that the scientific content of the book is in accordance with or even supported by Christian dogma.

The effect of such epigraphs can be enhanced by an illustration. In Buffon's *Histoire naturelle*, there is an etched plate and an epigraph at the beginning of the chapter on the formation of the Earth and the planets (Buffon 1749–1765, Vol. I, 126). The plate is an allegory representing God setting the Solar System into motion (Fig. 9.6). The epigraph is borrowed from Marcus Manilius, a Roman poet and astrologer (fl. first century CE), author of a didactic poem in five books called *Astronomica*: 'Fecitque cadendo/Undique ne caderet'.³¹

This epigraph can be understood in at least three ways. Firstly, it is possible that Buffon chose a didactic poem in order to emphasize the importance of form and style in the writing of science, an idea that is recurrent in his works. This interpretation is all the more plausible, since Vicq d'Azyr, in his eulogy of Buffon, draws a parallel between the French naturalist and poets such as Manilius.³² Secondly, the evocation of the Earth 'falling from all sides' may be an allusion to

³¹'And [he/it] made that [the Earth], by falling from all sides, did not fall at all' (*Astronomica*, Vol. I: 169–170).

³²Dans ces tableaux, où l'imagination se repose sur un merveilleux réel, comme Manilius et Pope, il peint pour instruire; comme eux il décrit ces grands phénomènes, qui sont plus importants que les mensonges de la fable; comme eux il attend le moment de l'inspiration pour produire; et comme eux il est Poète (Vicq d'Azyr 1788: 8).

subject of the verb *fecit* is not expressed, one can think that the subject is the Creator, as He is represented on the plate.³³ Consequently, the epigraph and the plate, taken together, proclaim the accordance of Buffon's views with Christianity. By contrast, Buffon's ideas, developed in the following text, do not match with his protestations of orthodoxy, since his geological and cosmological theories do not conform to the Book of Genesis and, more generally, he refuses to introduce any religious considerations into science. He thus plays with the double meaning of the Latin verses, so that they can be read as the reader chooses (i.e. as a Newtonian or Christian profession of faith) or just as an elegant introduction to astronomical questions.

Some other functions of epigraphs are more indirect in the sense that their intrinsic meaning is not as important as their mere presence, their source or some other external feature. For example, they can be used to indicate a relationship of allegiance in a patronage network or they enable the author to claim he is a follower of a major figure or school, in particular if the epigraph is a quotation from a living author. When Dionis du Séjour quotes two verses from Voltaire on the title page of his *Essai sur les comètes* (1775), we cannot exclude, of course, that it represents a sincere tribute, but it is certainly, too, a way to place himself in relation to the different trends and networks in French intellectual and scientific circles. Similarly, on the title page of his *Reise durch Sibirien* (1751–1752), Gmelin quotes a poem by Albrecht von Haller praising his own (Gmelin's) discoveries in Siberia: in this case, the epigraph is not very different from the blurb in today's books. In the same vein, epigraphs borrowed from Bacon, which are very common in scientific books in all languages, appear as means of proclaiming the empiricist approach and, accordingly, the rigor of the contents of the book, whatever the exact meaning of the epigraph.

Epigraphs may also be indicators of the nature of the book, whether this information is given by the author (or the publisher) intentionally or not. A catalogue of a natural history cabinet published in 1784, before the sale of the collection, has a quotation borrowed from Cicero on the title page; in the foreword, the anonymous author proclaims that 'because of the systematic order prevailing in this volume, it must not be considered a usual catalogue of sale, but as a very different work,' and that he uses the word 'catalogue' as a title only 'to conform to use' (*Catalogue systématique et raisonné ou Description du magnifique Cabinet appartenant à M. le C. de **** 1784: vii–viii).³⁴ Here, the epigraph, being similar to those present in scientific treatises and other didactic works, contributes to giving the book a scholarly flavor and a higher status than the title itself would suggest.

³³The Jesuits praised this plate in their comments on the *Histoire naturelle* (*Mémoires pour l'Histoire des Sciences et des Beaux-Arts*, October 1749: 2240).

³⁴On the significance of such catalogues, see Masson (2004).

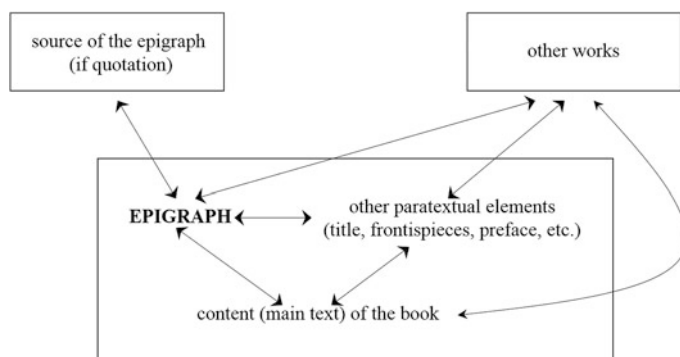


Fig. 9.7 Relationships among epigraphs and other elements inside and outside the book

Conversely, a gallant epigraph from Virgil, on the title page of Maupertuis' *Vénus physique*, works in synergy with the title to inform the reader that, although this book deals with complex subjects, it is written in a pleasant style.³⁵ As a consequence, an epigraph, even when it has a banal or conventional character (just as many other paratextual parts of text, such as prefaces, etc.), contributes to give the book its identity and, to some extent, to indicate its genre.

Although we have studied a limited corpus, concerning only a specific sample of eighteenth-century scientific publications, these examples show that epigraphs, far from being only conventional and uninteresting elements, often assume a diversity of meanings and functions, even in non-fiction. They can throw light on, among other things, the philosophical or scientific thoughts of the authors; their intellectual, social or political position; the audience they want to reach; and the nature and content of the book. Since they are short, isolated texts (mostly quotations), the authors can easily play with their meaning, use them in an ambiguous way and give them a completely new sense in accordance with their own views. Thus the different meanings of an epigraph can be fully understood only in connection with the content of the book, its paratext (including title, front illustrations, preface, or other epigraphs) and its context (for example, if there is a debate with other authors). This complex network has to be taken into account in order to better grasp the architecture of the book and the underlying strategies, and to locate it in the scientific culture of its time (Fig. 9.7).

³⁵Maupertuis (1745): 'Quæ legat ipsa Lycoris,' [something] that would be read by Lycoris herself (from Virgil, *Eclogues* X, 2).

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s.l., *sine loco* (without place [of publication]); s.n., *sine nomine* (without name [of publisher]).

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Chapter 10

Collecting Languages, Alphabets and Texts: The Circulation of ‘Parts of Texts’ Among Paper Cabinets of Linguistic Curiosities (Sixteenth-Seventeenth Century)



Fabien Simon

Abstract This paper focuses on three collections of languages, in the form of collections of parts of texts: the *Traité des chiffres* by Blaise de Vigenère (1586), the *Thresor de l'histoire des langues de cest univers* by Claude Duret (1613) and the *Traitez des langues estrangeres, de leurs alphabets et des chiffres* by François Colletet (1660). To make an inventory of the world during the Renaissance involved, along with the inventory of its territories, its plants and its animals, the inventory of its languages. It is the task that Vigenère, Duret and Colletet assigned themselves, and is the reason their works function as cabinets of linguistic curiosities. They are assemblages of two kinds of ‘parts’: first, samples of languages (alphabets and prayers); secondly, fragments of texts, written by humanists or missionaries especially, about languages. These three pieces of work, though presenting some differences and being separated by almost a century, are deeply connected. The idea is to consider the practice of collecting and its relations with the elaboration of books concerning languages. How does the literary *habitus* (i.e. incorporated by those who work on or with books) weigh on how they write? What did it mean in the sixteenth and seventeenth centuries to elaborate knowledge by collecting, when to read was concomitantly to write? Vigenère’s, Duret’s and Colletet’s books are indeed crossroads: built up from parts of texts, but also ‘reservoirs’, useful for later works. They are in some respects textual hubs, to which

The research leading to these results has received funding from the European Research Council under the European Union’s Seventh Framework Programme (FP7/2007-2013)/ ERC Grant Agreement No. 269804.

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texts arrived and from which they departed. Composite texts are susceptible to ‘re-adaptation’ or reconfiguration of the knowledge they contain.

We must not let this one escape, any more than the others, which deserved to be observed, because the curious polygraphs and researchers into Antiquity have brought it back from the Levant. Here we can see, as in the two previous examples, significant changes in the letters, showing that the Greeks adapted their language and characters according to the country in which they established themselves and furthered their conquest... (Colletet 1660a: 17)¹

This description of a ‘hunting’ scene does not come from the pen of a Renaissance botanist, looking for a specimen of some oriental plant to add to his collection. It is, in fact, as the second part of the quotation indicates, the account of the search for an alphabet. The place where this alphabet is presented, surrounded by others of its kind, is an example of what we will call, within this chapter, a paper cabinet of linguistic curiosities, which, in this case, is a printed book entitled *Traitez des langues estrangeres, de leurs alphabets et des chiffres*, by François Colletet (1660a).

This along with the *Traité des chiffres* by Blaise de Vigenère (1586) and the *Thresor de l'histoire des langues de cest univers* by Claude Duret (1613) are the three texts we are going to focus on. These three pieces of work, though presenting some differences and being separated by almost a century, are deeply connected. And the three were indeed collections of languages, in the form of collections of parts of texts. Collections, as the term was defined in seventeenth-century dictionaries, is, in Furetière’s dictionary for example:

a selection [*recueil*] one makes of the most beautiful passages that one finds in the Auteurs, or of the places that are useful to a certain intended purpose. [...] Collection is said also about a selection, a compilation of several books (Furetière 1690).²

The 1694 dictionary of the Académie française relates ‘*collecte, collecteur, collectif*’ with ‘*colliger*’, which means ‘to gather, to put together. It is almost only said for the passages, the noticeable parts of a book, of an Auteur. He collected [*il a colligé*] all the passages that concern this subject [...] He collected the most beautiful sentences of such an Auteur’ (Académie française 1694).³ Therefore,

¹Il ne faut pas laisser échapper celui-cy non plus que les autres, qui merite bien d'estre observé, puis que les curieux Polygraphes, & chercheurs de l'Antiquité l'ont apporté du Levant. Où l'on voit comme dans les deux precedents, les changemens notables des Lettres, qui font bien connoistre que les Grecs accommodoient leur Langue & leurs caracteres selon les pays où ils establissoient, & pousoient leurs conquests... (unless otherwise stated, all the translations are ours).

²s[substantif].f[éminin]. Recueil qu'on fait des plus beaux passages qu'on trouve dans les Auteurs, ou des endroits qui servent à quelque dessein qu'on a entrepris. [...] Collection, se dit aussi d'un recueil, d'une compilation de plusieurs ouvrages..

³Colliger: v. a. Recueillir, mettre ensemble. Il ne se dit guere que des passages, des endroits notables d'un livre, d'un Autheur. Il a colligé tous les passages qui concernent ceste matiere. *il a colligé les plus belles sentences d'un tel Autheur*. And ‘Collection: s.f. Recueil de plusieurs

following this narrow early modern meaning of the word, a collection is precisely, first and foremost, a collection of parts of texts.

These early modern texts are intrinsically composite. The terminology applied to them is varied and complex.⁴ They could be given different names: miscellanea (Courcelles 2003), *florilegia*, commonplace books, encyclopedias, etc. For example, one must distinguish *lectiones*—commentaries made from notes taken about what the author has read, with no order, for which the antique model is Aulus Gellius' *Noctes Atticae* (Mandisio 2003; Chatelain 1997)—from the organized commonplaces, more 'digested' readings (*digestus*), that can be considered closer to anthologies ('*loci communes sive florilegium*') and encyclopedias as well in a way (Goyet 1991; Céard 1996).

Rather than focus on all this different terminology, we prefer, in this article, to refer to these books by using the more encompassing term 'collection'. The idea is to consider mainly the practice of collecting and its relations with the elaboration of books concerning languages. How does the literary *habitus* (i.e. incorporated by those who work on or with books) weigh on how they write, how they elaborate a piece of work?⁵ What is the use of such an assemblage of several parts of texts in one book, in a specific context and with a specific goal: to bring together information about the languages of the world? How does the act of collecting apply to languages? What does it mean in the sixteenth and seventeenth centuries to elaborate knowledge by collecting?⁶

Anyway, the link between presenting different languages and the practice of collecting is made by the actors themselves, for example, Colletet again in this case:

I have also seen some other Alphabets in major Cabinets, especially in that of the late René Michel de la Rochemaillet, Prior of St. Lubin and of Champlant, that I knew in my time, a man who was equally curious about engravings, intaglios, woodcuts, medals, illuminations, rough sketches and pencil drawings, of which he had an incredible amount. (Colletet 1660a: 42)⁷

The word 'cabinet' here is ambiguous, because of its polysemy. According to Furetière again, it is, at the same time, a room in a house, a place to study—in

passages sur une ou plusieurs matieres, tirée d'un ou de plusieurs Auteurs.' (selection of various passages of one or several subjects, drawn from one or several Auteurs). It is also an ensemble of works united under a title, but we will focus on the previous, and indeed the first, meaning.

⁴And it could be confusing even for contemporary actors; for example Gessner (1548) in his *Pandectae* (Mandisio 2003: 18).

⁵For important reflections on the influence of the practice of 'collecting' on literary texts mostly, and in Early Modern England, see Crane (1993) and Swann (2001), and also Knight (2013) (Introduction 'Compiling Culture'), who brings to mind that books were 'malleable and experimental—a thing to actively shape, expand, and resituate as one desired. [...] Texts of all kinds were enlarged by writing, binding, and even sewing in additional material. These compiled volumes were not the sealed-off textual artifacts.' (Knight 2013: 4).

⁶See for example on Conrad Gessner, a humanist we are going to evoke, Goeing (2013).

⁷J'ay veu encore quelques autres Alphabets dans des Cabinets d'importance, particulièrement dans celui de feu René Michel de la Rochemaillet, Prieur de S. Lubin & de Champlant, homme qui fut aussi curieux d'Estampes, de Tailles-douces, Graveures, Medailles, Enlumineures, Desseins ébauchez & Crayons, dont il avoit une merveilleuse quantité, que j'aye connu de mon temps.

particular for scholars—and/or to keep precious things, but it is also a piece of furniture where things are stored: curiosities and rarities in general and/or books especially, being in this case a library (*‘Cabinet des livres, des armes, des medailles’*) (Furetière 1690).⁸ How were languages handled in these collections? What form did the linguistic artifacts take? Did Colletet see the alphabets displayed on objects on the shelves of la Rochemaillet’s cabinet or did he find them enclosed within books in a library?

To make an inventory of the world during the Renaissance involved, along with the inventory of its territories, its plants and its animals, the inventory of its languages.⁹ It is the task that Vigenère, Duret and Colletet assigned themselves, and is the reason their works function as cabinets of linguistic curiosities. These cabinets, as microcosms, scaled-down worlds, are linked in themselves with the question of languages. The collector, ‘like Adam in terrestrial Paradise, being given the “*nominatio rerum*” [the naming of things]’ (Lugli 1998: 173).¹⁰ The collected linguistic *Mirabilia* lead to the juxtaposition of the ancient with the exotic. As in the Renaissance cabinets, where parrot feathers coexist with Greek marble, the collection of languages could, as in Duret’s cabinet, juxtapose Latin, Hebrew and Tupi. But there is an order in these bookish *Wunderkammern*, behind their apparently disparate assemblages of two kinds of ‘parts’: first, samples of languages (alphabets, as already mentioned, but also prayers); secondly, fragments of texts, written by humanists or missionaries especially, about languages. As compilations, our texts integrate exogenous material and they are not only ‘listing’ or bringing them together but also organizing a new configuration of knowledge. That is why we would like to analyze the different layers of a text, to focus on how, like the strata exposed on a cliff face, some layers are continuous, shared between different texts over the years, while others disappear, maybe reappearing later on. We have to proceed beyond the archaeology of the text almost to its ‘geology’ to dig into its texture.¹¹

⁸Cabinet s[ubstantif]. m[asculin]. Le lieu le plus retiré dans le plus bel appartement des Palais, des grandes maisons. (...) signifie aussi, un petit lieu retiré dans les maisons ordinaires, qui n’est souvent fermé que d’une cloison: c’est où l’on estude, & où l’on serre ce qu’on a de plus précieux. Ce Sçavant est toujours enfermé dans son cabinet. (...) se dit aussi d’une espece d’honneste boutique où les curieux gardent, vendent & troquent toutes sortes de curiosités, de pieces antiques, de medailles, de tableaux, de coquilles, & autres raretés de la nature, & de l’art. (...) On dit chez le Roy, & chez quelques Grands Seigneurs, le Cabinet des livres, des armes, des medailles, pour signifier les lieux où ces choses sont rangées, & les choses même qui y sont conservées. Cabinet, est aussi un buffet où il y a plusieurs volets & tiroirs pour y enfermer les choses les plus precieuses (Furetière 1690).

⁹Claude Duret and Conrad Gessner, for example, wrote their books about languages while at the same time scrutinizing nature and inventorying its variety. Gessner composed a *Historia animalium* (1551–1587) and a *Historia plantarum* (1541) and Duret a *Histoire admirable des plantes et herbes esmerveillables & miraculeuses en nature* (1605).

¹⁰On the cabinets of curiosities and their meaning see, among other works: Bredekamp (1996), Falguières (2003), Findlen (1996) and Pomian (1987).

¹¹See the introduction to this volume by Florence Bretelle and Stéphane Schmitt.

Finally, with the example of the expression ‘*tenir cabinet*’, for a meeting of scholars, cabinets were also described by Furetière as social spaces, linked with social practices.¹² This gives the opportunity to question the books we are going to study in terms of social practices bound to them as well. What could the sociology of such texts be (McKenzie 1986)? Who is the author of a collection of bits and parts or what is the ‘author-function’ (Foucault 1969) of such pieces of work bringing together contributions from many authors: with what sort of discourses are they connected and inscribed in? How does the circulation of parts of texts between the different books, the intertextuality, the exchanges, the rewriting, and the echoes, incarnate a form of collaboration ‘across time’ (Blair 2010: 7)? How does linguistic knowledge circulate between the texts, and how can it continue its circulation later, outside the three texts constituting the core of our corpus, others echoing them?¹³

In the first section of this chapter, we are going to focus on language samples as parts of texts of two sorts: prayers, on one hand, as texts that refer to the Bible, especially the Acts of the Apostles, 2: 3–4; alphabets on the other, circulating as blocks of texts, ‘exchanged’ between the three books we are looking at.

Then, in the second section, the main point of focus is going to be quotations as parts of texts, coming from other texts and transforming the books, especially Duret’s, into a marquetry of extracts: how did the authors have access to books permitting them to transform their work into a paper library, a ‘library without walls’ (Chartier 1996: 112)? How do ‘encyclopedical men’ (Chatelain 1996: 156), accustomed to managing an accumulation of printed texts—in our case, of books concerning languages—cut and paste them? What are the material conditions of their access to the texts and of their handling of the fragments? What does the act of integrating parts of other texts, ‘borrowed’, in one rewritten text, between plagiarism and palimpsest, mean?¹⁴

¹²Furetière (1690): ‘On dit aussi, qu’un homme tient cabinet, pour dire qu’il reçoit chez luy les honnestes gens qui s’y veulent assembler pour faire une conversation sçavante & agreable. Messieurs Du Puy ont long-temps tenu cabinet dans la Bibliothèque de Monsieur de Thou. Monsieur Menage tient souvent cabinet chez lui.’ (it is said also that a man holds a cabinet to say that he welcomes honest people at his place, who want to assemble to have a learned and pleasant conversation. The Sirs Du Puy held for a long time a cabinet in the Library of Sir de Thou. Sir Menage frequently holds a cabinet at his place).

¹³For example the *Orientalisch- und occidentalischer Sprachmeister...* of Fritz and Benjamin Schultze (1748) reconfiguring Duret, as we will see in the final section of this chapter.

¹⁴It is to be noted that even if composite texts are more than common during the Renaissance, the notion of plagiarism exists anyway; see Kewes (2003) and Couton (2006). The noun ‘*plagiat*’, as ‘action de plagier’, is attested only in 1697 (in Pierre Bayle’s *Dictionary*), but ‘*plagiaire*’ is used as an adjective as soon as 1555 and as a noun (‘*plagiere*’) in 1584 (by André Thevet) (see Centre National de Ressources Textuelles et Lexicales 2012). For one of the many occurrences of the term, see the accusation of Antoine du Verdier against the ‘Bibliothèque’ of François de La Croix du Maine in 1585, whom he called a ‘Plagiarist’ (Chartier 1996: 126).

Eventually, in the final, concluding section, we are going to follow the paths leading us to other books interacting with our three book corpus: the re-reading, and varied forms of reception they offer, will allow us further insight into the nature of composite texts.

10.1 Linguistic Inventories of the World: Cabinets of Linguistic Curiosities as Collections of Languages

10.1.1 *The Pentecost in the Form of a Book: Making Languages Be Heard (Prayers as Samples)*

But all that was nothing compared to the Apostles of Our Lord Jesus Christ, whom after having been filled with the Holy Spirit sent upon them, started to speak in all the languages of the World, whereas before they neither understood nor spoke any other language than Syriac, which was their mother tongue, as is amply described in the Acts of the Apostles (Duret 1613: 967)¹⁵

The first parts of texts assembled in the books we are studying are prayers included in the collections of languages. The aim here, for the authors, is to give a stage to the languages of the world in books that celebrate the diversity of languages.¹⁶ The model referred to for this action is Pentecost. Whereas Babel symbolizes lost linguistic unity, Pentecost incarnates the benefits of diversity (Céard 1980). It represents the point of reference, the touchstone, for the universal translation of a message (or at least the possibility of understanding the same message in all different spoken languages). It is precisely the episode of the ‘Tongues of fire’—when the message spoken by the apostles is miraculously understood in all the varied languages of the assembled crowd—included in the Acts of the Apostles 2: 3–4, that Claude Duret mentions in his *Thresor*.

In his chapter, concerning ‘ceux qui ont sceu & parlé plusieurs langues’ (those who knew and could speak several languages), the author of the *Thresor* gave, as an example of famous polyglots in history starting with the apostles, the name of ‘Conrad Gesnerus Allemand (German)’ (Duret 1613: 963). This Zürich humanist wrote a book entitled *Mithridates* in 1555 which, as one of the first compilations of languages, is a model for Duret’s work, although Gessner is cited only once in the

¹⁵Mais tout cela n’a esté rien au pris des Apostres de nostre Seigneur Iesus Christ, lesquels apres avoir esté remplis du Sainct Esprit sur eux envoyé, se mirent à parler toutes les langues du Monde, combien qu’auparavant ils n’entendissent & parlissent autre langue, que la Syriaque, qui leur estoit maternelle ainsi qu’il est amplement deduit aux Actes des Apostres.

¹⁶See Simon (2016) where we developed this idea (the paper, inscribed in the same ‘frame’ as this one, is centred on Gessner and Duret only and on this question of diversity).

Thresor, in the final chapter. In the *Mithridates*, the Pentecost is a leitmotiv, occurring several times.¹⁷ In the ‘Epistle Dedicatory’, Gessner writes:

Indeed, it is thanks to you [John Bale to whom it is addressed], that we have a significant addition to our library and furthermore, to embellish this polyglot *Mithridates* of ours, you sent us a translation of the Lord’s Prayer in the ancient British tongue. It is essentially by rendering this prayer into various languages that seemed to me a good way to show the difference of each of them, as far as this prayer is able to do so: so that firstly it is easier to compare the languages the same text is translated into, and by taking a brief and holy support in order to do so. We surely owe the good and almighty God a huge debt of gratitude that He has bestowed our era with the knowledge of the universality of the true religion, and illustrations of the Holy Scriptures in many various tongues. (Gessner (1555 [2009]): A2rv)¹⁸

Gessner dedicates this special thanks to his friend, John Bale, English Bishop of Ossory in Ireland, then in exile in Basle. Bale gave him a sample of Welsh, the ‘Our Father’, included in the *Mithridates* (Gessner (1555 [2009]):13rv). Gessner also asks him to provide, if possible, samples of tongues from (Great) Britain to complete his collection.¹⁹ The *Mithridates* is ‘adorned’, to use Gessner’s vocabulary, by no less than twenty-seven versions of the prayer,²⁰ presenting itself as a sort of continuation of the episode of the ‘tongues of fire’. It is as if the cosmopolitan city of Zürich is showing through in the text. Gessner has access to some of the language samples he uses thanks to his meetings with friends, as his *Liber Amicorum* testifies. Zürich, as a new Jerusalem at the time of Pentecost, where a multiplicity of tongues could be heard, was an in vivo laboratory.²¹ It is a microcosm, symbolizing the worldwide diffusion of the Gospel that Gessner calls for. In this perspective, the *Mithridates* is a literary tool to extend this “gift of tongues”. Gessner offered his readers the message of the Christ in rare languages such as Icelandic. In the same way, Duret’s *Thresor* acted as a Pentecost in miniature in the form of a book. This is also precisely the way Pyramus de Candolle, editor of the treatise and author of the ‘Adresse’ to Maurice of Nassau, presents it:

Since you are today one of the Christian Princes who can give it safe-conduct to make it well received and utilized by the most remote nations of the earth, for which it has

¹⁷See the recent reference edition and its introduction by Bernard Colombat and Manfred Peters: Gessner (1555 [2009]).

¹⁸Nam et Bibliothecae nostrae auctarium non mediocre per te accessit: & quo polyglottum hunc Mithridatem nostrum ornarem, veteris Britannicae linguae specimen, quod orationem Dominicam interpretatur, nobis a te missum est. Visum est autem in hac praecipue oratione variis reddenda linguis, singularum differentiam, quantum eius fieri potuit, demonstrare: ut & facilius esset conferre inter se linguas quae orationem exprimerent eandem: & in brevissimo sanctissimoque argumento id fieret. Deo quidem optimo max. ingentes etiam hoc nomine [A2v] gratiae debentur, quod universam religionem synceram nostris temporibus innotescere, ac variis illustrari linguis sacram scripturam largitus est.

¹⁹Gessner (1555: A2v) ‘Hoc vero maxime peto, ut si quae alia Britannici regni lingua est [...] de illis quoque specimen aliquod, praesertim in oratione Dominica, mature ad nos transmittas.’

²⁰Twenty-nine with the various transcriptions (see Gessner 1555 [2009]: Introduction).

²¹Gessner (1555 [2009]): A2v and 16 for the mention of the *Liber Amicorum*.

principally been written. So that by the different characters (with which it is compiled), & the understanding of their writings, one nation could communicate more easily with another, on what concerns human society, & before all the treasure of the sacred Gospel of our Lord Jesus Christ. (Duret 1613: *ijr).²²

Duret highlighted the diversity of the languages of the world, more than a lost unity dating back to before Babel (and even if, for him, Hebrew is the mother tongue). Each language counts, being a vehicle for the Gospel. Duret even says that he and Gessner are behaving like new apostles, conveying samples of languages through their ‘paper cabinets’. Each of the tongues is equal to the others and ‘exhibited’ in the same fashion. The authors are transmitting them without necessarily understanding them, fading into the background behind their specimens. The prayer gives familiarity within the strangeness. In the *Thresor*, we find various examples of the Lord’s Prayer, in Arabic (Duret 1613: 405), Armenian (Duret 1613: 727), English (Duret 1613: 874) and Scottish and the ‘language of the Savages’ (*langue des Sauvages*) (Duret 1613: 944–945) in the chapter concerning the Western Indians.²³ See, for example, the organization of the pages bearing the prayer in Armenian (Fig. 10.1).

On page 727, Duret showed the prayer in three different versions, the passage being separated by a subtitle ‘Oraison dominicale en langue arménienne’ (Lord’s Prayer in the Armenian language). The prayer, as an exogenous part of text, is distinguished within the page by the use of italics. The last version is in Latin as a point of comparison (not always present, because, as already said, the prayer was known by everyone). Duret states that the first version on the page is taken from ‘writings of modern travelers and cosmographers’. He then gave a ‘correction’, according to him, with the correct pronunciation (called ‘appellation des lettres’ on the facing plate). This insistence on the sound of the language, its ‘phonetics’, emphasizes this will to make the diversity of the tongues of the earth be heard. But the facing page (726) shows a different aspect of the materiality of languages,

²²Puis que vous estes auioird’huy l’un d’entre les Princes Chrestiens qui luy peut donner un tres asseuré sauf conduit pour le faire bien recevoir en son utilité aux plus esloingnees nations de la terre, pour qui il a esté dressé principalement: afin que par les differents caracteres (desquels il est rempli), & intelligence de leurs escritures, une nation puisse avec plus de facilité communiquer avec l’autre, en ce qui concerne la société humaine, & principalement le thresor du S. Evangile de nostre Seigneur IESUS-CHRIST.

²³Also in ‘langue allemande’ (German language) (Duret 1613: 868–869) or ‘polonoise’ (Polish), ‘suessienne’ (Swedish), ‘livonienne’ (Livonian language), ‘des Laponiens et Finnoniens’ (of the Laplanders and Finns) (Duret 1613: 869). The prayer in the ‘langue des Sauvages’—in fact Tupi but transformed, in later texts, into Nahuatl—can, for example, be traced back to the coast of Bahia in Brazil during the 1550s, through the 1575 *Cosmographie universelle* of André Thevet, where Duret finds it (on this point, see our current research within the collective reflections held during colloquiums in 2015 and 2017 and to be continued (‘Babel transatlantique. Langues générales américaines, élaboration et circulation des savoirs linguistiques, Europe-Amériques XVIe-XIXe siècle’ (Paris Diderot), co-organized by Charlotte de Castelnau L’Estoile and Fabien Simon (ICT), and the ANR Langas (Capucine Boidin, Paris 3); 13th of May 2015; and ‘Babel transatlantique. Circulations des savoirs linguistiques. Europe, Amérique, Afrique (XVIe-XIXe siècle)’, co-organized by Charlotte de Castelnau-L’Estoile and Fabien Simon (ICT); 16th of November 2017).

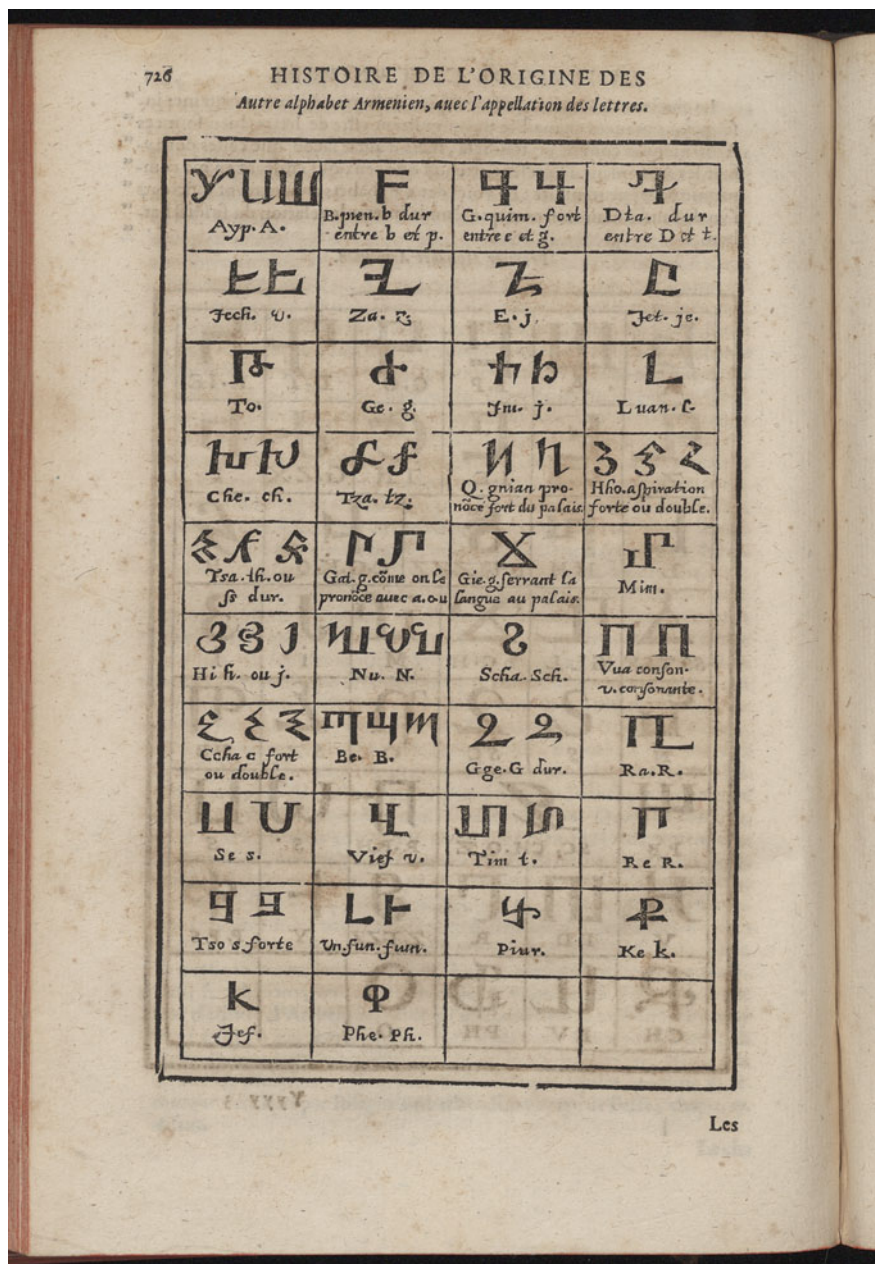


Fig. 10.1 Alphabet and 'Our Father' in the Armenian language, Duret (1613: 726–727). (Collection Bibliothèque Nationale Universitaire de Strasbourg (C.100.264))

LANGVES DE CEST VNIVER

727

Les Relations modernes qui viennent de Leuant & d'Italie, portent que le Primat, autrement grand Catholique d'iceux Armeniens, a de coustume de sept en sept ans, d'enuoyer vn Religieux à Rome, pour rendre l'obeyssance qu'ils ont promis & iuré à sa Sainteté: vray est que si dans les sept ans cy dessus mentionnez, iceluy Primat ou grand Catholique vient à deceder, & y en aye vn autre créé en sa place, ce nouveau Primat ou grand Catholique pour son inuestiture, doit vne nouuelle obeyssance. En l'an 1592. du temps de Clement VIII. Pape, le Patriarche d'Armenie, & Maronites du Mont Liban, vindrent à Rome prester leur obeyssance au S. Siege Apostolique, selon l'aucteur de l'Appendice de la Chronographie de Gilbert Genebrard.

Qui voudra apprendre ceste langue Armenienne lise curieusement l'introduction de Theſeus Ambrosius sur les langues Chaldaïque, Syriaque & Armenienne ch. 13. de Armeniorum literis, & introductione.

Oraison Dominicale en langue Armenienne.

Chair mer vr hierchins des srboi exisi anoncho. ekeſſe archaiotarcho, exisiu chan Kcho vrbis Kierkins ie & chri zachas mer hanaba gfordtour mez ais aur ie touz mer zaabartu mer vrbis ie mech tassumo bart banas merus ie mi tamir zame zpt zotai ail phirkai zamer i zare. Amen.

Ceste oraison a esté tirée des escrits des modernes voyageurs & Cosmographes, lesquels semblent n'auoir eu la vraye & entiere connoissance de ceste langue Armenienne, d'autant qu'en icelle, on doit ainsi prononcer ceste dicte oraison, comme ie l'ay par deuers moy en caracteres & langue Armenienne.

Hair mer or iercins des surb, egliz i anuncho eceſſe archaiutbai cho, egliz zin camch cho orpas iercins eu iercri. Zhazt mer hanapazord tur mez aisaur eu thogl mez zpaarti, mer orpas eu inech thoglunch merozi partpanazt eu mi tanir zmezi phorzutbai ail pharceai zmezi zara zis cho e archaiutbai eu zaurutbai eu pharch iaurians. Amen.

Pater noster qui es in celis, sanctum sit nomen tuum, veniat regnum tuum, fiat placita tua, sicut in celo & in terra. Panem nostrum super substantialem da nobis hodie, & remitte nobis debita nostra, sicut & nos remittimus nostris debitoribus, & ne ducas nos in tentationem, sed libera nos à malo. Quoniam tuum est regnum & virtus & gloria in secula. Amen.

De la region des Tzeruians, Seruians ou Posnauiens.

Pour bien scauoir & comprendre quelle est la region des Tzeruians, Seruians, ou Posnauiens, il faut connoistre premierement les regions circonnoisines d'icelle. Abraham Ortelius en ses Synonymes & thesors Geographiques en parle en ceste façon:

Dalmatia, Illyridis pars, versus Macedoniâ Ptolomæus, cû Strabone & Plinio. Scribit Ranzanus in sua Hungaria, vniuersam Dalmatiâ cum sibi

conter

Fig. 10.1 (continued)

concentrating this time on their visual dimension. The focus point is not to hear the language but to see it, to highlight the shape of its characters. The advantage of the prayer as a specimen of languages, exhibited without the need for explicit comprehension or clarification, is shared by the other type of specimen used: alphabets. They are even Duret's favourite samples, more than the prayers, which Gessner preferred.

10.1.2 *Movable Alphabets as Objects of Collection: To Exhibit Languages (Alphabets as Samples)*

The alphabets in these works are parts of text whose identity lies between a text and an image. These blocks of texts are indeed illustrations, engravings inserted within the pages. The borders often encircling them mark a clear partition from the rest of the text (Fig. 10.1). Skimming through Claude Duret's 1613 *Thresor*, the reader's eye is caught by this sort of visual punctuation. There are no less than fifty-one alphabets illustrating the 1030 pages of the treatise, starting with the 'Caracteres de l'Ange Raphael' (characters of the Angel Raphael) (Duret 1613: 117) through to the 'Alphabet Indien' (Indian alphabet) (Duret 1613: 885) and the 'simple Alphabet de la Chine et du Giapan' (simple alphabet of China and of Japan) (Duret 1613: 913–921).²⁴ This visual knowledge of the languages is clearly outlined by François Colletet in his *Traitez des langues étrangères* (Colletet 1660a). He also favored this way of exhibiting languages in his paper collection. The book presents itself almost entirely as a succession of alphabets, since the first part dealing with 'foreign languages' (Colletet 1660a: 1–43) holds thirty-four versions of ABCs, nearly one per page. The author actually noted the connection between this manner of displaying languages, reduced to their alphabets, and the manner some of those alphabets found their way into actual cabinets of curiosities:

This one, which is not very common, *is shown here among the Alphabets as a rare piece*. It is drawn from some ancient medals & from several ancient marbles and bronzes; its characters are really unlike those in the ordinary Greek Alphabet. But it is not astonishing, since the Languages, having changed from time to time, it has been thought useful to change the Letters too [...] This example is quite familiar to us, since our old French Tongue is written, on various Sepulchers, Epitaphs & old books, in Gothic characters, that have no resemblance with the letters we are using in Writing or Printing (Colletet 1660a: 16–17, my emphasis)²⁵

²⁴There are, in fact, fifty-seven alphabets in total, with tables comparing several at the beginning and the end of the text.

²⁵Celui-ci qui n'est pas fort frequent, *est produit au nombre des Alphabets comme une piece rare*. Il est tiré de quelques medailles anciennes & de plusieurs marbres et bronzes antiques; Ses caracteres sont bien dissemblables de l'Alphabet Grec ordinaire: mais on ne s'en doit pas estonner, puis que les Langues ayant changé de temps en temps, on a iugé à propos de changer aussi les Lettres(...): Cet exemple est assez familier mesme parmy nous, puis que nostre vieille Langue Françoisse se trouve escrite sur divers Tombeaux, Epitaphes & vieux bouquins de livres, en caracteres Gottiques, qui n'ont aucune ressemblance aux lettres dont nous nous servons dans l'Ecriture ou dans l'Imprimerie.

Colletet considered alphabets as ‘pieces’ for collection. In this case, the ‘rare’ ancient Greek alphabet is drawn, for example, from coins from antiquity. They are considered in the ‘museum’ as ‘medailles’, the change in the vocabulary underlying the change of status, from a simple coin to a collectible artifact.²⁶ That is to say letters could be either directly displayed in the cabinets of curiosities appearing on objects bearing them such as statues; or they could be exhibited on paper or in books, sometimes copied from ancient monuments, too big to fit in a room. We must remember here the ambiguity of the word ‘cabinet’, meaning a collection *or* a library. We have no clues concerning the collection of René Michel de La Rochemaillet (1597–1644)—vicar of Massy and priest in Champlant near Versailles, and also a Latin poet involved in the literary milieu and translator into Latin of a poem by Guillaume Colletet, father of François Colletet (1640)—in which the younger Colletet states he had seen alphabets on display. But the inventories of contemporary collections testify that languages and alphabets appeared among or ‘on’ other artifacts. For example, the description made by Pierre Borel (c.a. 1620–1670), physician and botanist, in his *Roolle des principaux Cabinets, & autres raretez de l’Europe...* including the portrait of his own cabinet (‘Catalogue des choses rares qui sont dans le Cabinet de Maistre Pierre Borel Medecin de Castres au haut Languedoc’ (Catalog of the rare things that are in the Cabinet of Master Pierre Borel, physician in Castres in Languedoc) (Borel 1649: 132 et seq.), provides some evidence:

Cowry shells [Porcelaines] or *Conchae venerae* of diverse sorts, big & small inlaid, [...] others very pleasantly flecked, & others very white, bringing this shell to the ear one hears the sound of the sea [...] & another, modest and very rare, & naturally covered with Hebrew, Syriac, Greek, and Latin characters, & all the other languages. (Borel 1649: 136–137, my emphasis)²⁷

Under the chapter concerning ‘shells’, a cowry shell is depicted as ‘naturally’ bearing characters in all the languages of the world. Later, in the ‘rare fruit’ section (Borel 1649: 140 et seq.), a fruit from the ‘Indies’ is ‘surrounded by lines, & reddish letters or figures that look like Chinese characters’; whereas among the depiction of ‘artificial artifacts’, Borel mentioned also ‘writing & paper from China & Armenia’.²⁸ Letters of rare languages appear among *naturalia* as well as *artificialia*,

²⁶On collections of ‘medals’, see Hiernard (2013).

²⁷Porcelaines ou *Conchae venerae* de diverses sortes grandes & petites marquetées, (...) autres fort agreablement tachetées, & autres de fort blanches, approchant cette coquille à l’oreille on entend le bruit de la mer, (...) & une autre mediocre tres-rare, & couverte naturellement, de *Characteres Hebrieux, Syriaques, Grecs, Latins, & de toutes autres langues*. On Borel, see for example Bredekamp (1996: 100).

²⁸Borel (1649): [section: des Fruits rares] Un autre fruit des indes de mesme grosseur mais moins espais, ayant une grande ouverture comme un bonet, & environné de lignes, & lettres ou figures roussastres qui semblent des *Characteres Chinois*. [...] [section: Choses artificielles] Un arc des sauvages, & la flesch. Un plat d’escorce de cocos. Un gobelet de la chine de certain jonc tres artistement agencé & verni dedans de couleur d’or. [...] De l’escriture & papier de la Chine & Armenie.

stressing the porosity of the frontier between the natures of the objects in the cabinets for the curious of the early modern age.²⁹ Regardless of which section, alphabets are included in the collections. And from there, they are extracted and appear in the ‘paper collections’, built up by Duret or Colletet, juxtaposing ancient alphabets with the ‘exotic’, such as Indian or Arabic.

The particularity of the printed artifact is that it facilitates exchange, and circulation between different collections.³⁰ The nature of the alphabet, the manner in which it is presented in a book, framed in a clearly circumscribed space, land-marked, makes it easier for it to move from one text to another. It is an easily movable part of text, able to be shared between printed books and likely to take its place in composite texts. We can, in fact, establish this point by clarifying where the alphabets collected by François Colletet come from. The thirty-four plates of the *Traitez des langues estrangères* can, indeed, all also be found in the *Thresor* but in a different order. They circulated readily: for example, the alphabet said to have been designed by the philosopher Apollonius of Tyana from page 132 of Duret’s book (‘Alphabet d’Apollonius Thianéen’ (alphabet of Apollonius of Tyana)) appears on page 32 of Colletet’s book (‘attribué au Philosophe Apollonius, le plus docte ornement de la Secte Pythagoricienne’ (attributed to the Philosopher Apollonius, the most learned ornament of the Pythagorean Sect)); and the ‘Alphabets des Georgianiens’ (Alphabet of the Georgians) of page 751 of the *Thresor* can also be seen on page 23 of the *Traitez*. The drawings of the letters, with slight differences, and the presentation with separations between the letters used by Duret’s printer underline that it is probably not the same printing block letters or, more precisely, the same plates that are being used.³¹

In fact, these alphabets can even be traced back to a third anterior text: Blaise de Vigenère’s (1586) *Traité des chiffres*. The alphabet from Apollonius appears on f. 328v, the ‘Georgianiens’ in f. 317r, the Ancient Greek, considered as ‘rare’ by Colletet, in f. 309r, the ‘Ange Raphael’ starting Duret’s collection is placed on f.

²⁹See especially Bredekamp (1996) and Falguières (2003).

³⁰For two examples, in different contexts, of the relation between paper collections and physical collections, see Margócsy (2010). He studies what he calls the ‘taxonomical orientation of the new conchological encyclopedias’ to facilitate ‘their use in the long-distance exchange of specimens’ and gives the example of the shell catalogue of the British Isles by James Petiver which is accompanied by the shells themselves: ‘Once readers have received the package, they could use the catalogue correctly to identify and learn about their newly acquired specimens.’ (Margócsy 2010: 78). For a symmetrical example, a century older, where the catalog and its illustrations functioned as collectable artifacts, see Fischel (2010). Studying the case of Conrad Gessner, whose practices are close as we have noted to those of Duret, the author underlines how the drawings of fish and fossils made by Gessner and sent to his friend Felix Platter (1536–1614), were included by the latter in his seven folio volume image collection: ‘This is entirely typical of how images from natural history were treated c.1600, in that drawings documenting objects were themselves treated as collectable artifacts.’ (Fischel 2010: 150). Once again, practices concerning natural history and those related to languages are close.

³¹Even if the context is totally distinct and the ‘printed object’ very different, interesting remarks can be found in Slauter (2012) and Johns (1998).

329r (and page 34 in Colletet).³² All the thirty-four alphabets in Colletet are found as well, and in the exact same order, among the fifty-three (or fifty-four) assembled by Vigenère. The attenuation of the letters in Colletet, characteristic maybe of the use of old printing blocks, and exactly the same layout could even highlight the utilization of the same printing material, even if we do not know how it could have passed from Abel L'Angelier (c.a. 1553–1610), who printed Vigenère—with the engraver Léger Delas—to Jean Promé (c.a. 159?–c.1653), printer of the *Traitez des langues étrangères*. Although it is this name that appears on the title page, it is more precisely his younger brother (or cousin) Jean II (c.a. 161?–1668) who printed the *Traitez*. We can note anyway these printers specialized in relatively cheap editions and were used to the practice of re-printing, with or without authorization, of older texts, with connections, for example, for Jean I with Nicolas I and Jean II Oudot, printers of the famous ‘bibliothèque bleue’ of Troyes.³³ There is, in any case, a diachronic connection between the three texts, which date, respectively, from 1586, 1613 and 1660. These three books share several parts of text, in this case in the form of alphabets.

During the circulation, some alphabets have disappeared while others have been added. The collection can expand, according, for instance, to current events. François Colletet regretted he could not add a last alphabet using human bodies to figure the letters, ‘that fell into [his] hands these last few days,’ he wrote; but he was keeping it for a second, more accurate edition, as he promised.³⁴ Something similar happened to Blaise de Vigenère. He published his treatise in 1586 on the presses of the printer-editor Abel L'Angelier. At this time, Vigenère (1523–1596) was a famous humanist, well known as a translator from Greek (Philostrate), Latin (Caesar) and Italian (Torquato Tasso). All his writings are posterior to 1570, because, before, he followed a career as a ‘diplomat’. Serving the ‘House of Nevers’, secretary of François de Cleves till the latter’s death in 1562, he was sent to Rome in 1549, and again in 1566, this time as secretary to the ambassador Just de Tournon. During this second Italian sojourn, he visited various cities.³⁵ His *Traité des chiffres* is a testimony of his identity as a diplomat, as well as the work of a polyglot humanist. First, because the lengthy first part of the book is, above all, a handbook for cryptography, the art of secret writing asserting itself as a skill of the

³²This last alphabet can even be traced back, as some others (the Chaldaeum (f. 201v), that of Appollonio (f. 203r) and the Hetruscorum (f. 206r)), to a more ancient text, maybe the source-text of Vigenère, who at least mentioned it explicitly (see *infra*) (Ambrogio 1539: f. 203r).

³³For details on those printers, see Bibliothèque nationale de France (2017) and Chartier (1983: 717).

³⁴‘Auparavant que de clore ce Traitté des Langues, je ne sçauois me taire d’un autre Alphabet qui me tomba ces iours passez entre les mains, dont l’invention n’est pas moins ingenieuse que divertissante; ce sont des figures humaines, qui par des postures, droites ou courbées; renversées ou estenduës; representent toutes les Lettres de nostre Alphabet François [...] le Lecteur se contentera de ce que j’en ai dit, en attendant qu’une seconde Impression repare les manquemens de cette premiere.’ (Colletet 1660a: 41–42).

³⁵On Vigenère, see Sarazin (1997) and Centre V.L. Saulnier (1994).

competent diplomat during the sixteenth century. But then the second part of the book, the collection of languages in itself—‘Alphabets de plusieurs nations, en nombre de cinquante six’ (alphabets of several nations, to the number of fifty-six) (f. 287r et seq.)—“plundered” later by Duret and Colletet, testifies of his frequentation of the Italian cabinets (as collections and/or libraries). He “found”, for example, one of the Chaldean alphabets, said to be “Babylonian”, in the ‘library of the Grimani Lords in Venice’ (Vigenère 1586: 300v), collected already in the fifteenth century by Cardinal Domenico Grimani (1461–1523). Vigenère’s collection gives evidence also of his social networks. This is particularly the case with the ‘Alphabet de la Chine et du Giapan’ (Alphabet of China and Japan), fruit of diplomatic, as well as political, connexions. This sample is only present in some copies of the book, in particular in the annotated copy, corrected by the hand of Vigenère himself, for a second edition that never came to light.³⁶ While in the majority of the copies, folio 327r, entitled ‘Alphabet de la Chine, & du Giapan’ (Alphabet of China and Japan), remained blank, in the Bibliothèque Nationale de France’s copy, there is a supplement of nine folios added at the end of the book and numbered CCCXXVII–CCCXXXVI. This particular language sample is a testimony of a ‘last-minute update’ to the collection. The author described how he had access to it. Vigenère communicated various examples of Japanese writing (Fig. 10.2) to his reader.³⁷ The first (Fig. 10.2a), a Japanese syllabary (used to teach children, for example), is a succession on three plates of the forty-seven *hiragana* or *kana* cursive characters, numbered from top to bottom and right to left, to indicate how to read them, ‘following the manner of the Hebraic language,’ the author stated. He also mentioned the names of the providers of the samples. ‘Monseigneur le Conte de Bouchage’—that is to say, Henri de Joyeuse (1563–1608), Master of the Wardrobe to Henri III (before becoming a Capuchin monk)—is one of these.³⁸ Vigenère confirmed this way of paying him homage in one of his other books, *Traité de la Pénitence*, noting that, ‘formerly’, Bouchage was ‘kind enough to let [Vigenère] have access to the alphabets and writings of China and Japan, kept among the rare and exquisite things of the cabinet of his Majesty to include them in

³⁶On the various copies, see Balsamo and Simonin (2002). In their catalog, three editions of the *Traité* are mentioned: no. 167 (1586), no. 186 (1587: BNF V. 17869), and no. 219 (1589, ‘see 1586’). We will come back precisely, later, to the particular copy, kept at the Bibliothèque nationale et universitaire de Strasbourg (R 105361). On the BNF annotated copy (RES M-V-348), see Maillard (1982).

³⁷For a very precise analyze of those pages in Vigenère, on which we rely for some aspects of our study in the next pages of this paper, see: Maillard (1982: 243–251).

³⁸Vigenère (1586: CCCXXVIIr): “Voicy donques le simple alphabet de la Chine, & du Iappon; dont l’écriture procede du hault en bas, par colonnes arrangees de la main droicte vers la gauche, à la mode Hebraïque qui nous a esté impartie, ou plustost au publicq, de la grace & beneficence de la Maiesté Royale; par le moien de monseigneur le Conte de Bouchage, chevalier de l’ordre du S. Esprit, & maistre de la garderobbe (...) A la requisition du non moins eloquent que tres-docte, le Reverend & devot Pere, Mr. Emond Auger, de la sainte société du nom de IESUS, qui nous a moienné ce bien”.

[his] Book of Ciphers, & by this way to show them to the public' (Vigenère 1587 Epistle, n.p.).³⁹

Explicitly here, again, the collection of alphabets and one of its highlights, obtained just in time apparently to be published as an *addendum*, interacted with an existing collection, in this case the cabinet of the king. As it was too late to insert it on Folio 327r, normally planned to receive it, it found its own place at the end of the text.

As a civil servant, the secretary to the Chamber of King Henri III since 1581, Vigenère could have access to the king's entourage and probably tried to reinforce this proximity paying tribute to them. It is for this reason that his *Traité* is dedicated to Antoine Séguier, one of the king's advisors. Two other courtiers are also mentioned in relation to the second plate of characters (Fig. 10.2b): 'Monseigneur le grand prieur de France', a title only held since June 1586 by Charles de Valois (1573–1650), the natural son of Charles IX (brother of Henri III, who died in 1574), and also the king's private tutor 'Monsieur de Roüen', the Cardinal Charles II de Bourbon-Vendôme (1560–1594) (Vigenère 1586: f. CCCXXXIr).⁴⁰ We can see that the plate combines various types of Japanese writing: 'Carolus' and 'Galliae' are rendered with a phonetical transliteration, using *kanji* for their phonetical value only (but meaning something closer to 'France' than 'Gallia'). Whereas the expression '*regis fratris filius*' (the son of the King's brother) is translated, this time, with Japanese words: 御子 (the son); 御兄弟の (of the brother); 帝王之 (of the king).⁴¹ These variations are not mentioned in the commentary, nor the fact that while Plates *a* and *b* (Fig. 10.2) are obviously produced by a Japanese hand, Plate *c* is more awkward and probably the work of a European copyist.⁴² This underlines the fact that the characters are more for exhibition than to be understood in the *Traité*.

The name of another "language broker", an intermediary supplying Vigenère with alphabets, is that of 'le Reverend & devot Pere, Mr. Emond Auger'. His name also appears on the top of another plate of Japanese characters (*kana* and *kanjis*), used to write in a phonetical transliteration again and in the Occidental manner, 'Jesus Christus Sancta Maria' as well as the name of the Jesuit. Auger's name gives a clue about the connections of the author of the *Traité des chiffres* with a different

³⁹Il auroit pleu à vostre bonté me faire communiquer les alphabets et escriptures de la Chine et du Jappon, tenez parmy les rares & exquises choses du cabinet de sa Majesté pour les inserer en mon livre des Chiffres, & par ce moyen en faire part au publicque (see also Maillard 1982: 244).

⁴⁰Vigenère could have taken some other alphabets for his collection from a manuscript in Charles II de Bourbon-Vendôme's library: *La Recherche de plusieurs singularitez* of François Merlin written in 1583–1587 and illustrated by Jacques Cellier (BN, Ms. Fr. 9152, f. 37–67). It contains twenty-eight alphabets, some being very close in their form to Vigenère's (for example the Gothic, f. 60 and f. 337v in the *Traité*) (Maillard 1982: 240–241 and Note 20).

⁴¹We would like to thank Professor Nathalie Kouamé, our colleague from Paris Diderot University and specialist in Early Modern Japan, for her expertise on these Japanese characters.

⁴²But on plate *a*, there are some errors: the transcription is problematical, not fitting with the syllabary ('i ro ha ni ho he to...') and with mistakes in the translation, for example one million instead of a hundred million for the character 億 (Vigenère 1586: f. CCCXXXv).

I. 15. よ	A. 8 ち	IA. 1 い
BO. 16. た	CA. 9. り	MA. 2. あ
FA. 17. れ	QI. 10. ぬ	QVE. 3. は
NI. 18. ろ	IV. 11. ろ	FV. 4 に
FO. 19. つ	ME. 12 を	CO. 5. ほ
FE. 20 ね	MI. 13 わ	IE. 6. へ
LO. 21. な	XI. 14 か	IE. 7. と

Fig. 10.2 Exhibiting the Japanese Language: f. CCCXIXv (a), f. CCCXXXIr (b), f. CCCXXXIir (c) in Vigenère (1586) (Collection BNF RES M-V-348)

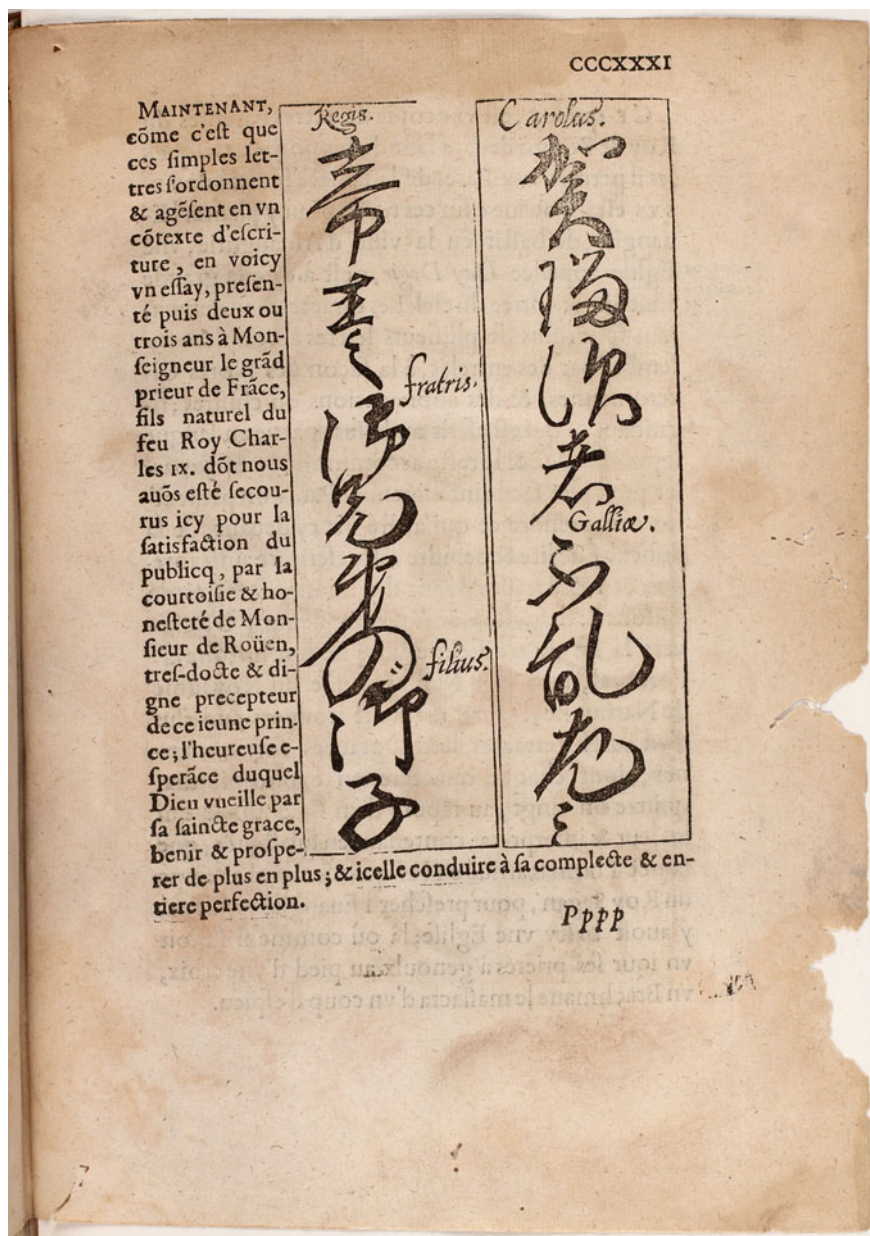


Fig. 10.2 (continued)



Fig. 10.2 (continued)

network, linked with the first: the Jesuit order. Two more names are indeed mentioned by Vigenère as suppliers:

RR. Peres, Mr. Odo Pigenat, provincial des Iesuites en la province de France [Jesuit Provincial of the province of France]; & Mr. Alexandre Georges, Recteur de leur college en ceste ville de Paris [rector of the college in this city of Paris]; deux tres-vertueux, prudents & doctes personnages [two very virtuous and learned persons] (Vigenère 1586: f. CCCXXXVv).

They appear within a eulogy of several folios of the accomplishments of the Society of Jesus in the Far East. Emond Auger (1530–1591), *socius* himself and confessor for Henri III (1575–1584), even has an indirect link with Japan, since he was the translator into French of a relation of Pietro Maffei, author of a *Historia Indicarum*, which is one of the major sources of information about those lands in sixteenth century Europe.⁴³ The long text in Japanese, developed on seven folios (Fig. 10.2c), entitled ‘lettres patentes du Roy de Bongo dedans l’isle du Iappon; par lesquelles il permet aux Peres de la sainte societé de Iesu estans arrivez sur ces terres pour y planter l’Evangile...’ (letters patent of the King of Bungo from the Japanese island; by which he authorizes the diffusion of the Gospel by the Fathers of the Holy Jesuit Society who reached this land...), could be found already, with the ideograms, in the *Rerum a Societate Iesu in Oriente Gestarum* of Emanuel Acosta translated in latin by Maffei (1573: f. 225r–228r; Maillard 1982: 246–248). In fact, the Japanese kingdom of Bungo would not have sounded unfamiliar to a learned European ear in 1586. With these Japanese characters exhibited to ‘the public’, Vigenère’s book is indeed one of the manifold outcomes of the communications surrounding the Japanese ambassadors’ visit to Rome in 1585. It was a voyage of four lords (*daimyos*) of the Kyushu kingdoms—Arima, Omura and Bungo—who left Nagasaki on 20 February 1582 to visit Europe for only a few months in 1585.⁴⁴ The visit, notably to the Pope, orchestrated by the Jesuits and Alessandro Valignano, was a way to convince the Head of the Catholic Church to support the missionaries’ enterprise. This propaganda aroused the curiosity of Europe for the foreigners. No less than seventy brochures about the event were produced, in six different languages (Latin, Italian, French, German, Spanish, and Portuguese), forty-nine for the year 1585 alone (Gomez-Géraud 1993: 246).⁴⁵

⁴³For Auger’s translation, see Maffei (1571).

⁴⁴For an inventory of the contemporary printed works concerning this embassy, see Boscaro (1973) (but she does not mention Vigenère) and on the Jesuits in Japan, see Boscaro (2008). On the embassy more generally, see Gomez-Géraud (1993). We can mention also here the recent work on this topic by Antonella Romano (oral paper in the seminar “Histoire des savoirs à l’époque moderne (Europe, monde): méthodologie et historiographie”, Paris Diderot (Charlotte de Castelnaud, Liliane Pérez, Fabien Simon), 10 Mar. 2015: “Rome en 1585: la reconfiguration asiatique des savoirs de la catholicité”; since the first draft of our paper it has been published in Romano 2016: Chap. 3); see also Romano (2013).

⁴⁵‘Les princes japonais deviennent à leur insu une machine de guerre contre l’hérésie. La catholicité, confondue avec l’universalisation du modèle européen, motive la définition d’un Japon banalisé, occidentalisé à l’extrême, miroir de l’Europe surgi des antipodes’ (The Japanese princes

Could Vigenère have had access also to some samples of the Japanese writings via one of those loose sheets, maybe reproducing them, or did he only get it directly through the Jesuit connections with Rome, sending pieces of information and objects to the King's ambassadors in Italy and/or directly to the King of France, from whose cabinet Vigenère said he could extract the alphabets?⁴⁶ At least some of the reports evoked, among the presents offered by the Japanese to the European leaders they met, gifts in the form of writings, valued for their exotic characters probably.⁴⁷ At the same time, the author of the *Traité des chiffres* explicitly evoked the embassy in his text. In the passage that was supposed to be concluded by illustrations of Japanese writing, he described the delegation as a source of information on the Chinese language as well, and especially the fact that, similar to Egyptian, the writing is divided into two sorts, one called 'hieroglyphic' and one 'common' (Vigenère 1586: 323r–326v).⁴⁸

All in all, the presence of this "alphabet" as a part of the *Traité des chiffres* gives evidence of a link between the text and its con-text. It is as if a part of the 1585 Japanese 'embassy', or at least of the communication built up around it, entered the collection. But this did not stop at a 1586 book and it continued its voyage.

While we do not find these plates in François Colletet's 1660 collection—because he had access to a copy without the added folios?—they are present in

unwittingly became a war machine against heresy. Catholicity, merged with the universalisation of the European model, spurred the definition of an extremely occidentalized unremarkable Japan, a mirror of Europe from the Antipodes) (Gomez-Géraud 1993: 246). Boscaro (1973: xvi) lists seventy-eight items.

⁴⁶See also Maillard (1982): 245.

⁴⁷This is the case, for example, in the reports of the meeting of the Japanese princes with the Serenissima Signoria of Venice; *Relatione* (1585) (Boscaro 1973: Note 46): 'Copia della Scrittura lasciata da gli Signori Giapponesi à sua serenità in loro lingua scritta sopra un foglio di carta di scorzo d'albero [...] Finita la nostra Ambasciaria, & ritornando à i nostri Regni, non habbiamo voluto lasciare di vedere la maravigliosa, & invitta Città di Venetia [...] & in essa ricevuti honorì, & segni di benivolenza, che dalla sereniss. Republica Venetiana si potevano sperare ne è parso cosa ragionevole lasciare questa scrittura per memoria nel tempo da venire' (emphasis ours) (copy of the writing left by the Japanese Sirs for her Serenità written in their language on a letter made of tree bark [...]) Since our embassy is finished, & going back to our kingdoms, we wanted to see absolutely the wonderful and invincible City of Venice [...] and having received honors, and signs of benevolence, as we could expect from the sereniss. Republic of Venice, it seemed a good thing to leave this piece of writing for remembrance in the time to come). On the contrary, the *Advis* (1585), translation of an Italian *Aviso* by Benacci (Boscaro 1973: Note 22), does not mention the question of Japanese writing.

⁴⁸Vigenère (1586: 324v–326r): 'Nous avons au surplus appris puis-nagueres, mesme de ceste ambassade du Giapan, qui l'an passé 1585. au mois de Mars, vint prester de si loin, comme de cinq à six mille lieües, l'obedience au saint Siege Apostolique de Rome qu'ès Indes Orientales, & encore deux mille lieües audelà, en la Chine, & au Cathaj, [...] il y a deux especes d'écriture, de mesme qu'Apulee raconte l'Egypte; l'une de lettres hieroglyphiques; & l'autre de lettres communes [...] Or avant que sortir de ceste matiere, je n'estimeray pas faire chose impertinente ny ennuieuse, bien que parergue aucunement, d'inserer icy tout d'un train, le cours de la navigation de ceste Ambassade, qui demeura trois ans sur mer tout de suite & sans sejourner [...] avant que d'arriver à Rome...'

Duret's *Thresor*. Even more than the mere characters, he also reproduces long developments of Vigenère's text, with no quotation marks, only concluding the paragraph by 'ainsi que le certifie le feu sieur de Vigenere en son Traicté des chiffres' (as it is certificated in the late Sire of Vigenere's *Traicté des chiffres*).⁴⁹ Alongside Vigenère, Duret uses other texts relating to Japanese: one of the reports from the embassy quoted, this time, in Latin ('Les Relations d'Italie de l'an 1585 parlent ainsi de l'ambassade' (the Italian relations of the year 1585 evoked the embassy this way)), but also the 'livr. 6 de son histor. Des Indes' (book 6 of his *History of the Indies*) by Maffei or a passage of the *Cosmographie universelle* by André Thevet (Duret 1613: 911–912). Besides the alphabets, the *Thresor* is also a collection of texts.

10.2 Libraries of Babel: Cabinets of Linguistic Curiosities as Collections of Texts

'Cabinets' are also libraries, and the alphabets as parts of text are also drawn from collections of books, as the authors indicate.⁵⁰ Apart from the Grimari collection Vigenère mentioned, among the Italian places he may have frequented during his stay in the peninsula, he referred to a 'library in Treviz, a city under the domain of the Venitians, belonging to a great and widely renowned person concerning all the occult sciences, called *Antonio de Fantis* [c.a. 146?–1533]'.⁵¹ Inside it, he picked the 'alphabet Geomantique, & Astrologique' (geomantic and astrological alphabet), moving afterwards to Colletet's *Traité* (Colletet 1660a: 39).

Finally, as we have seen with Gessner saying he increased his 'library' with new prayers provided by John Bale, the texts we are studying can also be considered as scaled-down libraries. Duret's *Thresor*, and Colletet's *Traité* in an extreme manner, are collections of quotations, a "montage" of parts "borrowed", more or less explicitly, from other books, kaleidoscopes of textual fragments. Besides paper collections, they are 'portable libraries' (Blair 1996).

⁴⁹Duret (1613: 888 and 910–911), separating Vigenère's passage into two different parts into his Chap. LXXVII 'De la langue des Indiens Orientaux en general' and Chap. LXXVI 'De la grande Isle du Japan ou Giapan'.

⁵⁰On the distinction between 'cabinets of books' and 'libraries', see Chatelain (2013); also Chatelain (2003).

⁵¹Vigenère (1586: 340r): 'Des deux alphabets ensuivans, venuz de la bibliotheque à Treviz, ville du domaine des Venitiens, d'un grand & fort renommé personnage en toutes occultes sciences, appellee *Antonio de Fantis*, il y peult avoir cinquante ans, ce premier est inscrit pour *Geomantique, & Astrologique*.'

10.2.1 *Paper Libraries: Textual Collections as Linguistic Commonplace Books*

Along with the samples, be they prayers or alphabets, the collections also brought together texts on languages. Claude Duret pushed the practice to its extreme. To analyze this, to get inside the texture of Duret's writing, we can focus on the chapter concerning the Chinese language, to which the author reserves a special place among the *exotica* of his *Thresor*, dedicating nine pages to it in his Chap. 87 'De la langue des Chinois en general' (On the language of the Chinese in general) (Duret 1613: 900–909). It quickly becomes evident that the chapter is indeed an assemblage of quotations, compiled from various books, and constituting a virtual ideal library on Chinese at the beginning of the seventeenth century. What would its inventory be?⁵²

Duret started by relying on the few references to the Far East made by antique and medieval authors, such as Ptolemaeus in his *Geography* 'Book 7, Chap. 3', reference accompanied by a ten-line quotation, with quotation marks in the margins (as in Fig. 10.3). Then the references become more numerous with travelers and/or compilers of travelogues from the sixteenth century. We can find the *Cosmographie* d'André Thevet ('liv. 11, Chap. 25')—omnipresent in the *Thresor*—but also 'Odouard Barbosse Portuguaiz' (in fact Edouard Barbosa, Portuguese navigator, author of an account of his travels in 1516 and who died during Magellan's expedition) or, in the final 'bibliography' of the chapter, the *Voyage autour du monde* of Antonio Pigafetta (1480–1534). Duret also referred to the Protestant historian Gothard Arthus (1570–ca. 1630) (Duret 1613: 905), author of a *Historia Indiae Orientalis, ex variis auctoribus collecta* (Arthus 1608), which he quoted in Latin. Maybe he had access to it through the *Petits voyages* by Théodore de Bry (1528–1598), compiling other books himself. The network of quotations and references is very intertwined and it is sometimes difficult to disentangle this compilation of compilations of compilations, with the third layer of text constituted by Arthus himself writing '*ex variis auctoribus collecta*' (from the collection of varied authors).

The lengthiest sample of text is an extract of the *Historia de las cosas más notables, ritos y costumbres del gran reyno de la China* by Juan Gonzalez de Mendoza published in Rome in 1585. Duret uses the French translation (1588, Paris, Jérémie Périer for the first edition), quoting it on two consecutive pages (Duret 1613: 902–903; Fig. 10.3).

While this Spanish Augustinian (1545–1618) never went to China, his work was a major source of information on the Chinese Middle Empire for sixteenth-century Europe, the book running to around forty editions up to 1656 and being translated into Italian, German, English, Dutch and Latin (Romano 2013). The author "observed" China from the coast of Mexico and constructed his work from earlier

⁵²See also Demonet and Toshinori (2008: 134–135).

premiers descouureurs des Philippines, qui mesme y conuertirent & baptiferent les habitans, accompagnez de Pierre s'Armiento, premier comte de la cité de Mauille, & Michel de Loarcha par le commandement de Guy de la Bassares gouverneur d'icelles entreterent en la Chine, conduits par vn capitaine particulier du Roy d'iceluy nommé Omoncon, lequel à l'improuiste aborda ez Isles susdictes, & quoy qu'il y allast de sa teste estant l'entree audict royaume interdite à tout estranger ne laissa pourtant de l'effectuer tresfidellement, briefprou d'autres particularitez se liront en la 2. partie de ceste hystoire composee des rapports faits & enuoyez par apres au Roy d'Espagne mesme.

Au ch. 2. ensuiuant il parle fort encor de ce pays.

Au c. 6. par apres, il dict que les circouifins appellent ce pays Sangley, & les Chinois Taybinco, qui ne signifie autre chose que Royaume. Le susnommé aucteur 1. partie susdicte li. 3. c. 13. parlant des caracteres, maniere d'escrire, & estude des habitans de ladicte Chine en dit ce que s'ensuit.

Venant au premier point, ie di que combien q par tout ledict royaume il y aye fort peu de gens qui ne sçachét lire & escrire: si n'ont ils point entr'eux vn certain nombre de lettre, comme nous auons nous autres, mais bien tout ce qu'ils escriuent, c'est par figures & caracteres, & ne l'apprenent qu'à long trait de temps, & avec grande peine & difficulté, d'autât que chaque parolle a presque son caractere particulier, &c. ils marquent & denotent le ciel. qu'ils appellent (*quant*) en leur langue, par ceste seule lettre que voicy **☸** Et le Roy qu'ils nomment (*Bontay*) par ceste cy **𐄎** & conséquemment ainsi la terre, la mer, & les autres elements, vnt de plus de six mille caracteres tous differents, lesquels ils marquent promptement & d'une main bien legere, comme il s'est veu maintefois aux Philippines à l'endroict de plusieurs Chinois tant de ceux qui y demeurent, que des autres qui y arriuent chaque iour. C'est vne langue qui s'entend mieux escripte que prononcee, tout ainsi que l'Hebraïque, à cause des petits points qui y sont, par lesquels vn caractere signifie la mesme chose que fait vn autre caractere different: ce qui ne se peut pas si bien distinguer en parlant.

Leur Escripture est au rebours de la nostre, pource qu'ils font les lignes du haut en bas fort esgalles, & bien arrangees, commençant au contraire de nous autres, de la main droite à la gauche. Ils gardent ce mesme ordre en l'imprimerie, ainsi qu'il se dira par cy apres, & comme il se peut veoir auioird'huy à Rome en la bibliotheque du palais, & aussi en la Librairie que le Roy d'Espagne a fait au Monastere S. Laurent de Real, & pareillement à d'autres parts & endroicts, où il y a de telles Escriptures & caracteres. Vne chose y a qui est admirable en ce fait, c'est que combien qu'ils parlent en cedit Royaume de beaucoup de langues, & que les vnes soyent toutes differentes des autres: neantmoins ils s'entendent tous generalement par escript, encorcs qu'ils ne s'entendent pas en parlant: & la cause de cela est, qu'une mesme figure, & caractere signifie vne mesme chose enuers eux tous, nonobstant que les vns & les autres les

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Fig. 10.3 Passage borrowed from Gonzalez de Mendoza, in Duret (1613: 902). (Collection BNU de Strasbourg (C.100.264))

reports, notably one manuscript by Martin de Rada (who visited Fujian in 1575). We find him in Duret transformed into ‘Martin Herrade’, Augustinian Provincial, and described as ‘the first European to learn the Chinese language’.⁵³ In a sort of “mise en abyme”, within the passage taken by Duret, Gonzalez mentions that he had seen ‘writings and characters’ from China in ‘Rome in the library of the Palace, and also in the library that the King of Spain built in the monastery of St. Laurent le Real.’ The characters exhibited by Duret—borrowed from Vigenère, just a few pages later, and the three examples of ideograms in Gonzalez’s passage (see Fig. 10.3)—established the Roman and Spanish libraries as centers of accumulations of linguistic knowledge, in the *Thresor*, via these Spanish and/or Italian sources. The Vatican library and the ‘bibliotheque Laurentiane du Roy Philippe’ are also present in another quotation.⁵⁴ This time, it is authored by Pietro Maffei. Duret indeed mobilized many Jesuits alongside the Augustinian Mendoza. From Maffei, he borrowed the fact the Mandarin language is the sort of Latin of these countries, being the *lingua franca* of the administrators, courtiers and the learned, even speaking different mother tongues; with Jose de Acosta, he stated that Chinese is a ‘transnational’ language, comparable to Arabic numerals used in algebra, in that it is readable in all languages even if written with the same ideograms (Duret 1613: 904).⁵⁵ Next to these printed and well-distributed Jesuit books, Claude Duret claimed too that he could use the latest news about the evangelization of China, gathered from the latest reports (‘modernes relations’) of ‘Jacques du Pantoie’ that he quoted—in fact, Diego de Pantoja (1571–1618), a Spanish missionary who lived for twenty years in China, in Nankin and Beijing, from 1597 until his expulsion in 1617—and Matteo Ricci.⁵⁶ These ‘modern Jesuit relations’ show, on one hand, the efficiency of the way the Order was ‘taking possession of the printing space’ (Romano 2013: 104) by putting into circulation missionary letters from China, long before the official and regular publication of the *Lettres édifiantes et curieuses* launched by Charles Le Gobien (1653–1708) in Paris.⁵⁷ On the other hand, it also demonstrated Duret’s will to be kept informed of the latest development concerning the collection of ‘new’ languages in foreign countries. He presents it as if he was gathering the information directly, working in the field, alongside the Jesuits.

⁵³Duret (1613: 908): ‘*le Pere Martin Herrade Provincial des Augustins cy dessus mentionné ayant esté le premier des Europeens qui apprit la langue Chinoise, & qui l’a redigée en art, & en fit une Grammaire, avec un Dictionnaire ainsi qu’il est rapporté en la 2. partie du livr. 1. chapitr. 1. de l’histoire de la Chine.*’

⁵⁴Duret (1613: 904).

⁵⁵The Chinese language is one of the most fascinating idioms for the learned Europeans in the seventeenth century, because of its transnational capability (see Simon (2011: 225–286), as Duret stated (Duret 1613: 902).

⁵⁶Duret (1613: 908).

⁵⁷See also Romano (2015: 354–355) mentioning among the ‘tools available to Catholicity to take the measure of the Earth’, the *Lettere del Giappone degli anni 74, 75 & 76, scritte dalli reverendi padre della Compagnia di Giesu, e di porthogese tradotte nel volgare italiano*, Rome: Zanetti, 1575.

Anyway, within the *Thresor*, there is a genuine rhetoric of quotation. The compilation is a textual assemblage, a mosaic of literary fragments. Duret explicitly described it this way when presenting his plan for an encyclopedia of languages in the ‘Adress’ in an earlier book of his:

Which discourse, for its noble and sublime subject, the great and huge diversities & clashes of the opinions of the ancient & modern Philosophers, Historians, Cosmographers, Geographers, Topographers, Astrologists, Mathematicians, Theologians, Travelers, Navigators, & other scrutinizers of the most hidden secrets of nature, [...] I elected and chose as, I would not say the most worthy, but the more appropriate to your Greatness, and sublime spirit, among my Discourses [...], the one on *The Origin, growth, grandeur, perfection, excellence, decline, & ruin of Hebrew, Chaldaic, Syriac, Aramean, Tangic, Abyssinian, Arabian and other infinite ancient Languages which in general and in particular were formerly in use and in vogue in this universe, of the Authors who wrote the more eloquently in those [languages], & of the books that are being composed in [the languages of the universe], but not yet printed, with the deduction of all the languages that are now being used, & spoken around the earth.* (Duret 1600: Adresse to Pomponne de Bellièvre, n.p.)⁵⁸

Duret portrays his own piece of work as a bringing together of ‘opinions’ from diverse origins, he “cut and pasted” from books, sometimes ‘not yet printed’, to underline again the topicality of the collection. And the form of the text bears the marks of this practice. The chapter we are concentrating on is, for example, full of the traces of this “collage”; the joints in the mosaic are visible: ‘Quand il dit ces paroles’ (when he says those words), ‘Pareillement dedans Strabon, livre premier, où se lit aussi’ (in the same way within Strabon, book one, where it can be read too), ‘Cecy presupposé nous dirons que Odouard Barbosse’ (this presupposed we will say that Odouard Barbosse), ‘ce que touche en passant A. Thevet’ (what touches incidentally A. Thevet), ‘R.P. Iuan Goncales de Mendoce [...] en parle ainsi que s’ensuit’ (R.P. Iuan Goncales de Mendoce [...] talks about it as follows [quotation marks opening]), ‘Le susnommé aucteur [...] en dit ce que s’ensuit ...’ (the aforementioned author says about it what follows [quotation marks opening]) (Duret 1613: 900–902, among other examples). Sometimes the quotations are clearly indicated. We are able, for instance, to trace back the ‘avis envoyé de Paquin, cité de la Chine’ quoted on pages 906–907 of the *Thresor* to the *Avis du R. P. Jacques de Pantoie, ... envoyé de Paquin, cité de la Chine, au R. P. Loys de*

⁵⁸Lequel discours pour la grandeur & sublimité de sons subject, les grandes et immenses diversitez, & contrarietez des opinions des anciens, & modernes Philosophes, Historiens, Cosmographes, Geographes, Topographes, Astrologues, Mathematiciens, Theologiens, Voyageurs, Navigateurs, & autres perscrutateurs des secrets plus cachez de la nature, [...] j’ay principalement esleu & choisy, comme plus je ne diray pas, digne, mais convenable à vostre Grandeur, & sublimité d’esprit, entre autres miens Discours [...], l’un *De l’Origine, accroissement, grandeur, perfection, excellence, decadence, & ruine des Langues Hebraïques, Chaldaïque, Syriaque, Arameene, Tangique, Abyssine, Arrabesque, & autres infinies langues anciennes lesquelles en general & particulier ont eu au temps jadis cours & vogue par cest univers, des Auteurs qui ont plus eloquemment escrit en icelles, & des livres qui se trouvent composez en icelles, mais non encor imprimez, avec la deduction de toutes les langues qui sont a present usitees, & parlees par toutes la terre.*

Gusman, ... sur le succès de la religion chrestienne au royaume de la Chine... published by P. Rigaud in Lyons in 1607 (Pantoie 1607: 115–121). Sometimes, it is a little more complicated. Indeed, the two pages borrowed from the *Histoire du grand royaume de la Chine* (Fig. 10.3) can also be found in the French translation (Mendoza 1589: 75v–76r). But, first, the two ideograms are reproduced very awkwardly in Duret's book and, in addition, upside down. As for the alphabets as 'images', the purpose is to exhibit languages, without necessarily understanding them. Secondly, a closer look at the translation shows that the borrowings are not always clearly claimed and marked: the beginning of Duret's chapter on the Chinese language in fact plagiarizes the paratext 'L'interprete au lecteur' (the translator to the reader), probably written by the translator Luc de la Porte, and takes from there all the references to antique and medieval authorities (Mendoza 1589: Aiiiiv). Between borrowings and plagiarism⁵⁹ the linguistic knowledge elaborated by Claude Duret relies on compilation, and on the accumulation of data and references. The texture reflects the accepted composite nature of his authorship.

Once again, the comparison with the earlier encyclopedia of all the languages of the world made by Conrad Gessner in 1555 can be enlightening here. The bibliometrical study of the *Mithridates* offered by Bernard Colombat and Manfred Peters allows very precise and explicit figures to be given: 42% of the text is written by the hand of Gessner, 11% is language samples and no less than 47% is quotations. Some extend to several pages, even if it is more difficult to detect them, as the markers, simply a few italics, are much more discrete than in Duret's book. One hundred and fifty-four authors are mentioned for a total of 508 quotations, mostly from Tacitus, Julius Caesar, Aventinus, etc. and with 55% of authors from antiquity and 35% humanists (but for 66% of the volume of the quotations).⁶⁰ The figures would probably be different for the *Thresor* (the book being a lot thicker), but the percentage of quotations is certainly even larger, and the number of references employed too, with many humanists as well and more travelers and compilers permitting Duret greater access to 'exotic' languages (from the 'New Worlds', etc.).

How did the language compilers have access to such libraries in the context of the early modern age book economy? An ongoing study of the inventory of his library has given some indications for Gessner. He specified in his personal copy of his *Bibliotheca universalis* which books he possessed, by marking '*habeo*' in the margins—adding fifty-three more books to the 395 in the inventory (Leu et al. 2008). Moreover, Zürich was an important printing center, with the presence of the Froschauers, and contained many libraries, for example, that of the *Schola Tigurina* founded by Zwingli in 1525. For Duret, the case is more complicated. Moulins wasn't a cosmopolitan center, but Duret travelled to Paris for official business linked to his status of officer, president of the 'presidial' (an intermediary court of justice). He explicitly wrote to Sully, addressee of his *Histoire admirable des*

⁵⁹See Note 14.

⁶⁰See the introduction of Bernard Colombat and Manfred Peters in Gessner (1555 [2009]). See also Colombat (2008).

plantes in 1605, about ‘the last voyage [he] had made to the court the other year, for the affairs of the public of this land of Bourbonnois’ (Duret 1605: Aijv).⁶¹ Maybe the Rigauds, his printers in Lyons, could have also supplied him. They edited Diego de Pantoja’s account of his travels in China, and Benoist Rigaud was the editor of the *Histoire des choses memorables...* of Maffei (1571), of the 1585 *Advis* (1585) and two other texts on the Japanese embassy (Boscaro 1973: Notes 24 and 47). Anyway, when the German student Justus Zinzerling (c.a. 1590–c.a. 1620) passed through Moulins on the French leg of his sixteenth-century ‘Grand Tour’, he recommended in his travel book, *Jodoci Sinceri Itinerarium Galliae* (1616), among the *viri illustri* (excellent men) of this city (illustrated with a view): ‘vir optimus N. Corderus’, merchant, for accommodation; the Lord ‘Billardus de Courgenay’ for his erudition and also the ‘name not to be forgotten’ of Dureti and his science concerning languages, thanks to his *Thresor* (*‘linguarum thesaurum’*).⁶²

Be that as it may, as a humanist, Duret, like Gessner and Vigenère before him, most probably had a daily frequentation with books and libraries. Finally, the works themselves and the manner in which they were written are reflections of the authors’ social identity. Faced with this ‘excess of books’ (Chatelain 2008), this ‘information overload’ (Blair 2003), several strategies can be developed.⁶³ One is to organize and classify the libraries containing the books, thanks notably to bibliographical tools (catalogs), used as a compass to draw a ‘cartography of knowledge of which the library would be the main laboratory’ (Chatelain 2008: 159). Another strategy is to reduce books to a paper library, a ‘portable’ library (Blair 1996). Gabriel Naudé in his *Advis pour dresser une bibliothèque* (1627) synthesized both approaches. Among the books Naudé presented to his reader in order to assemble the ideal, useful, library, he gave a prominent place to what he called ‘repertories’.⁶⁴ They constituted, according to him, ‘reservoirs and stores’:

One must not forget all sorts of commonplaces, dictionaries, miscellanies, diverse *lectiones* [leçons], anthologies [recueils] of sentences, and all other sorts of Repertories, because there is so much already done and prepared material for those who are industrious enough to use it advantageously, being certain that there are many who have done marvelous things concerning talking & writing almost without having seen anything else than these volumes mentioned [...] And for me I consider these collections as very useful and necessary, knowing the brevity of our life and the multitude of things needed to be known, to be considered as learned men, doesn’t allow us to do everything by ourselves [...] what harm is there if those whose industry is to imitate nature & to diversify and appropriate so much to their subject what they withdraw from others, *ut etiam si apparuerit unde sumptum sit, aliud tamen esse quam unde sumptum est appareat* [Seneca epist. 8] [so that, even if the

⁶¹[...] il vous pleust de vostre grace, et benignité, Monseigneur, m’honorer et favoriser de tant, de me faire une manifeste démonstration *au dernier voyage que je fis en cour l’autre année, pour les affaires du public de ce pays de Bourbonnois*.

⁶²We use here a later edition, Zinzerling (1655: 50): ‘Quin nec magni illius viri Dureti, qui juri justitiaeque hic praesidet, nomen indictum relinquendum. Mirantur virum hunc, qui linguarum thesaurum deque earum originibus scripta ab eo edita legerunt.’

⁶³See also for a synthesis, Waquet (2015): 249–273.

⁶⁴On Naudé and his *Advis*, see, for example, Revel (1996) and Nelles (1997).

source of such borrowing is clearly visible, it should be as visible that the borrowing is not a reproduction of the model (*Letter to Lucillius*, XI, 84,5), [they] borrow from those who seem to exist only to lend, and draw from the reservoirs and stores meant for this purpose, since we see ordinarily that the Painters and the Architects do excellent & admirable work by means of colors and materials that others grind and prepare for them. (Naudé 1627: 61–63)⁶⁵

Unlike the extreme defenders of the ‘Ancients’ against the ‘Moderns’, who were seen as mere ‘Copists or Plagiarists’,⁶⁶ Naudé was in favor of textual collections. They are tools, calling for the utilization of future users.

So it is not surprising to find, among Naudé’s own personal library, no less than two linguistic collections, those elaborated by Gessner and Duret. On the advice of Naudé, another copy of the *Thresor* was also included in Pierre-Daniel Huet’s huge Parisian library (Shelford (2007: 35).⁶⁷

Vigenère’s, Duret’s and Colletet’s texts are attempts to classify the sum of knowledge on languages at a time when the availability of such knowledge was growing rapidly. They are places in which to find data to understand languages. Their dual goal is to organize and to share.

To organize: Duret, for example, gives order to linguistic knowledge, classifying the samples he collected under headings, chapters and titles. This way of working is reminiscent of another knowledge tool: commonplace books. Technically speaking, it doesn’t exactly fit to the definition of such texts, as has been elaborated and

⁶⁵‘Il ne faut pas oublier toutes sortes de lieux communs, Dictionnaires, Meslanges, diverses leçons, Recueils de sentences, et telles autres sortes de Repertoires, parce que c’est autant de chemin fait et de matiere preparee pour ceux qui ont l’industrie d’en user avec avantage, estant certain qu’il y en a beaucoup qui font merveille de parler & d’escrire sans qu’ils ayent guere veu d’autres volumes que ces mentionnés [...]. Et pour moy je tiens ces collections grandement utiles et necessaires, eu esgard que la briefveté de nostre vie et la multitude des choses qu’il faut aujourd’huy sçavoir pour estre mis au rang des hommes doctes ne nous permettent pas de pouvoir tout faire de nous mesme [...] quel mal y a-il si ceux qui ont industrie d’imiter la nature & de tellement diversifier & approprier à leur sujet ce qu’ils tirent des autres, *ut etiam si apparuerit unde sumptum sit, aliud tamen esse quam unde sumptum est appareat* [Seneca epist. 8] [de façon que, même si la source de tel emprunt apparaît nettement, il apparaisse tout aussi nettement que l’emprunt n’est point une reproduction du modèle (*Lettre à Lucillius*, XI, 84, 5)], empruntent de ceux qui semblent n’estre faicts que pour prester, & puisent dans les reservoirs & magasins destinez à cet effet, puis que nous voyons d’ordinaire que les Peintres & les Architectes font des ouvrages excellens & admirables par le moyen des couleurs & materiaux que les autres broient & leur preparent.’ See also part of the quotation in Blair (1996, 2010).

⁶⁶Naudé (1627: 67): ‘parce que suivant leur dire [the Ancients] ils [the Moderns] ne sont que des Rapsodeurs [qui se content de rabouter des morceaux sans suite], *Copistes ou Plagiares*, & n’approchent en rien de l’esloquence, de la doctrine & des belles conceptions des anciens, ausquels pour cette cause ils se tiennent aussi fermement attachez comme le poulpe fait à la roche.’ The context is the ‘Quarrel between the Ancients and the Moderns’, which can be seen in the long run (Yilmaz 2004).

⁶⁷On Naudé’s Parisian library, see the edition of the manuscript inventory BNF, français 5681 in Bœuf (2007). Duret is No. 336 (f. 3r, 2d column) and Gessner No. 2361 (f. 20r, 1st column). On Huet’s 8000-volume library, see Dougnac (1968) and Shelford (2007). Huet’s *ex libris* is visible on one of the BNF’s copies of the *Thresor*: BNF NUMM-8701906 (only readable in the library).

studied by Ann Moss for instance: ‘a collection of quotations (usually Latin quotations) culled from authors held to be authoritative, or, at any rate, commendable in their opinions, and regarded as exemplary in terms of linguistic usage and stylistic niceties. The feature which distinguished the commonplace-book from any random collection of quotations was the fact that the selected extracts were gathered together under heads’ (Moss 1996: v). A collection of quotations organized under headings and, even more, ‘specialist repertoires of excerpts relevant to specific disciplines’ (Moss 1996: v) could be, nevertheless, definitions corresponding to the collections of languages.

The connections we have already seen between textual and physical collections can reinforce this link, since the ‘topic’ (i.e. the rhetorical science of *topoi*) is shared by both. Indeed, the *Wunderkammern* are the ‘formulation monumentale’ (monumental formulation) (Falguières 2003: 43) of the ‘topic’: ‘the [common]places offered a brief way, a short cut for hurried learning, a sure road in times of catastrophe, a method against forgetfulness and language confusion. They are catalogs’ (Falguières 2003: 18).⁶⁸ More generally, without focusing only on the determination of the exact nature of the works, we want to consider how this method of reading texts is incorporated by the authors we are studying. Notably, how the commonplace-book, this ‘influential *instrument de travail*’, is integrated into the *savoir-faire* of the Republic of Letters ‘as an artifact symptomatic of the mind-set of educated Western Europeans’ (Moss 1996: vi) and could color their practice as writers.⁶⁹

One way of perceiving this is to have a look at the index, a tool giving a view not only of how the authors ‘read in parts’ (Blair 2003: 17–19) but also wrote ‘in parts’.⁷⁰ Of the three works we are studying, the *Thresor* is alone in having an index—and even two. In it, the mere alphabetical order of Gessner—from *Abasinorum lingua* to *Zagouani*—gave way to a form of primary comparatism, ‘affinitarism’ (Auroux 1992: 554). Duret’s work is organized both geographically, being also an atlas of the languages of the world, as well as ‘chronologically’, starting to distinguish what he called ‘langues premieres et principales’ (first and main languages) (Duret 1613: 272) and others emanating from them. The first four-page index is

⁶⁸Les lieux proposaient une voie brève, un chemin de traverse pour les apprentissages hâtifs, une route sûre aux temps de catastrophe, une méthode contre l’oubli et la confusion des langues. Ce sont des catalogues.

⁶⁹Our texts come under the larger category mentioned by Ann Moss (1996: viii): ‘There was a clear line of demarcation between commonplace-books and other works of reference which included quotations. [...] the commonplace-book was part of the initial intellectual experience of every schoolboy. Encyclopedias, Latin miscellanies, and with even more reason, *lectiones* and *adversaria*, were produced by very learned adults for consultation by more or less learned readers. [...] The more erudite encyclopedias and *lectiones*, interesting and important though they are, were manifestations of the intellectual climate of the sixteenth and seventeenth centuries at a more rarified level and contributed to it less elementally.’ On commonplaces, see also Goyet (1996) and Swann (2001).

⁷⁰For a discussion about the link between commonplaces, index and library catalogs, see Neveu (2015).

entitled 'Indice des chapitres de l'Histoire de l'origine des langues de cest univers' (Index of the chapters of the history of the origin of the languages of this universe) and is a table of contents. The order follows more or less that of the seven major languages, with their associated idioms: first Hebrew (until Chap. 36), then Assyrian, Egyptian, Chaldaic and Arabic (with some variations in the order, and including Persian and Ethiopian, until Chap. 55), followed by Greek and Latin (starting at Chap. 67 and followed by Italian, Spanish, German, etc.); the last chapters deal with non-European languages (from the East and West Indies, etc.). But this table is continued with a second seven-page index, entitled 'Indice alphabetique des Noms, diction et matieres principales amplement declares en ce Volume de l'Origine des Langues de l'Univers' (Alphabetical index of the Nouns, diction and main subject matters largely developed in this Volume...). It goes from 'Abel Astronome' and 'Abraham Abram' to 'Zoar quel livre' and 'Zoroastre', passing by 'Alphabet Phenicien', 'Babel' and 'Hieroglyphiques'. How did Duret draw up such an index? If he did it himself and not with the workers of the typographic workshop printing his book, maybe he followed the method described by Conrad Gessner.⁷¹ His insight on index making, taking place in his 1548 *Pandectarum sive partitionum universalium... libri XXI* (Liber I 'De grammatica', titulus XIII, 'De variis', pars 2 'De indicibus librorum'), in fact gives clues on how texts were read but also written or read-and-written at one and the same time:

'Whatever one wishes to refer to in an index is written down, after having been excerpted, in no particular order on a sheet of paper of good quality, on one side only, so that the other one will remain blank. When a topic or a sentence has been treated separately a new line is started. [...] At last, all that has been written down is being cut up with scissors, and then you divide the cut slips in the desired order, first into larger parts, then subdivide again and again, however many times this is needed. [...] Finally, those that have been cut with sharp scissors are separately laid out on different places on a table, or are arranged in small boxes on a table. [...]

When it has been arranged in the desired order, it may either be copied immediately or, if the original entries have been written sufficiently well (which will be better), they may be mounted with glue made from flour. If you have not used glue for wood or artisans' glue it will be easier to remove the mounted slips when wetted with water if an error has been made or else if you wish to consider another use in a new order. [...] There are those who do not mount the slips but insert them between strings in a book prepared for that purpose. [...]

That much I can assert with certainty, that I know many learned men who are pleased to apply this convenience to almost all their studies; whether it is something to be written or something to be taught orally in public, they collect the subject matter of their discourse roughly and arrange it in the following manner. Both material that was recently compiled,

⁷¹On Gessner, Blair (2003: 25–26). On indexes in general, Waquet (2015: 284–285); on their fabrication, see Maison d'Erasmus (2001), especially the introduction and the conclusion (by Jean-François Maillard, 88–90), but also the paper by Jacob Schmutz (2001) on a text echoing that of Gessner, a century later: Juan Caramuel y Lobkowitz's *Syntagma de Arte Typographica...* (1664).

and that which had long since been acquired is being prepared for use on separate slips (not mounted) so that when needed for whatever subject is to be treated, they can produce them and select from the many slips those that serve best for the present purpose; the slips are fastened together with small pins, and are then arranged in whatever useful order one wishes to have them for the purpose of a discourse; what seems to be appropriate is noted down or left out at will, the slips then being put back again in their place. But the subject matter to be copied is partially collected from what one will have observed gradually while reading, partially from citations of authors which have been cut out of other books. For this purpose two copies are needed, of which in one the first page, in the other one the second one will be crossed out in black or red ink, so that from the two books one single copy, as it were, will be made. By this method, where it is possible, one can really achieve many shortcuts of labor and various advantages to studies. [...] What has compelled me to this digression is the remarkable utility of the thing. (Gessner 1548: 19v–20r)⁷²

We have here the benefit of a very precise description of the way a sixteenth-century humanist handled books, a window on the materiality of the acts involved. Gessner evokes this way of cutting-up paper slips for his correspondence too, in a letter dated 1563 to his friend, Jean Bauhin, a physician in Lyons (Gessner 1563–1565 [1976]: 71–72; Blair 2003: 25). The cut-and-paste method, in the very literal sense, appears as generalized. Gessner applied it to index fabrication and also to discourse or book elaboration. We can only postulate Duret used the same method to write his *Thresor*, presenting itself as a “montage” of parts of texts.

⁷²We use the translation given in Wellisch (1981). The Latin version in Gessner (1548: 19v–20r), not given by Wellisch, is: ‘Quaecunq. in indicem referre libuerit, omnia ut primum se obtulerint, nulla ordinis ratione habita in charta describantur, ab altera tantum facie, ut altera nuda relinquatur. Res sive sententiam quaelibet separate, versum novu[m] incipiat. [...] Tandem omnia descripta fortice dissecabis [it is more the act of cutting than the actual scissors], dissecta quo volueris ordine divides, primum in maiores partes, deinde subdivides semel aut iterum, vel quotiescunq opus fuerit. Aliqui dissectis omnibus, demum disponunt: alii inter dissecandum statim primam divisionem perficiunt, dum singulas schedulas in fine singularum dissectionis mucrone forcicis apprehensas digerunt per diversa mensae loca, aut uascula per mensam disposita. [...] vel si prima descriptio satis bene habeat, quod potius fuerit, agglutinato tantum, glutine ex farina: cui si nullam xylocollam aut fabril glutinum miscueris, facilius relines aut removebis agglutinata, madefacta aqua, sicubi erratum sit, aut alioquin in alium usum de novo ordine cogites: quam ab causam nonnulli in unam chartae faciem solum agglutinare malunt, ut cum libuerit, denuo discindant. Sunt qui non agglutinant, sed filis libri ad hoc destinati inserant. [...] Hoc certe testari possum, nosse me doctos aliquot homines, qui hanc dividendi commoditatem omnibus ferè studiis suis adhibeant, & sive scribendum eis aliquid, sive docendum publice fuerit, materiam sermonis congestam & rudem hoc modo disponant: sive materiam recens accumulaverint, sive olim conquisitam distinctis per locos schedulis non agglutinat in usum referent, ut cum opus fuerit ad quodcunq argumentum tractandum depromant, & ex multis, quae in praesentia potissimum ad institutum facere videntur, eligant, aciculis configant, suq modo ad quam voluerint partium orationis oeconomiam disponant, & quae vide[n]tur describant, aut pro arbitrio utantur, & in suum rursus locum recondant. Materia aute[m] colligitur partim describendo, que[m]quis paulatim inter lengendum observerit: partim dissectis authoru[m] communibus locis aliisue libris, ad quod efficiendum duobus exemplaribus opus est, quorum unius prima facies, alterius secunda deleatur atramento vel rubrica, ut ex duobus rursus unum veluti exemplar fiat. Hac methodo ad multa profecto laboris compendia, & varias studiorum co[m]moditates uti licebit. [...] Compulit me certe ad hanc digressionem insignis rei utilitas, & quam nisi expertus nemo facile quanti facienda sit aestimaverit.’

The idea of the paper slips, lightly glued so as to be movable, leads us to the second goal of the texts: to share. Parts of texts could also circulate between different works. First, because, as we have seen, they used common repertoires of samples, of ‘commonplaces’, concerning languages: from Babel and the Pentecost to anecdotes circulating, for example, from Gessner to Duret, like the fable of islanders with tongues divided in two and who could speak with two people at the same time (Gessner 1555 [2009]: 2rv; Duret 1613: 962–963). But, secondly, because the texts are places shared in “common”, one borrowing from the other, as is the case with Duret and Colletet plundering Vigenère. What are the effects of this humanist *habitus* of cutting and pasting on the actual circulation of parts of texts between the collections of languages? How do the texts actually work as ‘reservoirs and stores’?⁷³

10.2.2 *Collections of Texts as Humanistic Collections: The Meaning of the Act of Quoting?*

The goal of the texts we are analyzing in this chapter is to assemble the maximum amount of information to be garnered about all the languages of the world. But is it because of the scarcity of information on some languages that one collection is conduced to glean its materials from an earlier one, plagiarizing it?

Here is what François Colletet wrote in the ‘Advis au lecteur’ of his treatise:

I do not doubt that many who are going to see these Alphabetical Tables, knowing that they are in Vigenere, are going to believe, first, that this work is only a transcription, & that I took the discourse of that Author, as well as the illustrations; but I beg them to only leaf through it, & they will have a totally different judgment. It is indeed true that I have followed this great man’s footsteps in some places; however I did not take many things from it, and I followed more closely what was written about it by Sir Fulvio Montauri, born in Sienna Italy, the glory of whose work I do not wish to steal. It will be known therefore that he composed a Book entitled *Raccolta de diversi Antichi Alphabeti con l’annotationi in lingua Italiana* and obtained the Privilege of the King to print it in the year 1643. & this manuscript having fallen into the hands of my Printer, I was forced to accompany each illustration with a short discourse which explains it. But, since this Author didn’t discuss this subject at any greater length than Vigenere, I added to it a lot of things from myself, & I even entirely wrote the Treatise of Ciphers, of which he didn’t speak at all, for he only made succinct remarks on the Alphabets of Foreign Languages. I don’t know if I succeeded in this enterprise; but at least I am convinced that young fellows who are curious, will find in this little book something that will please them. (Colletet 1660a: Advis au lecteur, n.p.)⁷⁴

⁷³It is to be noted that, almost a century after Naudé, Ephraïm Chambers, author of the *Cyclopaedia* (1728), still sees commonplace books as ‘things of infinite service: they are a Kind of Promptuaries and Storehouses, wherein to deposit the choicest and most valuable Parts of Authors, to be ready at hand when wanted.’ (*Cyclopaedia*, ‘C–P’, Vol. I, 1728), as quoted in Yeo (2001: 109).

⁷⁴Je ne doute point, que plusieurs qui verront ces Tables Alphabetiques, sçachant qu’elles se trouvent dans Vigenere, ne croyent d’abord que cet ouvrage n’est qu’une transcription, & que j’ay

This statement by Colletet is meaningful for more than one reason.

First, he mentioned ‘authors’ who have to be ‘credited’ for their work, receiving for it ‘glory’.⁷⁵ That is why, conscious that he could be accused of plagiarism, in a context of affirmation of this authorship, he took the opportunity to defend himself at the threshold of his book. Colletet was, so to speak, trying to assert his own discourse, his own voice. Whereas his text was only a summary of Vigenère’s, from almost a century earlier, a “montage” but in the exact same order, he tried to make it appear as a personal work, even if it was ‘based’ on two books merged together, the *Traité des Chiffres* and another Italian work, a manuscript (of which no trace is left).

This identity as a mere imitator is assumed to a greater extent in other parts of the text:

It would certainly be the place here to talk about the Italian and Spanish languages, that are today more fashionable than ever, especially in France, where they are at the center of conversation in the most majestic places. But since my goal wasn’t to study this subject in depth, & since I only contented myself with reproducing the Alphabets of Foreign Languages, in the imitation of Vigenere, of Tritheme, and others who have written [about] it, who would not see it would be useless to reproduce the characters that serve to assemble Italian & Spanish words, since there is no difference between those, in their shape, and the ones we use in the French or Latin Language [...] (Colletet 1660a: 42)⁷⁶

pris le discours de cet Autheur, aussi bien que les figures; mais je les supplie de le vouloir seulement parcourir, & ils en jugeront tout autrement. Il est bien vray que j’ay marché sur les pas de ce grand homme en quelques endroits; toutesfois je n’en ay pas pris beaucoup de chose, & j’ay suivy de plus près ce qu’en a escrit le Sieur Fulvio Montauray, natif de Sienne en Italie, auquel je ne veux point dérober la gloire de son ouvrage. On sçaura donc qu’il avoit composé un Livre intitulé *Raccolta de diversi Antichi Alphabeti con l’annotationi in lingua Italiana*, qu’il avoit obtenu le Privilege du Roy pour le faire imprimer, dès l’an 1643. & que ce manuscrit estant tombé entre les mains de mon Libraire, il m’a obligé d’accompagner chaque figure d’un petit discours qui en donnast l’explication. Mais comme cet Autheur ne s’est gueres plus estendu que Vigenere, j’y ai adjousté beaucoup de choses du mien, & j’ay mesme entierement fait le Traitté des Chiffres, dont il n’a aucunement parlé, puis qu’il s’est contenté de faire des remarques assez succinctes sur les Alphabets des Langues Estrangeres. Je ne sçay pas si j’auray reussi dans cette entreprise; mais au moins me persuade-je que les jeunes gens qui sont curieux, trouveront dans ce petit ouvrage quelque chose qui les pourra contenter.

⁷⁵On the issue of authorship in the Early Modern and Modern Ages, see, among other publications: Ezell (1999), Biagioli and Galison (2003), especially Chartier (2003); Woodmansee and Jaszi (1994), especially Thomas (1994); but also Viala (1985); or on ‘copyright’ in eighteenth-century England, Yeo (2001: Chap. 8). Obviously, we do not draw any major conclusion concerning this vast historiographical problem from the example of Colletet alone.

⁷⁶Ce seroit iustement icy l’endroit de parler des Langues Italienne & Espagnole, qui sont aujourd’huy plus en vogue que jamais, particulièrement en France, où elles font l’entretien des plus augustes Ruelles: Mais comme mon dessein n’a pas esté de traiter à fonds ces matieres, & que je me suis contenté de produire les Alphabets des Langues Estrangeres, à l’imitation de Vigenere, de Tritheme, & autres qui en ont escrit, qui ne voit qu’il seroit inutile de produire icy les caracteres qui servent à l’assemblage des mots Italiens & Espagnols, puis qu’il n’y a point de difference de ceux-là en figure, avec ceux que nous employons dans la Langue Française ou Latine [...].

We are confronted here with the ‘paradoxical’ dimension of imitation in the Early Modern and Modern Ages, between appropriation—a source of controversy sometimes—and a form of respect (Couton 2006: 16), of homage. In the literary field (in Bourdieu’s sense of the word) of seventeenth-century France in which Colletet tried to position himself, Vigenère could appear as an authority, as a sort of “Ancient” from the sixteenth-century. This is all the more true concerning Trithème, touchstone of all the later works concerning cryptography, whom Vigenère himself quoted frequently (Vigenère 1586: 138v, 279r).

‘Nous ne faisons que nous entregloser’ (we only quote each other) wrote Montaigne (Compagnon 1979: 9). Intertextuality plays a major role within the works.⁷⁷ Built up as collections of quotations, and of references, a chain of texts is set up, whose origin seems almost indiscernible: Duret mentioned ‘Jean Baptiste Palatin Citoyen Romain’ (Duret 1613: 346; 476; Palatino 1561); Vigenère paid homage several times to Teseo Ambrogio (for example Vigenère 1586: 297v; see Ambrogio 1539)⁷⁸ and the homage was evidently picked up again by Colletet (1660a: 3).

As we have seen, actors perceived such books as libraries. That was not only a metaphor, but induced authentic cultural and social practices. To read is concomitantly to write. Notes taken become a printed work (Blair 2004). For example, Colletet, besides rewriting Vigenère entirely, mentioned several of the readings that made his book possible (the preface by Gabriel de Collange, translator of Trithème; Juste Lipse, etc.) and allowed him to produce new texts:

We will talk about it sometime at more length as I wish, if I am able to recover some books I read, in former days, in the Library of my late father, where I remarked a hundred curious & entertaining subjects. But for now, it is all that I can say, in the short time my printer [*Libraire*] is giving me, [he] didn’t grant me more than three weeks to do a piece of work which demands more than a year. (Colletet 1660a: 63–64)⁷⁹

We can note, first, the close interaction between authors and printers, in a time when there is no ‘fetishizing of the author’s hand’ (Chartier 2015: 61, 46–48, 59–60). The printers intervened in the process of writing and, in this case, as often happened, in hastening the completion of the work. We perceive also that for Colletet, writing a book is also drawing on the resources of a library, that of his father Guillaume Colletet:

⁷⁷On intertextuality: Kapp (1984); Zumthor (1981).

⁷⁸See Note 32.

⁷⁹Gabriel de Collange, natif de Tours en Auvergne, Traducteur de l’Ecriture Cabalistique de Trithème, rapporte dans sa Préface plusieurs Empereurs & Philosophes, tant Grecs que Romains, qui ont esté inventeurs de ces Langues Occultes, par des moyens tout à fait extraordinaires; & Lipse dans son Livre des Machines le témoigne encore en divers endroits, comme ont fait devant & apres luy plusieurs autres. *Nous en discourerons quelques jour plus à loisir, si je suis en estat de recouvrer quelques Livres que j’ay leus autrefois dans la Bibliotheque de feu mon pere, où j’ay remarqué cent choses qui concernent ces curieuses & divertissantes matieres. Mais quant a present c’est tout ce que je puis dire, dans le peu de temps que me donne mon Libraire, qui ne m’a pas accordé plus de trois semaines pour faire un Ouvrage qui demande plus d’une année.*

I would have, I think, enough courage to undertake something on the subject of Languages, that maybe would not displease people, because during my own short readings, I have made certain observations, which together with what I have discovered from time to time, in the Cabinets of our famous [ancestors], would maybe shed light [on this subject] to those who start to devote themselves to this beautiful study, or at least it would relieve them in their curious & laborious research. (Colletet 1660a: 42)⁸⁰

Cabinets of curiosities and libraries go hand in hand to allow Colletet to produce his texts. But this idea of books that enable other books to be written was envisaged by Vigenère himself. He conceived his work—as a humanist *par excellence*, whose motto engraved on his ex-libris was Seneca's *De otio* '*Otium sine litteris mors est*' (leisure without literature is death)—as commonplace books:

So that the youth finds in it something to fish, not with a line, but with both hands [à pleine seine] in those commonplaces; that I offered myself to prepare as a large beautiful orchard with all sorts of fruits, that I would cultivate, not for my own use, but for the convenience and recreation of the Public, being at liberty to put their hand in it like in their funds and heritage. (Vigenère 1605: 66v)⁸¹

His texts are compared to orchards, where one could easily pick or harvest “parts of texts”, or to rivers where the fish are so plentiful they can be caught by hand. He guides his readers in the art of excerpting from his books, as Jeremias Drexel did in his later excerpting handbook, *Aurifodina, or The Mine of All Arts and Sciences, or the Habit of Excerpting* (1638).⁸²

That is why, in this context, Colletet's plagiarism of Vigenère deserves more than complete disqualification. The *Traitez* is indeed a digest of Vigenère's work intended to give '*succintes & faciles lumieres*' (brief and easy enlightenment) to the public (Colletet 1660a: 43). But there are also some additions that are meaningful. The plagiarism is probably useful in Colletet's position, being an easy way to try to assert his social identity. Minor poet, polygraph, and failed journalist—creator, for example, of the *Bureau académique des honnestes divertissements de l'esprit*, that only lasted for 6 months in 1677—François Colletet tried time and again to equal his father Guillaume (1596–1659), a famous poet and one of the first members of the Académie française (see Collinet 1999).

⁸⁰J'aurois ce me semble assez de courage pour entreprendre quelque chose sur le sujet des Langues, qui peut-estre ne déplairoit pas, puis que dans mes petites lectures particulieres, j'ay fait certaines observations, qui jointes à ce que j'ay decouvert de temps en temps, dans les Cabinets de nos illustres, donneroient peut-estre des lumieres à ceux qui commencent à s'addonner à cette belle estude, ou du moins les soulageroient dans leurs curieuses & penibles recherches.

⁸¹Vigenère, Blaise de. 1605. *L'Art militaire d'Onosander*. Paris: A. Langelier: 66v; as it is quoted in Maillard (1982): 237: 'afin que la jeunesse y trouve de quoy pescher, non à la ligne, ains à pleine seine en ces lieux communs; que je me suis proposé de leur aprester comme un beau grand verger de toutes manieres de fruits, que je cultiverois non pour mon usage particuliere [sic], ains pour la commodité et recreation du Public, estant loisible aux passants d'y mettre la main comme en leurs fonds et heritages.'

⁸²See, for example, Blair (2004: 96); and on this 'art' used by Daniel Georg Morhof, see Zedelmaier (2000) and, more generally, Delcultot (2003).

To make reference to Vigenère allowed Colletet to make a stand, to assert his position in the field of “linguistic knowledge”, thanks to the timeless position of authority of the sixteenth-century humanist. The book was a sort of ‘diachronic collaboration’ (Blair 2010: 208), a dialog where Colletet repeated his model’s discourse (Foucault 1971: 23–25). This process of copying is part of the humanistic ethos. Alongside ancient models (Vigenère, Tritheme, etc.), Colletet also mentioned contemporary people and institutions permitting him to take a position also. That is why his *Traitez des langues étrangères* is dedicated to the major institution which has the authority on language issues in seventeenth-century France: The Académie française (Colletet 1660a: ‘A Messieurs de l’Académie françoise’). In the text, it is also possible to find some remarks re-inscribing Vigenère’s material in the context of the 1650s. Colletet evoked, for instance, important figures of his time, such as Gilles Ménage (1613–1692), but alongside marginal ones, like himself. This is the case of Jean Douet, an ‘*homme à projets*’ (projector), author notably of a *Proposition presented to the Kingdom of a universal writing, admirable for its effects, very useful... to all men of the earth* (Douet 1627). Colletet made reference to another book of his, with a ‘Table of Letters’, which he saw in the ‘beautiful cabinet’ of ‘N. Regnesson Maistre Graveur’ (Colletet 1660a: 61–62; Douet 1660).⁸³ This ‘Table’ is in fact an anagram playing with the names of the king and his future wife, Marie-Thérèse of Spain, on the occasion of their marriage, in 1660. Here, Colletet was trying to support Douet to obtain a reward from the king.⁸⁴ Reward he claimed for himself too. His *Traitez*, rewriting the 1586 *Traité des chiffres*, is one attempt to gain access to a position in the literary field, another being, for example, an account of the 1660 Royal Entry in order to celebrate, like Douet did with his text, this regal event (Colletet 1660b).

Pieces of work as assemblages of parts of texts, even coming from the same “source text”, can vary in their meanings, thanks to the context in which the compilation is built. Even if the *Traitez des langues estrangeres* is only a slight variation on Vigenère’s text, it is nevertheless a work appropriated by Colletet, inscribing it in a different context.

⁸³On these French authors interested in language issues, particularly a universal language, in the middle of the seventeenth century, see Simon (2011: 546–615) and Knowlson (1975).

⁸⁴Colletet (1660a: 40 (where he mentioned also Ménage, Vaugelas)): ‘Iean Doüet, Escuyer sieur de Rompt-Croissant a desia rendu ce témoignage devant moy, de la fertilité de nostre Siecle, dans sa France Guerriere [Paris, 1643], où il traite entre autres choses, des Langues et des Chiffres, à l’exemple de Vigenere & de Tritheme, & qui seroit asseurement achevée, s’il nous avoit donné un discours de l’Anagramme qu’il promet de traiter à fons, & dont il est tout à fait capable, puis qu’il en a une parfaite & profonde connoissance. C’est à quoy je l’invite, aussi-tost que nostre Invincible Monarque l’aura favorisé de quelques recompenses, qui sont veritablement deuës à ses travaux & à ses veilles.’

10.3 Conclusion—Printed Texts as Open Spaces and Their Circulations: Decontextualising and Recontextualising

What is the effect of a text being received in a different context? What are the active choices made by the reader, the ‘textual tactics’ of the receiver (Certeau 1990: 253), all the more active when he is building his own work from the bits and parts of the original text? What are the results of the reader’s “poaching”, to use Michel de Certeau’s metaphor (Certeau 1990: 239)?⁸⁵

In this concluding section of our chapter, we are going to focus on two texts in direct connection with those we have studied above. They are examples of the paths to which the circulations of parts of texts lead. Vigenère’s, Duret’s and Colletet’s books are indeed crossroads: built up from parts of texts, but also commonplace books used as ‘reservoirs’, useful for later works. They are representative of the effects induced by the fact of displacing a passage from one text to another. The displacement changes the possible interpretations, since texts ‘circulate without their contexts’ (Bourdieu 2002: 4). To quote or “borrow” a part of text is not a neutral act, since it is taking a position within a “field”.

The final two examples we are going to briefly develop in this conclusion offer a perspective on the international circulation of texts and over a longer timeframe, allowing the ideas developed above to be addressed anew.

10.3.1 *Dismantling Collections: The Consecration of Claude Duret as a “Collector Orationum Dominicae” in the Eighteenth Century*

Built upon various parts of texts assembled together, the reception of these textual collections in different contexts can lead to a dismantling of the text. Or at least a reconfiguration of the knowledge held within it.

In 1748, a new collection of languages was published in Leipzig, authored by Johann F. Fritz, probably a language teacher, and Benjamin Schultze (1689–1760), a protestant missionary from Halle University. It is entitled *Orientalisch- und occidentalischer Sprachmeister, welcher nicht allein hundert Alphabete nebst ihrer Ausprache... vor Augen leget, sondern auch das Gebet des Herrn in 200 Sprache und Mundarten...* Duret’s name appears in it several times. But whereas Duret’s collection was presented in a sort of synthesis, Gessner’s language sample

⁸⁵For a discussion of this pristine historiographical text—and the question of the encounter between ‘the world of the text’ and ‘the world of the reader’ (P. Ricoeur), because “new readers make new texts” (McKenzie) (134) and reading is a ‘silent production’ (152)—see Chartier (1996, Chap. 5 ‘Communautés de lecteurs’, 133–154).

(prayers), and Vigenère's one (alphabets) were organized slightly differently in the eighteenth-century collection. A first part is devoted to writings and alphabets; a second introduced figures and numbers; the third and final part dealt with prayers, giving and comparing 200 versions of the 'Our Father', as the title proclaimed: 'The Master of Oriental and Occidental Languages, who presents 100 alphabets but also their pronunciation... and the Lord's Prayer in 200 languages and dialects...' The comparison is more systematic, the number of languages larger than in earlier texts. The *Sprachmeister* is inscribed in the context of the birth of a linguistic science (effective only in the nineteenth century), based on a systematic comparatism.⁸⁶ In this perspective, the 'Our Father' became the privileged sample, a real linguistic tool.⁸⁷ This is why Fritz and Schultze cut only the prayers in the large *in-quarto* of Duret. The separated parts of the text, delimited by italics, as we saw, are taken out of the book, and "migrate" to a new one. The encyclopedia of all the languages of the world is reduced to a collection of versions of the 'Our Father', some of which Fritz and Schultze also selected from other famous collections, like Gessner's but also Mesiger's or Chamberlayne's. For example, while the *Hispanica*, *Gallica* and *Britannica vetus* are taken from Gessner's *Mithridates* (Fritz and Schultze 1748: 5–9), the *Scotica*, *Anglica*, *Germanica Hodierna* and *Finnica* (Fritz and Schultze 1748: 11, 14, 29, 41; Duret 1613: 874, 868, 869), and the *Syriaca* and *Arabica* (Fritz and Schultze 1748: 67–69; Duret 1613: 405) are drawn from the *Thresor*.⁸⁸

During the process, Duret gained, if not fame, at least textual authority. In this eighteenth-century book, the art of being a compiler, a collector, offered access to a form of consecration. Benjamin Schultze and Johannes Fritz retrospectively consecrated the collectors, the compilers of language with a specific identity: they are now '*collectores orationum dominicae*' (collectors of the Lord's Prayer). The "title" bestowed them with authority. Within this development, the meaning of the repertoires of languages evolved: from assemblages of parts of texts and, in this case, prayers, they are reconfigured as texts—source texts—from which to assemble new compilations. Duret and Gessner, who collected their prayers from other texts or thanks to social spaces such as libraries/cabinets, are now those from whom the prayers are collected. Whereas the real providers, like John Bale for Gessner, disappeared. Therefore, Duret was included in the list at the end of the *Sprachmeister*: next to '*Gesnerus* (Conr.) in *Mithridate suo*' (Conrad Gessner in his *Mithridate*) one can read '*Duretus* (Claud.) in *Thesauru LL. universi Gall*' (Claude Duret in his *Thresor de l'histoire des langues* in French). The *Thresor* functioned as a textual hub, to which texts arrived and from which they departed. Such texts are susceptible to "re-adaptation", reconfiguration of the knowledge they contain.

⁸⁶A comparison could be made again with the evolution of natural history between the sixteenth and eighteenth century, between Gessner and Linné or Buffon.

⁸⁷See for example Auroux and Boës (1981).

⁸⁸On the specific circulation of one of the prayers, in Tupi but transformed in '*Mexicana*', our current reflections ('Une oraison mobile: circulations d'une prière en « langue des Sauvages » (XVIe-XVIIIe siècles)'; see Note 23).

10.3.2 *Expanding Collections: The Traité des Chiffres as a Tool for Decipherers in the Nineteenth Century*

On the contrary, instead of dismantling the collection, its reception in a new context can lead to it being expanded. Composite texts always leave space for the addition of new parts of texts. This was already the case in the *Traité des chiffres* with the adjunction of the Chinese and Japanese alphabets, placed by Vigenère himself at the end of his book. It is the case, once again, more than two centuries later. Indeed, besides the annotated copy by Vigenère (Maillard 1982), we found a copy annotated by some other hand.⁸⁹ The hypothesis is that it was scribbled in by Francis Willes, whose signature appears at the beginning of the book: ‘Francis Willes, 1827’, written in the same black ink that is also used on several pages of the treatise. Thanks to this copy, it is possible to have an outline of the usage of Vigenère’s work by a nineteenth-century English cryptographer.⁹⁰

Titles were already signs of the de-contextualization of a book. While Vigenère conceived his treatise primarily as a book on ciphers, copied by Duret in his *Thresor*, the accent was put on the second part of the *Traité*, on foreign languages, not mentioned in the 1586 title. It was the same with Colletet’s *Traitez des langues estrangères, des alphabets et des chiffres*, inverting the two parts of Vigenère’s book. Even if the source-text is largely plagiarized, echoes can transform the initial message, centered on ciphers, into a different one, concerning foreign tongues. For example, the significance of the Kabbalah for Vigenère, for whom nature is the real cipher to decrypt, is taken up by his cousin Claude Duret (Secret 1959, 1985) but is more or less missing in Colletet’s ‘reading’.

In 1827, the reconfiguration of Vigenère’s knowledge takes place in the marginal notes to the book and it leads to a return to its cryptographic roots. The annotations take several forms. The majority are in English, but some, summarizing the page, are in French (‘le vin, le secret et l’amour’ (wine, secrets and love), Vigenère (1586 [1827]: 12r, 142r) and even in Greek (167r) and Hebrew (21r). Many marginalia are landmarks in the text, probably to allow a quicker rereading (‘loadstone’, or ‘sympathetic alphabet’; 1586 [1827]: 14r and 17r). Some pages seem also to bear marks of exercises, putting into practice some of the methods Vigenère was presenting (for example, the table on f. 250r). This process of appropriation of a book by its reader goes further, when Willes created his own handwritten paratext, with a personal manuscript index

⁸⁹For the moment, we have not found any mention of those annotations in other sources. For example Balsamo and Simonin (2002) mention the copy kept at the Bibliothèque nationale et universitaire de Strasbourg (R 105361; BNF Gallica 2017) but without saying anything about it. On the BNF catalog, the copy is indicated as annotated by the hand of Vigenère like the other one (RES M-V-348). We only offer here a few hypotheses and ideas and we shall come back to this source in a later publication, we hope (see, for example, further developments in our oral paper during the workshop ‘Ecrire/inscrire: écritures plurielles’, Strasbourg, 9th of June 2017 (co-organized by Juliette Deloye et Anne Rauner (ARCHE)): ‘Lectures, recompositions, collages: le *Traité des chiffres* de Blaise de Vigenère (1586) (re)lu en 1827’).

⁹⁰On the importance of cryptography in England, since the seventeenth century, and its connection with composite text as miscellanea, see Smyth (2004: 142).

Page	
46	Tr. Chiffre. Revol. Circulaire de commutation d'Alphabets
95	Table des Lignes (ou Commutations)
134	Mystères du mot. Brevet
180	Omnia et omnia tribus terminantur
181	Labyrinthe; des Echos, Tauxes, Érythres (transposition, échant, échantillon)
200	aaa- aab. aac. aa. bbb- bba
208	A sort of Book Cypher
250	Signification C.
267	New Cypher
307	Arabic
308	Greek
316	Coptic
317	Georgian
319	Egyptian
322	Italian. Ruffini
328	Alphabet de Salomon

Fig. 10.4 Handwritten paratext (a) and “collages” (b) in Francis Willes’ personal copy of Vigenère’s *Traité des chiffres* (Coll. BNU de Strasbourg, R 105361)

and table of contents, replacing the printed original, and thus selecting only the passages that interested him (Fig. 10.4a).⁹¹

⁹¹On the role of marginalia ‘to flag the topics dealt with in the text, to be able to find one’s way back to a particular passage’, see Blair (2003: 17). For another example of a manuscript index,

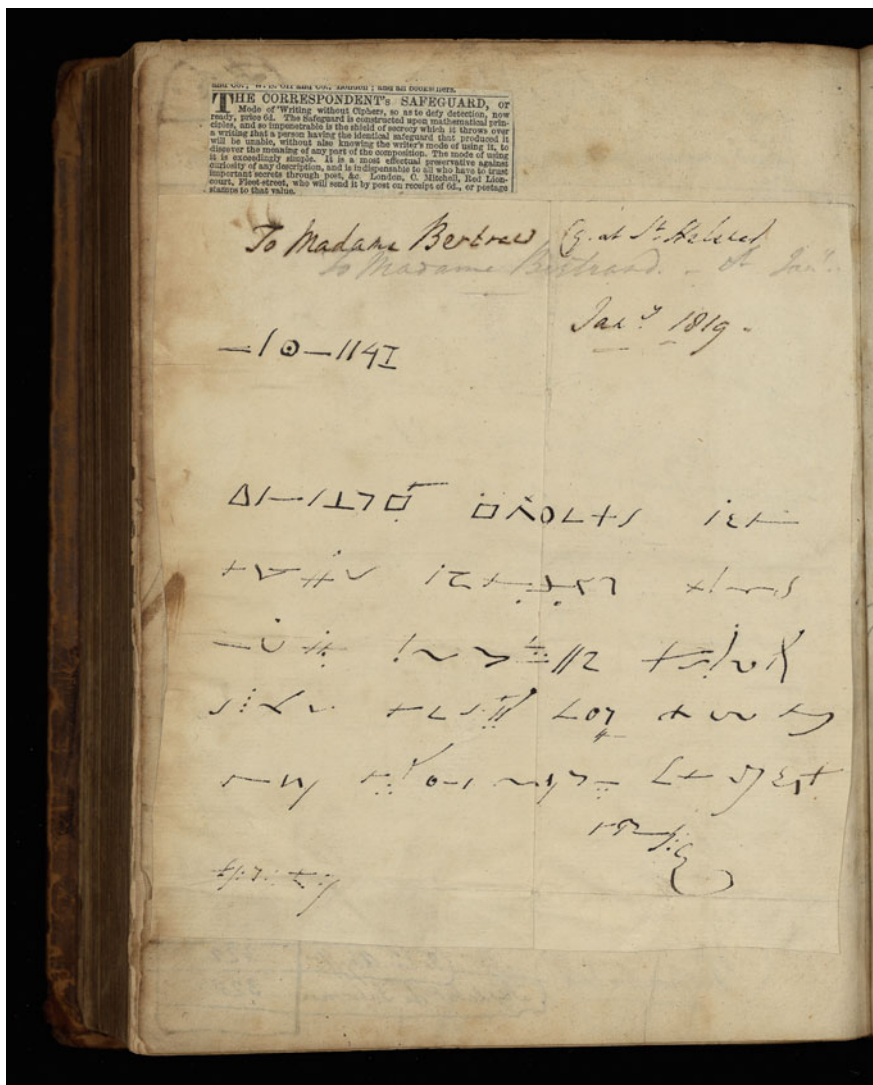


Fig. 10.4 (continued)

It shows that Willes ‘poached’ different aspects of Vigenère’s treatise, notably its concern for the Kabbalah: one of the entries in the personal table of contents leads to f. 95r ‘Table des Ziruphs (on commutations)’. And the title page was already

made, in this case, by an anonymous reader of the 1508 edition of Erasmus’ *Adages* (Aldo Manuzio; copy in the Houghton Library), who numbered the messy original index by common-places and made a new one with rubrics in alphabetical order, see Blair (2008).

inscribed with the word ‘cypher (and the word in Hebrew)/sephar/from saphar humeravit’. But it cohabited with names of sixteenth- and seventeenth-century European rulers (‘1603 K. James I’, ‘Rodolph II Emperor of Germ.’; ‘1589 Hy IV Bourbon’...).

These ‘political’ annotations give us a first small clue to Francis Willes’ social identity. Little is known precisely about him, but his father, Edward (1694–1773), is famous. Bishop of Bath and Wells, and cryptanalyst, he had two careers as an ecclesiastic and as the king’s chief ‘decypherer’. Fluent in Latin, French, Spanish and Swedish, he learned the art of decoding in Oxford, with William Blencowe, Queen Anne’s decypherer, and became decypherer to George I, with a salary of £200 a year, intercepting, for example, pro-Jacobite messages (Marshall 2004). He and his wife, Jane, had four daughters and five sons. Three of the boys helped him in the task of deciphering: Edward (from 1742), Francis (from 1752) and William (from 1758). It is this ‘Francis Willes’ who was in possession, in 1827, of the 1586 book. He is known in particular for having decoded a set of letters for King George III from the Marquis de Lafayette, then in Philadelphia, to France’s Minister of Foreign Affairs, the Count de Vergennes (Kahn 1968: 187–188). In fact, in the 1820s, Francis Willes was the decipherer in charge of the ‘Decyphering Branch’, only helped by his assistant and nephew, the Reverend Mr. William Willes Lovell.

His personal copy of the *Traité des chiffres* bears witness to this status. One of the last blank pages of the volume is transformed into a “collage” (Fig. 10.4b). Vigenère’s treatise, already an assemblage of parts of texts, was completed in the nineteenth century with some final additions. At the top of the page, a paragraph is taken from a newspaper: it is an advertisement for a cryptographic tool, sold as ‘The Correspondent’s Safeguard’ (‘London, C. Mitchell, Red Lion-Court, Fleet Street, who will send it by post...’).⁹² Just below, a letter is glued to the page. It is an encoded note, apparently addressed to a ‘Madame Bertrand (g. at St Helena)’ and dated January 1819. It is probably a message sent, during Napoleon’s captivity in Saint Helena (1815–1821),⁹³ to a member of his entourage there. Fanny Dillon (1785–1836), Comtesse Bertrand, was indeed married to General Bertrand, a faithful friend of Bonaparte. She was a close relation who was even present at Napoleon’s death on 5 May 1821 (Macé 2004).

As a cryptographic handbook, maybe Vigenère’s treatise helped Francis Willes decode this message. As an open space, the printed book possessed by the decipherer to the King of England became a place to collect and “cut and paste” new elements, new data and new samples. Once again, as was the case between humanists of high and low standing (the relationship between Vigenère and

⁹²On a later use of newspaper articles in compilations/collections, collected by hand (for example by Ernst Gehrcke or Georg Grosz) and/or industrialized by a ‘newspaper cutting industry’, see Te Heesen (2008).

⁹³January 1819 was a time of crisis: Napoleon was suffering from a malaise, probably related to the sickness that killed him two years later. Then, in March maybe, he received the news from the Vienna Congress informing him he would never leave St Helena and he wrote the first version of his testament (Chevallier et al. 2005: 55 et seq.).

Colletet), we find a form of ‘diachronic collaboration’ here between specialists in cryptography.

Interestingly enough, one of the other ‘marks’ included in this copy of the *Traité des Chiffres* is located on the back of the front cover: it is the stamp of a museum. Meaning that, apparently, the copy was held for a few years in the collections of the ‘*Schriftmuseum F. Soennecken, Bonn. Abschnitt: Schriftgeschichte; Ordnungs n° 2338*’. Friedrich Soennecken (1848–1919), a German office supplies entrepreneur and an inventor specializing in writing and calligraphy, found a place in his collection, under the section ‘History of Writing’, for the 1586 treatise annotated by Francis Willes.⁹⁴

Conceived from the holdings of collections of languages, in the form of cabinets of curiosities or libraries, the book arrived, in the nineteenth century, in the collection of a museum of writing. A collection of languages inside the collection of languages/writings.

Acknowledgments We would like to thank here Stéphane Schmitt and Karine Chemla for reading of previous versions of this chapter.

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⁹⁴We have no clue, for the moment, how the transfer between Willes and Soennecken took place. We know Soennecken was the author of a pamphlet about writing (Soennecken 1881). More generally, on the treatment of annotated books in modern collections and the value of ‘clean books’ and/or annotated ones, see Sherman (2001).

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