Comparative Oriental Manuscript Studies
An Introduction

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Project Editor

Eugenia Sokolinski

The present volume is the main achievement of the Research Networking Programme 'Comparative Oriental Manuscript Studies', funded by the European Science Foundation in the years 2009–2014. It is the first attempt to introduce a wide audience to the entirety of the manuscript cultures of the Mediterranean East.

The chapters reflect the state of the art in such fields as codicology, palaeography, textual criticism and text editing, cataloguing, and manuscript conservation as applied to a wide array of language traditions including Arabic, Armenian, Avestan, Caucasian Albanian, Christian Palestinian Aramaic, Coptic, Ethiopic, Georgian, Greek, Hebrew, Persian, Slavonic, Syriac, and Turkish.

Seventy-seven scholars from twenty-one countries joined their efforts to produce the handbook. The resulting reference work can be recommended both to scholars and students of classical and oriental studies and to all those involved in manuscript research, digital humanities, and preservation of cultural heritage.

The volume includes maps, illustrations, indexes, and an extensive bibliography.

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Preface

The present introductory handbook on comparative oriental manuscript studies is the main achievement of the Research Networking Programme 'Comparative Oriental Manuscript Studies' (COMSt), funded by the European Science Foundation from June 2009 to May 2014. Within the framework of the five-year programme, several hundred scholars from 'central' as well as 'marginal' fields related to manuscript study and research had the opportunity of exchanging ideas and discussing diverse approaches, looking for common ground and a better understanding of the others' reasons and methodology in manuscript studies: from codicology to palaeography, from textual criticism and scholarly editing to cataloguing as well as conservation and preservation issues, and always taking into account the increasing importance of digital scholarship and the natural sciences.

Out of the larger community of COMSt members and associates, a smaller group of scholars and experts have enthusiastically accepted the challenge of contributing one or more pieces to this handbook, being convinced of the importance of presenting in a compact form not only the state of the art but a coordinated reflection on a wide range of selected themes on comparative manuscript studies. Working together, sometimes in unpredictable grouping constellations, they carried out their task to the best of their abilities. For all this, all those who have *volunteered* to contribute to this enterprise deserve the deepest gratitude.

The handbook is the result of joint and cooperative work both within each of the five Teams of the programme and across the Teams. Each Team was directed and coordinated by a Team-Leader (and in some cases by a Co-Leader) who assumed the major responsibility of the work. The central management of the project was provided by the Project Coordinator in Hamburg, and the general supervision, by an international Steering Committee representing the countries and their respective funding institutions (national research councils and/or academies as well as single universities in some cases) which made the COMSt project possible through the European Science Foundation. They are, in alphabetical order, Belgium, Cyprus, Denmark, France, Germany, Greece, Israel, Italy, the Netherlands, Norway, Slovakia, Sweden, and Switzerland. It has been my honour to chair the Steering Committee since December 2009, when my predecessor and co-applicant for the COMSt project, Siegbert Uhlig, resigned. During the second phase of the project, which was more directly focused on the preparation of the handbook, an Editorial Board composed of the Team Leaders and a few members of the Steering Committee took the most important decisions related to this task. Throughout the project runtime, the organizational umbrella was provided by the European Science Foundation as the funding institution and by its Standing Committee for the Humanities.

Peer reviewing was a major asset of the network. Besides undergoing the obligatory mid-term and final evaluations by the European Science Foundation, the COMSt programme continuously subjected itself to an internal review process. It is now time to face a more crucial trial, namely the verdict of our readers as to whether the cooperative and comparative approach is indeed so sound, fruitful and useful that it might set standards for future research. What is certain even now is that many people who have taken part in COMSt share the feeling that the scholarly and human experience acquired during this project will last a long time.

Some explanation is due to the larger community of all those who have participated in COMSt activities in the last few years on how the work was actually conducted. We may certainly state that neither the Steering Committee nor the Editorial Board have ever reduced 'formalities' in the technical sense to 'simple formalities'. In projects such as COMSt, formalities are matters of substance indeed, and they were approached accordingly. Every application for a workshop or a travel grant, report, minutes, every draft submitted for the present volume, all were openly and thoroughly discussed, without any pre-determined result. There may be projects where any question is settled in a two-minute discussion, or even without any discussion at all. In the case of COMSt, this was never the case—even if in some cases this might have caused some inconvenience. True collegiality—sharing responsibilities, the search for unanimity wherever possible or at least for widely shared compromises, without concealing divergences and open questions—has always been the leading work principle in COMSt.

The community of scholars that cooperated in the Comparative Oriental Manuscript Studies Research Networking Programme was inspired right from the beginning by the common expectation that an agreed approach can provide a significant contribution to progress in manuscript research, both on a general, interdisciplinary level and with regard to the individual disciplines of manuscript book culture; this community has therefore volunteered to accomplish a common task deemed important and urgent. The academic backgrounds of the COMSt members are different but, along with their respective differences and various ideas and attitudes, they have shared some basic convictions, which in some cases were challenged or looked upon in a new or different light in the course of these years. The intensive activity of exchanging ideas, experiences and points of view has eventually served to create a common language and to focus on the topics that were selected as relevant and crucial in the comparative perspective. The many core-points where the practice of the COMSt activity and interchange deployed its fruitful results with regard to achievements and contents, reveal themselves in the chapters of the present manual.

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Not only do COMSt associates come from different nationalities and research disciplines, they differ also in regard to their formal academic role and status: there are full professors, *professores emeriti*, even *honoris causa laureati*, members of venerable academies, side by side with young emerging researchers, as well as non-academic professionals who mostly work outside the narrower university circles. As a result, new ideas and research concepts have been developed by many, if not all, participants and contributors. Moreover, some of the early stage researchers involved may even have acquired better career chances thanks to their active participation and to the contacts established through the programme.

The differences regarded also the degree of challenge involved, even for people with the same or similar academic status. For some of them, being involved in a project with a comparative perspective of this type may have been just one more among many contributions already delivered within the framework of international and cooperative endeavours. This is true for all those whose discipline was well advanced before in terms of available handbooks, comprehensive syntheses, introductory works, as well as methodological standardization, or first-hand work carried out in the field—for example, some codicologists who were in the forefront of our work, and generally participants coming from fields with a stronger methodological orientation. For them, contributing might have meant mainly a question of selection, or of putting new accents and fine-tuning. For those who best interpreted their project role, the COMSt project was another intriguing challenge. Others, however, had to start from next to nothing in some cases, building upon scant information available only in less accessible languages, or upon very elementary previous research, or working with a highly restricted profile and with special linguistic prerequisites. The COMSt undertaking was anything but a minor task. Contributing to this endeavour meant the collecting of data scattered across a number of publications and selecting and narrowing down all essential data to a concise synthesis, in a clear and comprehensible form of presentation and, what was even more crucial, in a comparative perspective. In many cases this implied undertaking first-hand research *ad hoc*, starting from catalogues or, in some cases, from the manuscripts themselves, sometimes even from still unexplored collections requiring hard field work.

Another important factor to be considered was the need, agreed by the members, to produce an introductory handbook that could be used by a wide audience, by students as well as by established scholars on manuscripts in different fields looking for reliable and up-to-date information. The profile of the handbook therefore remains that of a didactic and elementary work, with the ambition to cover, with a consistency and coherence never attempted before, the whole spectrum of manuscript cultures envisaged by COMSt (see below for this). Starting from the example of some comprehensive comparative handbooks of the last decade, each one with its own merits (for example Maniaci 2002a; Agati 2003; Géhin 2005; Agati 2009), our intention was to go beyond them in focusing on oriental manuscript cultures in an unrestricted perspective, where the consideration of 'materiality' is not intentionally regarded as opposed or detrimental or alternative to textual investigation, and vice versa, and where everything is put at the service of a better 'understanding' of manuscript cultures (including the textual heritage they carry).

This handbook is neither intended to be exclusively a *Nachschlagewerk* nor a *Sachlexikon* nor an *Encyclopaedia*. Articulated in chapters, it still aims at being, especially in its introductory sections, a book that can be read from the beginning to the end. As we all well know from our own experience, it is anything but a simple task to avoid specialisms and, at the same time, not to miss the most essential data. Since the very beginning of our work, we have attempted not to include and consider in our handbook every single detail for every manuscript culture considered, but only and precisely those which appeared important in the light of our comparative (or even contrastive) perspective, aiming at a comparison against a vast and various background.

Thinking more broadly, our project was also a serious attempt to defend and preserve the COMSt-related fields within the academic world. We know that disciplines and fields are often determined and justified by the mere existence of an easily accessible handbook or, in the better cases, sets of handbooks, textbooks, series and journals. The lack of comprehensive introductory works which are reliable, up-to-date, of broad interest and accessible to a wide audience and might be used in teaching, has a direct impact on the survival of the 'small subjects' most of the COMSt-related disciplines pertain to. The decision to make the COMSt handbook freely accessible online and printable on demand in a paper version at an affordable price was strategic in this respect, and not just meant to meet the prescriptions of the European Science Foundation. We deliberately declined to produce an extremely expensive work that might be bought only by a few libraries and research institutions; on the other hand, a plain electronic edition only to be accessed and downloaded as a PDF file was not regarded as a desirable solution either. Dealing with two millennia of manuscripts and codices, we did not want to dismiss the possibility of circulating a real book in our turn.

It remains, hopefully, only to say,

Lector intende: laetaberis.

Alessandro Bausi

Acknowledgements

There are many persons and institutions who must be thanked for their work in the COMSt project, including people who advised early in the application phase. The first is Siegbert Uhlig, who was the main applicant in the earliest phase of the project, doing everything to prepare and submit a successful application. He also acted at the very beginning as the Chair of the Steering Committee. At the very beginning, and in all subsequent phases of the project, in her new capacity of COMSt Coordinator, Eugenia Sokolinski displayed her skills and dedication: she must be deeply thanked for her competence in all matters of the managing of the project, from practical organization to the redaction of minutes, reports and budget planning, and for editing and typesetting all COMSt publications, including all the issues of the *COMSt Newsletter* as well as this handbook.

Some of the COMSt members volunteered beyond the limit of their individual contributions to the manual. Besides the general and chapter editors, the language tradition editors Bernard Outtier and Lara Sels deserve a particular mention. I am deeply grateful to Stephen Emmel and Ralph Cleminson for the thorough English language revision and to Sever Voicu for the control of the final bibliography to this volume. I would also like to thank Cristina Vertan for setting up the bibliographic database and Sophia Dege for her assistance in the consistency checking of the bibliography.

Several European Science Foundation science and administrative officers helped us in keeping fruitful relationships with the funding institution, at times when restriction of funding also caused serious inconveniences and disappointment. We would like to thank in particular the administrative officers Madelise Blumenroeder and Marie-Laure Schneider and the science officers Arianna Ciula, Barry Dixon, Rifka Weehuizen and Etienne Franchineau. In particular, Arianna Ciula played a special role from the very beginning of the network, and her involvement lasted beyond her employment with the European Science Foundation.

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Of these institutions, the University of Hamburg must be thanked in particular, since it not only supported the programme financially, contributing the missing sum necessary to launch the programme back in 2009, but it also provided the headquarters, offering offices for the Chair and the Coordinator, server space for the web applications as well as logistic support in the organization of the two major programme conferences (the Launching in 2009 and the Final in 2014).

I have certainly forgotten or unwittingly omitted too many important points, and for this I sincerely apologize.

Alessandro Bausi

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Notes to the reader

A series of editorial choices have shaped the present handbook. While most are clear and transparent, some may need explanation.

The language of the book is British English, in the standard suggested by the *New Oxford Style Manual* (Oxford: Oxford University Press, third impression, 2012). The style is reflected in the orthography (including capitalization) and punctuation throughout the volume.

Some exceptions to the Oxford style have been necessary. A notable exception is the bibliographic format: for the sake of clarity and economy, we have adopted the author–date referencing method in the text; the works cited are listed alphabetically by author in the general bibliography at the end of the volume. For works with three or more authors, citations have been abbreviated to the name of the first author followed by ʻet al.ʼ; in the final bibliography, the names of the co-authors are provided between a pair of curly brackets. In order to keep works by the same author together in the bibliography, the spelling of names has been standardized, with the variants provided in square brackets. Authors bearing the same surname appear separately in the final bibliography; in order to help the readers identify the right title, the initial or, if this is not sufficient for the disambiguation, an abbreviation of the first name is supplied after the surname whenever the work is cited in the handbook.

In order to increase the readability of the volume, and underline its handbook character, it has been decided not to use footnotes, with the exception of acknowledgements at the beginning of some chapters or sections. Usability was also the reason behind the decision to keep the number of abbreviations to a minimum; the list of abbreviations used can be found on p. xxi. Practical use is further facilitated by a number of internal cross-references to paragraphs or chapters within the handbook.

The authors and editors have tried hard to illustrate aspects that may be difficult to put in words by appropriate figures and tables. The overwhelming majority of images in this volume are previously unpublished. The illustrations are numbered continuously, the designation always beginning with the number of the chapter and the subchapter in which the figure is to be found (for example the first figure in Chapter 1, subchapter 9, is referred to as fig. 1.9.1, etc.). The maps showing the approximate extent of the individual manuscript traditions in the General introduction § 3 are numbered continuously as Map 1, Map 2, etc. A list of all figures, tables, and maps is included on p. xxiii.

The readers are further assisted by the indexes of languages and traditions, place names, persons and works, institutions and projects, and manuscripts and manuscript collections. The general index concludes the volume.

Abbreviations

AG	Georgian era	fig. (figs.)	figure(s)
AH	*anno Hegirae*	i.e.	*id est*, that is
BCE	Before Common Era	l. (ll.)	line(s)
c.	circa	lit.	literally
C	Celsius (degrees centigrade)	m	metre(s)
CE	Common Era	mm	millimetre(s)
Ch.	Chapter	MS (MSS)	manuscript(s)
cf.	confer	n. (nn.)	note(s)
cm	centimetre(s)	nm	nanometre(s)
cp.	compare	no. (nos.)	number(s)
d.	died	p. (pp.)	page(s)
ed.	editor, edited	pl. (pls)	plate(s)
e.g.	*exempli gratia*, for example	r	*recto*
et al.	*et alii*, and others	š.	*Šamsī* (solar Hegira)
etc.	*et cetera*, and so on	v	*verso*
f. (ff.)	folium (folia)	vs.	versus

For the abbreviations of the names of contributors see Copyright page.
For the abbreviations of libraries and collections, see Indexes: Collections and manuscripts.

Tables, figures, and maps

Maps

(Unless specified otherwise, the schematic maps in the General introduction show the places mentioned in the text as well as some other sites considered relevant by the authors and the editors of the Handbook)

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Introduction

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Chapter 5

General introduction

edited by Alessandro Bausi and Jost Gippert[*]

1. Scope of COMSt (ABa)

1.1. The background of COMSt

Work with manuscripts in both an academic, i.e. scholarly, and a non-academic context involves a huge number of aspects to be considered. It has not been a goal of the COMSt project to work on a theoretical definition of the *manuscript*, namely to define *what a manuscript is*. Instead of such a theoretical and comparative typological approach, the object of COMSt was, right from the beginning, *manuscript studies* as a conglomeration of already existing disciplines spread among various fields that were to be put in dialogue with each other. For the sake of convenience, a recent definition might be provided as a starting point here, according to which a 'book' is 'a transportable object intended for hosting, sharing and transmitting immediately readable contents in an ordered and lasting way' (Andrist et al. 2013, 46, my translation). The focus of the COMSt handbook, however, is on a peculiar subtype of the 'book', namely *handwritten book forms* of the *codex* area, including the horizontal and vertical roll and rotulus, all of them seen in their historical development *in a definite historical and geographical area* here styled 'oriental' (see below). Other types of handwritten artefacts that are often subsumed under the term 'manuscript'—such as *ostraca* or inscriptions on other solid or soft supports—are considered and mentioned only in cases where they overlap to some extent in use and function with codex-like book forms in a given manuscript culture (typically in the case of the Coptic manuscript culture (see Ch. 1 § 5.1) and, in general, that of papyrology (see Ch. 3 § 3.16), where *ostraca* are rightly assimilable to manuscripts).

Some basic principles and shared assumptions of COMSt should be introduced here.

(1) COMSt deals with manuscripts as intellectual products of written cultures in the ancient, mediaeval and pre-modern period, before the introduction of printing; it considers manuscripts as products of literary activity, as opposed, as a rule, to purely archival or documentary materials.

(2) COMSt deals with manuscripts written in less-taught languages that are mostly considered ancillary, or somehow exotic in the present-day academic landscape of Europe (with the exception of Greek, for reasons that will be explained below); they are opposed to and compared with:

(a) languages or clusters of languages which by themselves define disciplinary fields (typically, the classical languages and literatures, namely Greek and Latin, the Romance languages and literatures, the Germanic languages and literatures, the Mediaeval Latin language and literature, and so on);

(b) mainstream disciplines and fields which are not defined linguistically, yet traditionally related to some linguistic spheres, even where this is not explicitly declared, as in the cases of codicology and palaeography, which are mainly and usually associated in the European academic environment with Greek, Latin, or Mediaeval European languages and literatures, with a focus thus limited from the very beginning to manuscripts from precise areas. These mainstream fields (either linguistically or methodologically oriented) can look back upon a long tradition of research and standard practices manifesting themselves in a number of handbooks, series, journals, scholarly tools, and scholarly associations: for most of the disciplines in the COMSt spectrum, such an infrastructure is not yet available.

(3) COMSt deals with manuscripts not only as testimonies of the history of a literate civilization, objects of textual criticism, or cataloguing. They can also be the object of scholarly interest independently of their linguistic domain, in particular when we speak of material (physical, chemical, biological) and digital analysis, as well as conservation, preservation, and restoration.

(4) COMSt does not focus on the contents as such, even if the textual and figurative constituents are in most cases—yet not always—the ultimate reason for the emergence of a manuscript. Contents have been considered only insofar as they were strictly functional, to illustrate issues concerning codicology, principles of text editing, cataloguing, conservation, preservation and restoration. To deal with the contents of the texts would have meant dealing with the unmanageable mass of knowledge

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transmitted in the manuscripts, that is of the entire knowledge of a good portion of the ancient, mediaeval and pre-modern cultures of the world. At the same time, limiting the content to be considered to pictorial matters would not be justifiable either, since this is subject of yet another well-defined discipline, namely art history.

As mentioned above, most of the COMSt disciplines have not (yet) reached the recognition of the 'major' fields. Besides, it is anything but easy to overcome the confines of many national or even European and Occidental scholarly traditions, especially in some fields where the echo of harsh debates is still heard. Just to give an example, in textual criticism, the trend towards a 'New Philology' was initially accepted enthusiastically in the United States and France (where Bernard Cerquiglini's *Éloge de la variante*, 1989, was considered a milestone in the field). While much less popular in those countries now, and considered largely irrelevant—superfluous and misleading—in many others (e.g. Italy), this trend has been still attracting adepts in Germany in recent years (as an understandable reaction to a sort of divinization of the 'old' *Philologie*) and in the countries that are relatively new to the field of philology in general.

The same can be said of the varying and asymmetric constellations in which the minor COMSt-relevant fields are accommodated within the narrow academic scene of Europe. Some find themselves within (Christian) theology—with religious history, biblical (Old and New Testament) criticism, and patristic studies—or classical studies, with an 'extended' look at one or more parallel oriental traditions (for example, Syriac, as already in the case of some of the greatest philologists of the twentieth century, such as Eduard Schwartz or Wilhelm Frankenberg, the editor of the Syriac *Pseudo-Clementines*, who used to retrovert Syriac into Greek; also Coptic, Armenian, and other languages, all the more after the explosion of Late Antique studies in the last decades). Some are addressed within general Islamic studies and history, including Arabic, Persian and Turkish literature. Some are at times accommodated within comparative linguistics, in particular Afro-Asiatic (for the Semitic and Coptic traditions), Indo-European (for the Armenian, Slavonic or Iranian languages), Altaic (for Turkic), and Kartvelian studies (for Georgian); they can also be found as particular area studies; subfields of comparative literature; mediaeval history, etc.

To try to overcome the barriers between the disciplines and the various scholarly traditions was among the most prominent tasks of the COMSt programme. It meant comparing the methods used and, eventually, seeking a shared approach, taking into very serious consideration the achievements of the mainstream disciplines, but also giving due importance to the specifically 'oriental' features wherever these became apparent.

1.2. The notion of 'oriental' in the COMSt perspective

The first and most engaging aspect that has been used to identify 'oriental' fields of research is definitely the languages involved. We may state with conviction that there is practically no 'oriental' study imaginable that is not multilingual, and therefore multilingualism is in a way consubstantial with 'oriental studies'. However, this is not necessarily true for 'oriental' manuscript and textual traditions in themselves.

In her recent book, *German Orientalism in the Age of Empire* (a well-informed book indeed, yet not from the point of view of oriental studies, but much more from that of the history of European culture), Suzanne L. Marchand (2009, xxiii) defines Orientalism as a '*set of practices* that were bound up with Central European institutional settings in which the sustained and serious study of the languages, histories, and cultures of Asia took place'. Taking this definition as a basis, the determining feature of an 'orientalist' is—at least historically—to be able to read texts of a culture from Asia (extending to other regions and areas assimilated to it, typically the whole Islamic World, including Egypt, North Africa, and Ethiopia), in the original language.

The definition of what is 'oriental' in the view of COMSt was obviously among the tasks of the project, but it pertained by necessity also to its very preliminary choices, and the ongoing activities of the project have in fact positively contributed to the point. 'Oriental' in the COMSt perspective actually embraces *all non-Occidental (non-Latin-based) manuscript cultures which have an immediate historical ('genetic') relationship with the Mediterranean codex area*. This definition first excludes all East-Asian manuscript cultures, which are also 'oriental' in a broader sense but which do not share the relationship with the Mediterranean codex area. As a working definition, this delimitation geographically largely corresponds to an alternative one which builds upon the concept of the *area of monotheistic cultures* (Jewish, Christian, and

Islamic). However, the ancient Near Eastern and classical civilizations, especially the Graeco-Roman one, have played a decisive role in the *uninterrupted development of manuscript cultures manifesting themselves in a Mediterranean 'codex area'*, and in this respect, the former definition appears by far superior, all the more since it stresses the basically and intrinsically historical character—be it of structural codicology, textual criticism, or comparative scientific analysis—of all research on manuscripts.

Members of the COMSt community are well aware that the delimitation and selection of an area of study focusing on 'oriental codex cultures' defined as above still remains arbitrary, at least to some extent. More than the exclusion of non-related Central and East Asian manuscript cultures, which has mainly typological implications, the main limitation of this choice consists in the disregarding of the Ancient Near Eastern civilizations, notably the Ancient Egyptian and the cuneiform script cultures, which are nevertheless crucial to understanding the origin of practices still observable in the 'codex cultures'. An example here can be the phenomenon of the colophon, not to mention the impressive results that the application of text-critical 'genealogical' principles to cuneiform texts has brought about recently (see Worthington 2012 on Akkadian textual criticism).

The delimitation of the COMSt focus area has had a substantial consequence: it has distinguished the COMSt enterprise from other 'manuscriptological' projects and research initiatives which pursue more theoretical issues that are inspired by the necessity, in their case unavoidable, of a more typologically than historically oriented comparison. The specific ambition of the COMSt network has been to demonstrate that a strict cooperation between comparative typological and historical approaches can uniquely enhance our understanding of the cultures involved and the relevant phenomena—in terms of codicology, textual criticism, cataloguing, preservation and conservation practices, and, across all these different fields, of digital and technical approaches—and thus establish a sounder basis for an eventual broader comparative perspective.

The geographical and cultural spectrum of COMSt embraces the Greek manuscript culture, from Classical Antiquity down to the Late Byzantine period, as one of the main cultures that were responsible for the emergence and the further development of the codex in Graeco-Roman times and in Late Antiquity, but also in consideration of the quality of the evidence it provides in continuous documentation, starting with papyri and *ostraca*, and of the unparalleled cultural interconnexions it has always had with most of the other manuscript cultures considered. As a matter of fact, all other COMSt-related manuscript cultures have a relation to Greek, manifesting itself in translations from and/or into Greek. What is more, Greek is also essential in terms of the methodology applied and of the scholarly work carried out in manuscript studies. This is true not only for recent developments in codicology, but even more so for the centuries-long expertise in textual criticism, the very invention of palaeography as an autonomous discipline three centuries ago (at the time basically including what is styled codicology today), and the development of scientific practices of cataloguing. It is true that the scholarly work on Latin and western European manuscript traditions offers no lower standard, but it was not considered in COMSt in consideration of its vastness and because, to some extent, its link to the 'oriental' cultures is weaker and more indirect. However, dialogue with specialists in the field was continuously entertained by the COMSt network, and some of the sections take the 'western' studies into consideration.

For evident reasons, the study of the Hebrew manuscript culture, one of the major manuscript cultures that adopted the codex book form at a certain time, has likewise been central for COMSt; not only because it pervaded at large the Mediterranean area and beyond, into Occidental Europe to the North, to Yemen southward, and to Iran eastward, but also because of its exceptional and huge interrelationship with the Graeco-Roman culture and with the Christian and the Islamic civilizations, and moreover, because of the exceptionally high state of the art in the field of codicology it has achieved (Beit-Arié 2014).

The Arabic manuscript cultures, meaning the manuscript cultures that use Arabic characters in writing—Arabic, Turkish, Persian, and the large spectrum of *ʿağamī* literate civilizations—provide by far the largest amount of manuscripts covered by the COMSt spectrum, also embracing the largest geographical area, which extends well beyond the Mediterranean area. It is not only its central place and its vastness, but also its comprehensiveness, the hegemonic role it played for many centuries in the 'Orient' above almost all other manuscript cultures here considered, and the quality, variety and importance of the relevant scholarly tradition that makes it one more major domain in COMSt (see Gacek 2001; Déroche 2006; Gacek 2009; Déroche – Sagaria Rossi 2012).

The Zoroastrian and Manichaean manuscript cultures represented by Avestan, Middle Persian, Parthian, Sogdian, and other mostly Iranian-speaking traditions, are a peculiar case in that they illustrate the easternmost diffusion of the codex book form towards India and Central Asia, with a scholarly tradition that has remained extremely specialized. In accordance with the relative scarcity of relevant materials, they have only been touched upon casually in the present handbook.

The remaining oriental manuscript cultures considered in this handbook are part of a consistent, even though very varied field in terms of languages, scripts, typology of contents, quantity of manuscripts, chronological distribution, and state of the art, which may be subsumed under the heading of the 'Christian Orient'. Traditionally, Greek is also included (*ex professo* or *de facto*) in this area. The Slavonic manuscript culture holds a place of its own in it, due to its strict relationship to the Byzantine civilization. Within this group, we may distinguish various clusters: a Syro-Palestinian one (including Syriac and Palestinian Aramaic, often in close connexion with Hebrew and Jewish Aramaic manuscript cultures, later continued by Christian Arabic), an Egyptian one (including Coptic, Nubian, too scarcely attested to be considered *in extenso* in our handbook, again Christian Arabic and Ethiopic), and a Caucasian one (with Armenian, Georgian, and Caucasian Albanian, the latter attested only in palimpsest form). The Christian Oriental tradition is indeed one for which we have extensive studies that might be considered 'comparative' (with investigations into parallel literary, liturgical, or church historical traditions across several languages), but, to be honest, there is still very little and very poor methodological consistency in these studies, especially as far as the editorial practices are concerned (in the series *Patrologia Orientalis* and *Corpus Scriptorum Christianorum Orientalium*; in several journals, the *Revue de l'Orient Chrétien*, *Oriens Christianus*, *Le Muséon* etc.; and in introductory works such as Assfalg – Krüger 1975; Albert et al. 1993; see also Ch. 3 §§ 1.3B and 3.17). This situation has partially changed only in the last years, with a new editorial policy in some of the most important series (notably, the *Corpus Scriptorum Christianorum Orientalium*) and some important projects in specific fields; we may quote, for example, the editorial activity carried out in the field of Christian Apocrypha by the AELAC (Association pour l'étude de la littérature apocryphe chrétienne), which has introduced a systematic consideration of all available manuscript witnesses to the texts considered, from Western European languages to Sogdian.

1.3. Oriental studies and the role of 'orientalism'

A history of oriental manuscript studies has not yet been sketched from the inside so far, or only very partially, at least in the perspective of the methodologies and critical approaches the COMSt project has tried to apply. However, when talking of current practices, especially in text editing and cataloguing, we will immediately realize that a whole range of orientations and choices—arbitrary at times and often completely divergent for the different fields—can only be explained by looking at the history of the research in the respective fields.

The work in COMSt, to everyone's surprise, has revealed that the perception of what is the 'normal' approach in a given field (for example, in the case of cataloguing practices) is often a matter of dispute. For many people, the 'normal approach' is simply the one they regard as 'the only possible one'; this, however, may be very different in its contents and its methodology for each field. Comparing the various 'normal approaches' has revealed the huge range of methodological differences between the individual disciplines within oriental studies and has resulted in questions such as 'what should be introduced into my own field that is normal in others?' or 'why have the 'normal' approaches of others been so far ignored in my own field?' The different 'normal' approaches are often unconnected with each other, being the result of early choices and traditions no longer scrutinized today, rather than the effect of continuous reasoning. This sound criticism should always be preferred to thinking that there is only one way (I am thinking for example of text editing) and to looking for a 'unique solution' (for example a fixed, immovable set of 'fields' to be filled in in cataloguing). Conversely, in keeping with the comparative approach, similar cases evidenced in other disciplines and fields should not be considered in principle as unrelated ones for which something new and unique must be invented every time, and no single problem can be solved with a vague 'good sense'.

If we try to have a general view of the development of oriental studies, from the perspective of how this term has been and still is used in the academic occidental environment, we may distinguish the following features.

(a) The so-called *philologia sacra* ultimately rooted in ancient Hellenistic philology, through the example of Origen and his *Hexapla* (see Ch. 3 § 3.21) obviously made no distinction whatsoever between 'oriental' and 'non-oriental' texts and manuscripts, since no such distinction existed. This functional consideration of the material evidence to be used for the study of the divine revelation, characterized by a strict interrelationship between classical philology and oriental studies, has somehow remained—with all possible caution—a continuum up to the present day in the western scholarly tradition. Relying on a knowledge deriving from pilgrimages, crusades, long-distance trade (Marco Polo) or legendary travels (John Mandeville), the Orient was located before the modern age in the Ancient and Near East, as the birthplace of some of the most important world religions and religious texts. Some cases remain exceptional, such as that of the Florentine Riccoldo da Monte di Croce (*c.*1243–1320), who learnt Arabic, visited the Orient (Baghdad around 1290), and also authored a detailed analysis of the Qurʾān based on the Arabic text. On the eve of modernity this interest was renewed with the flowering of Greek studies, when Europe was invaded by a flood of Greek as well as oriental manuscripts after the fall of Byzantium (1453). Before the Renaissance, already during early Humanism, the knowledge of Hebrew, besides Latin and Greek (consider Giannozzo Manetti, 1396–1459), sometimes also of Aramaic and Arabic (Giovanni Pico della Mirandola, 1463–1494), was not a rare exception but something envisaged by the scholarly and humanistic ideal of the *vir trilinguis*. In addition, the role played by the Jewish as well as by the Christian oriental communities at the pilgrimage sites and even in Europe must not be underestimated. For example, the Ethiopian community in Rome played a decisive role in the development of Ethiopian studies, and the ecumenical councils of the west which saw the participation of oriental delegations, such as the Council of Basle–Ferrara–Florence of 1431–1445 promoted the interest in the east. This went together with the curiosity and interest in the 'oriental face' of the syncretistic traditions of Late Antiquity and the appreciation of Jewish cabalistic traditions, Hermetism, Egyptian and neo-Platonic traditions, as they were perceived at the time. But even earlier, for example in Spain, the relationships of Arabic-speaking, Jewish and Romance communities gave birth to a variety of contacts and exchanges, the importance of which must not be disregarded. Translations from Arabic into Hebrew, from Hebrew into Spanish, from Spanish into Latin, and so on were often the way through which lost Greek texts, once translated into Arabic, survived and were circulated (see Ch. 3 § 3.18). (For a first elementary sketch of the forerunners of oriental studies in Europe, see at least Richard [J.] 2001, and for Italy some of the essays included in Spina 2013, 9–20, preface by Franco Cardini, and Galletti 2013).

(b) The early modern period, with a broadening of the concept of the 'Orient' beyond the Near Eastern biblical horizon (see Irwin 2006), still kept the same interest in *philologia sacra* unchanged. Humanists and scholars such as Guillaume Postel (1510–1581), Josephus Justus Scaliger (1540–1609), Giovanni Battista Raimondi (1536–1614), the brothers Giambattista (d.1619) and Girolamo Vecchietti (d. after 1635) or Nicolas-Claude Fabri de Peiresc (1580–1637), or later Hiob Ludolf (1624–1704) had strong interests in the oriental cultures, and some of them in oriental manuscripts in particular (Scaliger's manuscripts are preserved in Leiden University Library; Peiresc tried, in vain, till the last days of his life, to acquire a copy of the Ethiopic *Book of Enoch*; and Ludolf tried to acquire Ethiopic manuscripts through his pupil Johann Michael Wansleben, who failed then, yet succeeded later in providing Jean-Baptiste Colbert with hundreds of Greek and oriental manuscripts, which are now kept in the Bibliothèque nationale de France). Frequently they relied on Levantines who supplied them with oriental manuscripts and information on the Orient. The situation did not change with the Protestant and Catholic Reformations, quite the opposite (see Wilkinson 2007a): the study of the Bible became even more important and it had to be done in the original language in Protestant Churches, thus being a continuous source of impetus to oriental studies. Hebrew was completely integrated into biblical scholarship. The sixteenth and the seventeenth centuries are also the period of the absolutely remarkable intellectual, technical and editorial enterprises of the polyglot Bibles (from 1514 to 1657; see Wilkinson 2007b).

(c) On the other hand, political events and other factors (for example, the missionary activity in the Orient by the Jesuits) strongly contributed to the condescending view characterizing Islam in derogatory terms, even though in the sixteenth and seventeenth centuries there are still several examples of Arabic being considered a key instrument to access Greek mathematics, as appears from the numbers of miscellaneous manuscripts preserved, not a few from a Jewish milieu, containing mediaeval translations; and the edition (1663) by Edward Pococke (1604–1691) of the *Taʾrīḫ muḫtaṣar al-duwal* by Ibn al-ʿIbrī shows the interest in Arabic as a source for historical research, with the paradoxical result that the first ever

printed Arabic historiographical work is one authored by a Christian. It was only in the second half of the eighteenth century, with the gradual decrease of the power of the 'Turks', that a more scientific and less suspicious interest in Islam grew (it is needless to mention the importance of Galland's 'translation' of the *Thousand and One Nights*, 1704–1717). Yet, Arabic still tended to be considered an auxiliary language for theology (biblical and Christian studies), since this language had for centuries mainly been cultivated for Christian theological interests and selected manuscripts had been acquired for European collections accordingly (on Arabic studies in England, see Toomer 1996).

(d) The Age of Enlightenment saw the discovery of further oriental cultures, mostly the Indian, with the publications of the first Indian texts in the late eighteenth century by William Jones (1746–1794). The growing interest in Far Eastern cultures provoked a diminution of interest in the Near East; in particular, the interest in Islam, perceived as a 'late', definitely not an '*Ur*-culture', decreased, while the charm and fascination of ancient civilizations still grew.

(e) The institutionalization of oriental studies, at least at some European universities (in Germany at Göttingen, for example), also dates from the last decades of the eighteenth century. It happened in close connexion with the extraordinary development of classical philology, and still within the framework of Old Testament and generally biblical criticism. Theology still kept all its importance for oriental studies, and theologians, for example in the Protestant tradition, had to learn Greek and Hebrew. Besides the interest in the biblical text, the interest in ancient Judaism played a major role in keeping this ultimately humanistic Christian oriental tradition alive.

(f) It is extremely important to observe that it is from within this tradition that those philological and text-critical innovations emerged that provoked—applied to the text of the New Testament—a revolution in philological studies. Johann Albrecht Bengel (1687–1752) tried to establish a relationship between the manuscripts on the basis of similar readings. He did not yet distinguish between errors and correct readings; he did realize, however, that it is the majority of the families that is important, and that the authenticity of a reading is proved by the agreement of codices of different families. Johann Jacob Wettstein (1693–1754) claimed that it was important to use the codices and not the *textus receptus*, that is the Greek text of the New Testament as first established by Erasmus and then accepted by the Protestant Churches, even in minor details. He did not understand the criterion of the majority of the families but preferred, like Bengel, the use of internal criteria, and only when two readings were equivalent, he turned to the codices—unlike Karl Lachmann (1793–1851), who used *iudicium* only when two readings had the same authority. Johann Salomo Semler (1725–1791) distinguished between the external and internal age (*äusserliches* and *inneres Alter*) of a reading. Johann Jacob Griesbach (1745–1812) summarized what his predecessors had proposed.

(g) We may say that up to the end of the eighteenth century most of the orientalists working and dealing with manuscripts had shared substantially the same methods and approaches as were used in classical philology: orientalists and classicists belonged to the same academic milieu and their attitudes overlapped at large. Between the last decades of the eighteenth century, still in the Age of Enlightenment, and the mid-nineteenth century, a text-critical method emerged in classical studies; this is the reconstructive method connected with the name of Lachmann. A century earlier, Johann August Ernesti (1707–1781) and, above all, Friedrich August Wolf (1759–1824) had already taken systematic recourse to manuscript witnesses for their philological work, and it was Wolf who stressed the unparalleled superiority of classical, and Greek philology in particular, as the best way to interpret humanistic culture, and who consistently disparaged the importance of the *philologia sacra*. As a result, philological studies focused exclusively on classical Greek, and oriental studies still followed their own traditional way, in theological studies or biblical criticism, or even, at the other end, in the current of a more explicitly 'orientalist' approach in the Saidian sense. It is important to remark here that a great deal of oriental studies was completely underestimated by Edward Said in his celebrated, yet misleading and definitely one-sided analysis of European orientalism, the birth of which he locates in the age of Imperialism (see Said 1978) and which he substantially restricts to British and French orientalism. Mallette (2010) has provided a completely new perspective on orientalism from a Mediterranean perspective, with much stronger consideration of the phenomena of interchange and cultural continuity in the Mediterranean basin, where, for example, such figures as the scholar and colonialist Enrico Cerulli (1898–1988), who animated the intellectual debate on cross-Mediterranean cultural interconnexions and relationships for fifty years, is portrayed as one of the most emblematic figures (see also Fiaccadori 2011).

Still in the nineteenth century, while classical philology became more and more elaborate, oriental studies tended to become weaker and gradually less up-to-date and less methodologically oriented, since the mainstream was dictated now by classical and particularly Greek studies, as Marchand (2009, 73) states:

> In the early modern period, oriental philologists had pioneered many of these text-critical skills, but nineteenth-century orientalists almost by definition could not concentrate on one language; nor could they secularize their field with equal alacrity.

The end of the eighteenth century—*c.*1780—is the period to which the beginning of scientific secularized oriental studies is usually fixed, but also exactly the period when oriental studies ceased to follow the development of the mainstream humanistic disciplines. We may say that this was also due to some intrinsic features of the respective fields. Classical studies were based upon an intensive scholarly tradition extending over several centuries, with a huge number of printed editions of texts, where often manuscripts did not play the most important role in editing (yet this was again one of the important contributions by Wolf and Lachmann). Besides, the needs of oriental studies were completely different, the majority of texts remaining unpublished (somewhat similar to mediaeval Latin and Byzantine studies). For a long time, 'to publish a manuscript' (one manuscript, the most accessible, not necessarily the best, or only 'the best', etc.), rather than to edit a text, was the 'normal' working condition, and this trend has in many cases survived to the present. In oriental studies, the content of a single manuscript—*understood exclusively as a text-carrier*—has remained for much longer a self-justified object of study and research.

(h) One more factor to be considered is the development of comparative and historical linguistics in the nineteenth century. Unlike Romance studies, where the link between linguistics, philology as textual criticism, and, in a way, the whole spectrum of manuscripts and literary studies, was not broken and interrupted, certain fields of oriental studies, for example in the Neo-Grammarians' approach, were absorbed by and reduced to comparative linguistics, implying a disregard of non-linguistic aspects, including material carriers, but also text-critical methodology.

(i) As said before, we do not have any history of oriental studies from a proper methodological perspective: we only have very sectorial approaches that are based upon all-embracing empty and almost meaningless labels. One may quote two examples, among possibly many others, of orientalists who were well aware of the methodological questions discussed at their time (it is a pity that neither of them has received any attention in this respect in Marchand 2009).

(1) The first is the very remarkable antiquarian—or, better, classicist and orientalist—and, above all, coptologist, Georg Zoëga (1755–1809). Like Wolf, who was only a few years younger, he was a pupil of Christian Gottlob Heyne (1729–1812) at Göttingen. Wolf dealt with Homer and classical texts, whereas Zoëga, besides the bas-reliefs of Rome, also worked with coins, obelisks, and Coptic parchments. Zoëga applied principles that were very similar to those proposed by Wolf, which he developed independently and in parallel. The study of Coptic and of the special kind of documentation represented by dismembered codices oriented his research in a decisive way. As elsewhere, in countries such as Italy, the knowledge of Greek was at the time in the hands of the orientalists, who were somehow its 'custodians'. Moreover, the documentation of Coptic, dispersed and fragmentary, implied and required an extremely careful and absolutely new type of material philology and cataloguing, in an extremely modern sense, which was radically different from the purely formal textual analysis (see Ch. 4 § 2.3). One more important element to consider is that Zoëga did not feel the need to dispose of *philologia sacra*—probably he could not and did not want to do so, for various reasons, some of them obvious (he worked at the papal court). Rather he understood the potential interest of the almost virgin field of oriental Christian apocrypha, which he started to explore.

(2) The other remarkable example to be mentioned, although outside the COMSt spectrum, is that of August Wilhelm Schlegel (1767–1845). While Sanskrit linguistics was rapidly developing,

> it was he who understood, even better than his British contemporaries or predecessors, that besides a pure Sanskrit *linguistics* also a real Sanskrit philology had to be established, furnished with text editions and commentaries carried out according to those principles of textual criticism and exegesis which were being developed by the scholars of Greek and Latin philology. He planned a very clear programme of this activity, which he also began to implement, and he also had a pupil and collaborator of exceptional value: Christian Lassen (1806–1876; Timpanaro 1973, 61–62, translation ABa; see also nn. 8–9 for reference to Schlegel's method and philological activity).

Note that besides being a pioneer in Sanskrit philology, Christian Lassen was also a remarkable Arabist.

In the course of the nineteenth century, philological discourse and methodologies were developed in the field of classical, New Testament, and Romance studies, and the names of Karl Lachmann and Gaston Paris (1839–1903; see Ch. 3 § 3.13) can be mentioned as exemplary for the critical, reconstructivist methodology. It is a matter of fact that with very few exceptions—usually due to a stronger connexion to biblical scholarship or classical studies—at the beginning of the twentieth century and later on, oriental studies in the COMSt spectrum still practised by and large the method of the 'base manuscript'. This practice had little to do with Joseph Bédier's (1864–1938) rethinking of the reconstructive Lachmannian method—a rethinking that might have had its reasons, although the solution is always questionable (see Ch. 3 § 2.3)—and had much more to do with the continuation of a previous practice current in oriental studies, corresponding to what might be termed 'the simple normal way'. In pre-Lachmannian classical studies, the editor 'normally' started from the *textus receptus* and an existing edition which he emended, and the recourse to codices was occasional and optional; in oriental studies, however, the editor usually started from one manuscript, since most of the time the text in question was to be published for the first time. Not much more attention was paid in oriental studies to the application of the so-called 'neo-Lachmannian' approach which was elaborated in Classics by Giorgio Pasquali (1885–1952) and his pupils, and in Romance studies by Gianfranco Contini (1912–1990)—even though they did take into account cases and questions that would also be relevant for some oriental traditions, the latter not being affected by a special status of their own (Witkam 1988). For the Christian Near East in particular, René Draguet's (1896–1980) credo of the 'base manuscript' method has dominated for long, even before being canonized in a controversial contribution (Draguet 1977; see Ch. 3 § 3.17), a major part of which was dedicated to technical concerns of layout and printing, and very little to methodological concerns. It recommended a simple reproduction of the best manuscript's text—taking into consideration its age and legibility—with all its errors included. Draguet's 'best manuscript' is thus simply the most suitable for the representation of the form; it is not even the 'best manuscript' *a posteriori*, i.e. the manuscript most similar to the critically established text (see Bausi 2006a, 2008b). It is therefore different, one might even say, worse, than the *codex optimus*, *codex vetustissimus*, etc. of pre-Lachmannian philology, which was a 'base manuscript' whose errors could be corrected *ope codicum* and *ope ingenii*.

Exceptions to this trend can be probably traced in every field. One example is Bernard Botte (1893–1980), the investigator of Christian oriental canonico-liturgical texts, who pleaded for the consideration of versions as textual witnesses, *when undertaking the search for an original*:

> The principles I have set out are not new… I do not think one can proceed in any other way, without risking falling into fantasy. One cannot blindly trust any version. The question is not that of finding 'the right version', any more than in a critical edition of a Greek text one must look for 'the right manuscript'. What is important is to make a good use of all the witnesses (Botte 1955, 168, translation ABa; see also Botte 1966, 177–179).

Earlier in 1922, Albrecht Götze (1897–1971), later the great Hittitologist, examined the manuscript tradition of the Syriac *Cave of Treasures*, and on the basis of the extant manuscripts he supposed the existence of an archetype, reconstructed its physical structure (columns and number of lines), as well as that of a subarchetype; he established subgroups on the basis of mechanical errors (loss of folia), and corroborated all this evidence by that of 'various readings and shared innovations' ('verschiedene Lesungen und gemeinsame Neuerungen'), giving also a complex but clear *stemma codicum* (Götze 1922, 5–12).

A third even earlier example is that of the Syriacist Arthur Amiaud (1849–1889). In the year of his death, 1889, following in the footsteps of Gaston Paris both in contents and method, he published a reconstructivist edition of the Syriac Alexis legends, stating in his introduction:

> We do not deal… with personal compositions… If one undertook the publication of a family of such works, where every author respecting only the general features of the legend has dealt with all other features with absolute freedom…, all that one could do would be to present each one entirely and separately. But here, where we have only more or less precise copies of the same text, the duty of the editor is to try to trace the original or to restore it as far as possible, and this is the target we are aiming at now through the comparison and the classification of our manuscripts (Amiaud 1889, ix, with an explicit reference to Paris 1872 on p. x, n. 1; translation ABa).

It is quite remarkable then to note that while little has been proposed on a methodological level for the scholarly editor, the respective 'traditional philologies' of the individual oriental cultures have, in some

cases, been investigated widely and in-depth: this is definitely the case of the Islamic one, starting from Franz Rosenthal's classic work *The technique and approach of Muslim scholarship* (Rosenthal 1947), and all handbooks of Arabic codicology devote some sections to the question of *iǧāza* (certificates of transmission) and related phenomena (Gacek 2001, 256–261; Déroche 2006, 332–334; Gacek 2009, 266–268).

Among the few attempts at applying a consistent text-critical methodology in oriental studies, one may mention the work conducted on Ethiopic texts by Paolo Marrassini (1942–2013), who used with full awareness a 'neo-Lachmannian' approach in a number of critical editions of Ethiopic texts, both original (hagiographical and historiographical ones) and translated (apocryphal writings, for example the Ethiopic version of the *Apocalypse of Peter*; Marrassini 2009).

1.4. The comparative approach

The COMSt handbook is a comparative manual. We can distinguish at least two meanings of 'comparative' in the COMSt perspective. In the field of codicology in particular, the necessity of a comparative approach has become the watchword of the most progressive trends in the last decades. A broader scope of interests has actually been encouraged and applied by codicologists starting from the 1980s at least, in a series of conferences that have focused on book forms and cultures in the Byzantine, Near Eastern and Islamic areas, yet these at times have assembled views from different fields rather than pursuing a real comparative work, which was hardly possible because of the uneven state of the art and consequent lack of data (see Déroche 1989; Cavallo et al. 1991; Maniaci – Munafò 1993; Condello – de Gregorio 1995; Déroche – Richard 1997; Hoffmann [P.] 1998). The importance of the most recent trend is well declared by J. Peter Gumbert in his preface to Agati's manual (Agati 2009, 14), stating that 'comparative codicology and quantitative codicology' are 'the two most striking modern developments' in the field (see for example Gumbert 2011, for a keen application of the comparative approach in codicology).

While a generally applied quantitative approach is still to come for most of the fields concerned with the manuscript traditions considered in this handbook, with a few notable exceptions (mainly, Hebrew and Greek codicology), we can confidently say that each chapter displays a comparative approach, yet in different ways. Moreover, it is the first time that such a systematic attempt of overall comparison has been carried out in a handbook on such a scale. In Chapters 1 ('Codicology') and 4 ('Cataloguing'), the manuscript traditions compared alternate, whenever applicable and possible, according to a common scheme of themes and topics corresponding to the intrinsic features of the manuscripts as objects of investigation and the studies carried out, whereas a comprehensive and synthetic overview of the main common points is outlined in the relevant chapter introductions. Chapter 2 ('Palaeography' in the narrow sense) is less comparative in fact, since it answers to the need of providing basic information on the scripts featuring in the handbook and their history. Of a broadly unitary character is Chapter 5 ('Conservation and preservation'), where methods, practices, and questions revolve around material aspects that largely transcend the individual manuscript traditions. Quite different is the case of Chapter 3 ('Textual criticism and text editing'), the first section of which assumes the text as an absolute reference point independently of the individual manuscript cultures, while the comparative perspective is delegated to a series of detailed case studies, not necessarily representative of a linguistic or manuscript culture, but rather of a method, a typology, or a problem to be approached.

Obviously, even in the extended COMSt perspective, a total comparative view was limited by the availability and accessibility of data and was only possible in terms of goals to be pursued and issues to be discussed. Moreover, as stated above, the comparison was applied to a coherent or in any case defined historical and cultural area of the 'codex' cultures. (As to a more general definition of 'codex' that to some extent seems to go beyond the usual understanding, see Andrist et al. 2013, 47, 'a book consisting of a series of folia' (translation ABa): yet the authors do not consider cases beyond the COMSt spectrum, and actually focus only on the Greek codex).

1.5. Structure of the book

1.5.1. Structure and approach

Needless to say, any structuring is arbitrary, at least to a certain extent, like every cutting of a continuum of documentation and questions. The chapters of the present handbook follow five thematic focuses that were originally selected as relevant and most appropriate for the work to be carried out in the COMSt re-

search networking programme. These focuses correspond to the work done by, and within, the respective work teams, namely, 'Codicology' (Chapter 1 and in part Chapter 2), 'Textual criticism and text editing' (Chapter 3), 'Cataloguing' (Chapter 4 and in part Chapter 2), and 'Conservation and preservation' (Chapter 5, and the part of the *General introduction* dedicated to ethical and legal issues). The work of the team 'Digital and instrumental approaches to manuscript studies' has been distributed in the General introduction and every chapter wherever applicable.

The structure of the handbook has been conceived in order to provide a reasonable balance between a strictly focused presentation of the topics on the one hand, and a comfortable readability on the other hand, the latter necessarily implying some repetition in providing background information. In order to limit repetitions and redundancies, cross-references to the relevant chapters and paragraphs have been provided wherever possible. In a few cases redundancies are dictated by the uneven state of the art in the single fields, which also implied the consideration of different points of view. This is not always a matter of the state of the art, but also of the specific internal features of each single tradition. For example, arranging single codicological features chronologically, usually done in order to date precisely undated manuscripts, is a practice little developed in Armenian codicology, since Armenian manuscripts can be so precisely dated, almost without exception, by colophons, that it was never necessary to establish such correlations. This is definitely not the case for most of the other manuscript traditions, some of which (Hebrew, to a lesser extent Greek) successfully developed refined codicological and palaeographical dating systems. Some very particular issues (for example, manuscripts with musical notation) could not be dealt with within the limited time frame and the physical space allotted. The same applies, as already said, to art-historical issues, which were to some degree considered as aspects of codicology / book production.

Finally, I cannot stress enough that the COMSt approach tends to consider manuscript studies in a global perspective, and that every attempt has been made to take advantage of the fruitful interrelationship established between methodologies, in a real interdisciplinary approach, where the more precisely focused single disciplines are, the better they can reveal their potential—which is the opposite of an all-embracing interdisciplinary approach, where disciplines tend to merge and methodological clearness disappears.

1.5.2. Questions of terminology

The question of terminology is extremely sensitive in a comparative approach, since comparing necessarily entails defining exactly *what* is compared. The COMSt manual has approached this difficult question with a practical attitude. The redaction of a detailed, extensive terminology for the whole area encompassed by COMSt would have been a research project in itself. The present handbook has considered throughout the work carried out in major fields that investigate the codex manuscript cultures (see for example Muzerelle 1985; Maniaci 1996; Ostos et al. 1997); however, as a matter of fact, it appeared that the construction of a common and satisfactory English terminology, also in main-stream disciplines, is still in its very beginning (see Beal 2008; and above all, Gumbert 2010b; see also Andrist et al. 2013 for a detailed critical discussion of some of Gumbert's proposals, starting from Gumbert 2004).

Carrying out a complete standardization of terminology has therefore been impossible at this stage of research. Consequently, terminology specific to certain fields has sometimes been retained when the relevant scholarly tradition had established practices that did not entail methodological consequences. Yet due explanation has always been provided. Book forms, *Realien*, all phenomena related to codicology, palaeography, textual criticism, cataloguing, and digital and scientific approaches, have been defined as clearly as possible when first introduced (typically for book forms such as 'roll' versus 'scroll' versus 'rotulus', respectively defined as horizontal or vertical rolls/scrolls; 'accordion book' has been adopted for the alternative terms 'concertina' or 'leporello book'; and 'painting', 'illumination', 'illustrator', and 'decoration' with the relevant *nomina agentis*, that is 'painter', 'illuminator', 'illustrator', and 'decorator' are all used and as carefully as possible distinguished, instead of the often comprehensively and extensively used 'illumination' and 'illuminator', or even simply 'artist'). In particular in Chapter 3 ('Textual criticism and text editing'), case studies show the variety of traditions and theoretical and practical approaches, and consequently of terminology, which is precisely what was intended to be surveyed and displayed in that part of the chapter.

We must not disregard, however, that the parallel presentation of the single manuscript traditions in the single chapters has *de facto* enforced a tendentially uniform, consistent, common and shared terminology, and even in this respect the COMSt manual definitely marks a substantial progress.

On the other hand, no attempt has been undertaken to collect or systematically take into account the traditional terminology used by the single manuscript traditions. Except for a few fields, where much research has been done and the tradition itself has developed a special interest in terminological taxonomy (for example, the Arabic and Islamic manuscript tradition, see Gacek 2001, 2008), basic research is still very much needed in most of the fields (for a first attempt and with a degree of caution, see for example Mersha Alehegne 2011 on Ethiopic manuscript culture terminology). In very few cases, however, local terminology has been introduced or quoted to describe specific phenomena.

References

Agati 2003, 2009; Albert et al. 1993; Amiaud 1889; Andrist et al. 2013; Assfalg – Krüger 1975 (1991); Bausi 2006a, 2008b; Beal 2008; Beit-Arié 2014; Botte 1955, 1966; Cavallo et al. 1991; Cerquiglini 1989; Condello – de Gregorio 1995; Déroche 1989, 2006; Déroche – Richard 1997; Déroche – Sagaria Rossi 2012; Draguet 1977; Fiaccadori 2011; Frankenberg 1937; Gacek 2001, 2008, 2009; Galletti 2013; Géhin 2005; Götze 1922; Gumbert 2004, 2010b, 2011; Hoffmann [P.] 1998; Irwin 2006; Mallette 2010; Maniaci 1996, 2002a, 2008; Maniaci – Munafò 1993; Marchand 2009; Marrassini 2009; Mersha Alehegne 2011; Muzerelle 1985; Ostos et al. 1997; Paris 1872; Pfeiffer – Kropp 2007; Richard [J.] 2001; Rosenthal 1947; Said 1978; Spina 2013; Timpanaro 1973; Toomer 1996; Wilkinson 2007a, 2007b; Witkam 1988; Worthington 2012.

2. Digital and scientific approaches to oriental manuscript studies (JG–IR–FA)

2.1. Digital approaches to oriental manuscript studies (JG)

With the spread of personal computers in the 1980s and early 1990s, studies concerning manuscripts and their contents started to change in both their aims and their methods, and the 'digital turn' has meanwhile embraced nearly all relevant fields. It seems therefore appropriate first to outline the essentials of digital approaches to oriental manuscript studies here; more detailed treatments will be found in the individual chapters following. The present survey focuses on questions of the representation of different scripts (original and transcriptional) and the encoding of characters; the conception of electronic texts, their structuring and their processing; the arrangement of databases, their layout and their handling; and the basics of digital imaging including special relevant methods of photography.

2.1.1. The representation of oriental scripts and the encoding of characters

In the early times of the digital age, attempts to store and process data in oriental languages were for many years hampered dramatically by the fact that computers were not yet able to deal with scripts other than Latin, and even the correct treatment of extra characters such as the 'umlaut vowels' of German or the accented letters of French was anything but guaranteed. The reason was that in a digital environment, the encoding of written text must be based on a given set of correspondences of characters with numerical values, every character being represented by one unique value. To encode the two times 26 letters (lower and upper case) of the Latin alphabet plus the digits from 0 to 9, the punctuation marks, parentheses, and the like, a set of less than 100 unique values is necessary, and this is why the 'stone age' mainframe computers of the 1960s to 1970s were based on a so-called 7-bit encoding: with 7 bits, $2^7 = 128$ characters can be encoded uniquely. The most popular standard developed on this basis is the so-called ASCII standard ('American Standard Code for Information Interchange', see Table 0.2.1), which prevailed in the first personal computers.

It is clear that on the basis of this encoding scheme, English texts could easily be digitized, but German, French, or Spanish texts could not, let alone Greek, Russian, or Arabic texts in their original scripts. This does not mean, however, that it was impossible then to process texts in more 'exotic' languages. What was necessary was the invention of encoding schemes that used more than one 'code point' to represent certain characters. One such scheme, the so-called 'BETA-Code', was applied to encode the ancient Greek texts that are comprised in the 'Thesaurus Linguae Graecae' (TLG), a huge database attempting to cover the complete textual heritage from Homer down to the Middle Ages. Cf. Table 0.2.2 which shows the 7-bit adaptation of the beginning of Hesiod's *Theogony*, contrasted with the 'traditional' rendering in Greek script. It is clear that the 7-bit encoding had at least two disadvantages: it was hardly possible to visualize the text as it should be on a computer screen, and the encoding was not transparent (or 'self-explaining') in the sense that the individual items (letters, diacritics, accent marks) could be easily determined by people who were not involved in the encoding process themselves. It is true that this encoding met the condition of being consistent in that a given sequence of codes always represented the same character, and this is why these texts can be used and analysed even today (and the TLG website still supports it); however, it will be clear that it remains clumsy and hard to handle.

With the extension of the ASCII encoding basis to 8 bits, this problem was at least partially overcome. On an 8-bit (= 1-byte) basis, $2^8 = 256$ characters can be encoded uniquely, and since the early 1980s, many 8-bit encoding schemes were developed and applied, adding 'special' characters such as those representing German *ä*, *ö*, *ü*, the accented vowels *é*, *à*, *ô*, etc. of French, or the Spanish palatal nasal *ñ* to the inventory. Unfortunately, this was not done in an equal, 'standardized' way right from the beginning; instead, several leading computer companies developed their own individual schemes, which resulted in serious problems whenever data were to be exchanged between systems. Tables 0.2.3−5 show the encoding systems used in IBM/DOS computers, Mac computers, and MS-Windows—only the latter one is more or less identical with the 8-bit standard used in many applications up till now, the ANSI standard ('American National Standards Institute') also known as ISO standard no. 8859-1 (the special MS-Windows characters are displayed on a grey background within Table 0.2.5).

Still, these encoding systems were not sufficient for the immediate encoding of other scripts such as Greek, Cyrillic, or Chinese. This is why from the middle of the 1980s on, so-called 'code pages' were

Table 0.2.1 ASCII encoding standard (7-bit)

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
000																				
020														!	"	#	$	%	&	'
040	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~													
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9

Table 0.2.2 Greek text with its BETA-Code representation (Hesiod, *Theogony*)

```
*MOUSA/WN *(ELIKWNIA/DWN A)RXW/MEQ' A)EI/DEIN,
AI(/ Q' *(ELIKW=NOS E)/XOUSIN O)/ROS ME/GA TE ZA/QEO/N TE,
KAI/ TE PERI\ KRH/NHN I)OEIDE/A PO/SS' A(PALOI=SIN
O)RXEU=NTAI KAI\ BWMO\N E)RISQENE/OS *KRONI/WNOS:
KAI/ TE LOESSA/MENAI TE/RENA XRO/A *PERMHSSOI=O
H)' *(/IPPOU KRH/NHS H)' *)OLMEIOU= ZAQE/OIO
A)KROTA/TW| *(ELIKW=NI XOROU\S E)NEPOIH/SANTO,
KALOU\S I(MERO/ENTAS, E)PERRW/SANTO DE\ POSSI/N.
E)/NQEN A)PORNU/MENAI KEKALUMME/NAI H)E/RI POLLW=|
E)NNU/XIAI STEI=XON PERIKALLE/A O)/SSAN I(EI=SAI,
```

Μουσάων ῾Ελικωνιάδων ἀρχώμεθ' ἀείδειν,
αἵ θ' ῾Ελικῶνος ἔχουσιν ὄρος μέγα τε ζάθεόν τε,
καί τε περὶ κρήνην ἰοειδέα πόσσ' ἁπαλοῖσιν
ὀρχεῦνται καὶ βωμὸν ἐρισθενέος Κρονίωνος·
καί τε λοεσσάμεναι τέρενα χρόα Περμησσοῖο
ἠ' ῎Ιππου κρήνης ἠ' ᾽Ολμειοῦ ζαθέοιο
ἀκροτάτῳ ῾Ελικῶνι χοροὺς ἐνεποιήσαντο,
καλοὺς ἱμερόεντας, ἐπερρώσαντο δὲ ποσσίν.
ἔνθεν ἀπορνύμεναι κεκαλυμμέναι ἠέρι πολλῷ
ἐννύχιαι στεῖχον περικαλλέα ὄσσαν ἰεῖσαι, …

Table 0.2.3 Non-standard 8-bit encoding (‘DOS/IBM’, ‘Extended ASCII’, ‘Codepage 437’)

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
000		☺	☻	♥	♦	♣	♠	•	◘	○	◙	♂	♀	♪	♫	☼	►	◄	↕	‼
020	¶	§	▬	↨	↑	↓	→	←	∟	↔	▲	▼		!	"	#	$	%	&	'
040	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~	⌂	Ç	ü	é	â	ä	à	å	ç	ê	ë	è	ï
140	î	ì	Ä	Å	É	æ	Æ	ô	ö	ò	û	ù	ÿ	Ö	Ü	¢	£	¥	₱	ƒ
160	á	í	ó	ú	ñ	Ñ	ª	º	¿	⌐	¬	½	¼	¡	«	»	░	▒	▓	|
180	┤	╡	╢	╖	╕	╣	║	╗	╝	╜	╛	┐	└	┴	┬	├	─	┼	╞	╟
200	╚	╔	╩	╦	╠	═	╬	╧	╨	╤	╥	╙	╘	╒	╓	╫	╪	┘	┌	█
220	▄	▌	▐	▀	α	ß	Γ	π	Σ	σ	µ	τ	Φ	Θ	Ω	δ	∞	∅	∈	∩
240	≡	±	≥	≤	⌠	⌡	÷	≈	°	∙	·	√	ⁿ	²	■					
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9

Table 0.2.4 Non-standard 8-bit encoding (Mac OS)

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
000																				
020														!	“	#	$	%	&	´
040	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~		Ä	Å	Ç	É	Ñ	Ö	Ü	á	à	â	ä	ã
140	å	ç	é	è	ê	ë	í	ì	î	ï	ñ	ó	ò	ô	ö	õ	ú	ù	û	ü
160	†	°	¢	£	§	•	¶	ß	®	©	™	´	¨	≠	Æ	Ø	∞	±	≤	≥
180	¥	µ	∂	Σ	Π	π	∫	ª	º	Ω	æ	ø	¿	¡	¬	√	ƒ	≈	Δ	«
200	»	…		À	Ã	Õ	Œ	œ	–	—	"	“	'	’	÷	◊	ÿ	Ÿ	⁄	¤
220	‹	›	fi	fl	‡	•	‚	„	‰	Â	Ê	Á	Ë	È	Í	Î	Ï	Ì	Ó	Ô
240		Ò	Ú	Û	Ù	ı	ˆ	˜	¯	˘	˙	˚	¸	˝	˛	ˇ				
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9

Table 0.2.5 Standardized 8-bit encoding (ANSI / ISO 8859-1 plus MS-Windows / Codepage 1252)

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
000																				
020														!	“	#	$	%	&	´
040	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	<	=	>	?	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	`	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~				,	ƒ	„	…	†	‡	ˆ	‰	Š	‹
140	Œ					‘	’	“	“	○	—	–	˜	™	š	›	œ			Ÿ
160		¡	¢	£	☼	¥	|	§	¨	©	ª	«	¬	-	®	¯	°	±	²	²
180	’	µ	¶	-	¸	¹	º	»	¼	½	¾	¿	À	Á	Â	Ã	Ä	Å	Æ	Ç
200	È	É	Ê	Ë	Ì	Í	Î	Ï	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û
220	Ü	Ý	Þ	ß	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
240	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ				
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9

developed for 8-bit based computers, in which, just as in the examples shown above, the ‘upper’ area exceeding the basic ASCII plain (values above 128) was used to encode various other character sets. Some of these code pages have been standardized within the ISO standard 8859 (see, for example, Table 0.2.6 contrasting the Cyrillic code page ISO 8859-5 with the ANSI standard, ISO 8859-1), and some of them are still used in web pages.

Apart from these ‘official’ extensions, an unknown amount of local or even personal 8-bit encoding systems were developed in the 1980s and 1990s to meet the needs of philologists dealing with oriental languages. As a matter of fact, whenever someone developed and applied a certain font, the encoding of which did not match one of the standardized code pages, a new encoding system was created from scratch. Applying the method of ‘font mapping’, one could thus meet, for example, the requirements of Ancient (‘Polytonic’) Greek to be noted in original characters as well as Iranian languages to be rendered in a scholarly Latin transcription (see Tables 0.2.7−8).

Table 0.2.6 Standardized 8-bit mapping: ISO 8859-1 vs. ISO 8859-5

ISO 8859-1

32		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/	47
48	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	63
64	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	79
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	95
96	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	111
112	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~		127
160		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯	175
176	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿	191
192	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï	207
208	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß	223
224	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï	239
240	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ	255

ISO 8859-5

32		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/	47
48	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?	63
64	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	79
80	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_	95
96	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	111
112	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~		127
160		Ё	Ђ	Ѓ	Є	S	I	Ї	J	Љ	Њ	Ћ	Ќ	·	Ў	Џ	175
176	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П	191
192	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я	207
208	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п	223
224	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я	239
240	№	ё	ђ	ѓ	є	s	i	ї	j	љ	њ	ћ	ќ	§	ў	џ	255

Table 0.2.7 Non-standard 8-bit encoding: Ancient ('polytonic') Greek

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
000		̀	̆	̈	́	̔	̓	·		∘										
020		§			̋	̑	́	̀	́	F	Ϛ	Ϡ		!	"	̓	́	̓	̃	'
040	(	)	*	†	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	́	̓	̀	?	ς	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	̀	]	̃	·	̀	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	́	|	̀	̃	̆	̆	ü	έ	ᾶ	ä	ὰ	ᾶ	ῖ	ε̃	ĕ	ὲ	ï
140	ῖ	ὶ	Ä	ĭ	ŏ	ŭ	ε̃	õ	ö	ὸ	ῦ	ὺ	ϋ	Ö	Ü	ᾶ	ε̃	ῖ	õ	ῦ
160	ά	ί	ό	ύ	ώ	ᾠ	ᾧ	ᾠ	ώ	ᾧ	ᾤ	ῒ	ῠ	ᾷ	ῆ	ῃ	Γ	Δ	ῃ	
180	ῃ	ῃ	Θ	ώ	ὼ	Λ	ῶ	ὼ	Ξ	ώ	Π	ῶ	Σ	ὼ	ῷ	Φ	ῶ	Ψ	Ω	ᾶ
200	ῖ	ῦ	ά	ᾰ	ῆ	ῆ	ῆ	ὰ	ε̇	ι	ὸ	ὺ	ᾳ	ᾰ	ᾷ	α	ῶ	γ	δ	ε
220	ζ	η	ϑ	ι	κ	β	λ	μ	ν	ξ	ῷ	π	ρ	σ	τ	υ	φ	χ	ψ	ω
240	ϱ	ῖ	ῦ	ᾰ	ᾰ	ῃ	ῳ	ᾳ	ά	ε̇	ι	ὸ	ύ	ῦ	ὅ					
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9

Table 0.2.8 Non-standard 8-bit encoding: Latin font with diacritics for Iranian languages

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
000		̇	̇	̄	̆	̌	́	̀	̈	̂	̋		̇		̌	̆	̌	́	̀	̈	̏
020	″	§	̂	̧	̨	Ł	Þ	ʰ	ᵘ	°	‘	’		!	"	#	†	°	+	'
040	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7	8	9	:	;
060	<	=	>	?	√	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
080	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	¯	̀	a	b	c
100	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
120	x	y	z	{	|	}	~	≈	ź	ü	é	â	ä	à	å	ç	ê	ë	è	ï
140	î	ì	Ä	ø	ė	æ	œ	ô	ö	ò	û	ù	ẏ	Ö	Ü	ã	ẽ	ĩ	õ	ũ
160	á	í	ó	ú	ñ	ŋ	ā	ē	ī	ō	ū	ǻ	ǰ	Í	ł	ű	ǟ	ě	Ì	ı
180	ǜ	ą	ǟ	ǻ	xᵘ	ž	ŋᵘ	ṛ	ĭ	ī	ŭ	ą	ę	į	ǫ	ų	į	ų	ə	ā
200	ę	ą̃	ą	ę̃	ę	ě	é	ǐ	į	ų̃	ų	ũ	ỹ	ý	β	ƀ	č	ḍ	đ	δ
220	ǵ	ġ	g	γ	ḫ	ß	ḥ	ʰu	ḱ	ļ	Į	Ī	Ì	ṃ	m̃	m̆	ṃ	ṅ	ń	ŋ́
240	ṇ	ṛ	ŗ́	ī	ī́	ř	ś	ş	š	š	ş	ţ	ṭ	ϑ	þ					
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9

The problem about all this is that whenever 'font mapping' is applied, the basic requirements of consistent encoding, namely the recoverability and exchangeability of data, cannot be guaranteed as there is no unique one-to-one-relation between a character to be encoded and a given digitized value. If, for example, we applied the Greek 8-bit font illustrated in Table 0.2.7, the value of 231 would represent a Greek lower case letter *pi* (π); the same value would stand for a Cyrillic *ča* (ч), however, if we used a font matching the standard codepage ISO 8859-5, and it would represent a Latin *c* with cedilla (*ç*) if we used the plain ANSI standard. This means that whenever an 8-bit encoding was applied in the encoding of tex-

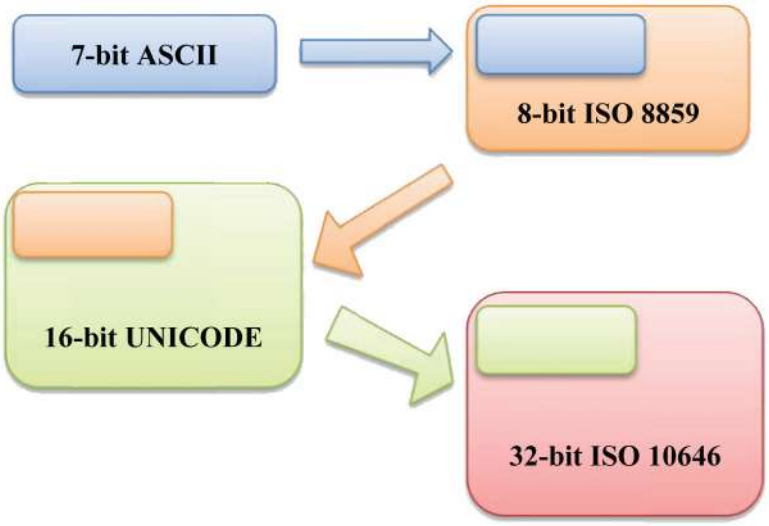


Fig. 0.2.1 From 7-bit to 32-bit encoding

tual materials, additional information had to be stored as to what code page or font encoding was valid for a given character. This information, however, was not encodable as such in a standardized way, being dependent on the idiosyncrasies of word processing programs such as Microsoft Word, and it was lost all too easily when data were transferred across systems. This is all the more true so for scripts with right-to-left direction such as Arabic, which required special encoding solutions in all cases. This is why many textual materials in oriental languages stored electronically in the twentieth century (sometimes even later) in transcribing manuscripts or editing their contents are no longer usable today—or at least hard to process.

To be able uniquely to encode all characters that have been used in writing down human languages including both 'original' scripts and alphabets and linguistic 'transcriptions', the basis of encoding had to be extended far beyond the 1-byte (8-bit) standard. This is exactly what has been undertaken since the early 1990s when the so-called 'Unicode' standard was created: based on 16 bits (or 2 bytes), this standard comprises 2^{16} = 65536 basic 'code points' used for the 'unique' encoding of characters. Considering that for the Chinese script alone, far more than 65,000 different characters have been used throughout history, it is clear that even this standard is not yet sufficient to cover all characters used by mankind at all times. This is why a further extension has been conceived, in the 32-bit standard ISO 10646 which provides a total of (2^{32} =) 4,294,967,296 code points; as a matter of fact, the Unicode standard is but one subset of this near to 'infinite' inventory, just as the ANSI standard (ISO 8859-1) is a subset of Unicode, and the ASCII standard a subset of ANSI (see fig. 0.2.1).

Along with the expansion of the World Wide Web, Unicode encoding has become more and more prominent since the late 1990s, and it is the encoding basis of practically all up-to-date operating systems and word processors today. There can be no doubt that this is a huge advantage for the purposes of oriental manuscript studies. Cf., for example, Table 0.2.9 which shows a few of the 'blocks' of Unicode characters: the distinction of a Cyrillic *ča* (ч) and a Latin *c* with cedilla (*ç*) is now guaranteed by their different code points (hexadecimal number 0447 = decimal 1095 vs. hexadecimal 00E7 = decimal 231), and various Latin-based characters used in transcription systems can now as well be encoded as characters of the Greek, Coptic, or Georgian scripts. In addition, the Unicode standard even comprises information on the directionality of a given character so that Hebrew, Arabic, or Syriac texts can be encoded (and exchanged!) without further programming—provided the system used has implemented the relevant 'blocks' and the rules pertaining to them.

However, even Unicode encoding is not without problems. First of all, it builds upon the so-called character/glyph distinction. According to the definition provided by the Unicode Consortium, a 'glyph is a particular image which represents a character or part of a character', and it 'may have very different shapes' as illustrated by the set of six 'sample glyphs' for the Latin 'character' *a* in Table 0.2.10 (modelled after the diagram in General introduction § 2.1 at <http://www.unicode.org/reports/tr17/tr17-3.html>, accessed March 2014). It will be clear from the example that a 'character', which is what is to be encoded, is an abstraction of all the possible actual forms of a 'letter' that may appear in handwritten or printed

Table 0.2.9 16-bit encoding: Unicode blocks Latin and Cyrillic

Latin

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
000																
001																
002	?	!	“	#	$	%	&	'	(	)	*	+	,	-	.	/
003	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
004	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
005	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
006	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
007	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	
008																
009																
00A		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬		®	¯
00B	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
00C	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
00D	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
00E	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
00F	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

Cyrillic

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
040	Ѐ	Ё	Ђ	Ѓ	Є	S	I	Ї	J	Љ	Њ	Ћ	Ќ	Й	Ў	Џ
041	А	Б	В	Г	Д	Е	Ж	З	И	Й	К	Л	М	Н	О	П
042	Р	С	Т	У	Ф	Х	Ц	Ч	Ш	Щ	Ъ	Ы	Ь	Э	Ю	Я
043	а	б	в	г	д	е	ж	з	и	й	к	л	м	н	о	п
044	р	с	т	у	ф	х	ц	ч	ш	щ	ъ	ы	ь	э	ю	я
045	ѐ	ё	ђ	ѓ	є	s	i	ї	j	љ	њ	ћ	ќ	й	ў	џ
046	Ѡ	ѡ	Ѣ	ѣ	Ю	ю	Ѧ	ѧ	Ѩ	ѩ	Ѫ	ѫ	Ѭ	ѭ	Ѯ	ѯ
047	Ѱ	ѱ	Ѳ	ѳ	Ѵ	ѵ	Ѷ	ѷ	Ѹ	ѹ	Ѻ	ѻ	Ѽ	ѽ	Ѿ	ѿ
048	Ҁ	ҁ	҂	҃	҄	҅	҆	҇	◌҈	◌҉	Ҋ	ҋ	Ҍ	ҍ	Ҏ	ҏ
049	Ґ	ґ	Ғ	ғ	Ҕ	ҕ	Җ	ж	Ҙ	ҙ	Қ	қ	Ҝ	к	Ҟ	ҟ
04A	Ҡ	ҡ	Ң	ң	Ҥ	ҥ	Ҧ	ҧ	Ҩ	ҩ	Ҫ	ҫ	Ҭ	ҭ	Ү	ү
04B	Ұ	ұ	Ҳ	ҳ	Ҵ	ҵ	Ҷ	ҷ	Ҹ	ҹ	Һ	h	Ҽ	ҽ	Ҿ	ҿ
04C	І	Ӂ	ӂ	Ӄ	ӄ	Ӆ	ӆ	Ӈ	ӈ	Ӊ	ӊ	Ӌ	ӌ	Ӎ	ӎ	Ӏ
04D	Ӑ	ӑ	Ӓ	ӓ	Æ	æ	Ӗ	ӗ	Ә	ə	Ӛ	ӛ	Ӝ	ӝ	Ӟ	ӟ
04E	Ӡ	ӡ	Ӣ	ӣ	Ӥ	ӥ	Ӧ	ӧ	Ө	ө	Ӫ	ӫ	Ӭ	ӭ	Ӯ	ӯ
04F	Ӱ	ӱ	Ӳ	ӳ	Ӵ	ӵ	Ӷ	ӷ	Ӹ	ӹ	Ӻ	ӻ	Ӽ	ӽ	Ӿ	ӿ
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

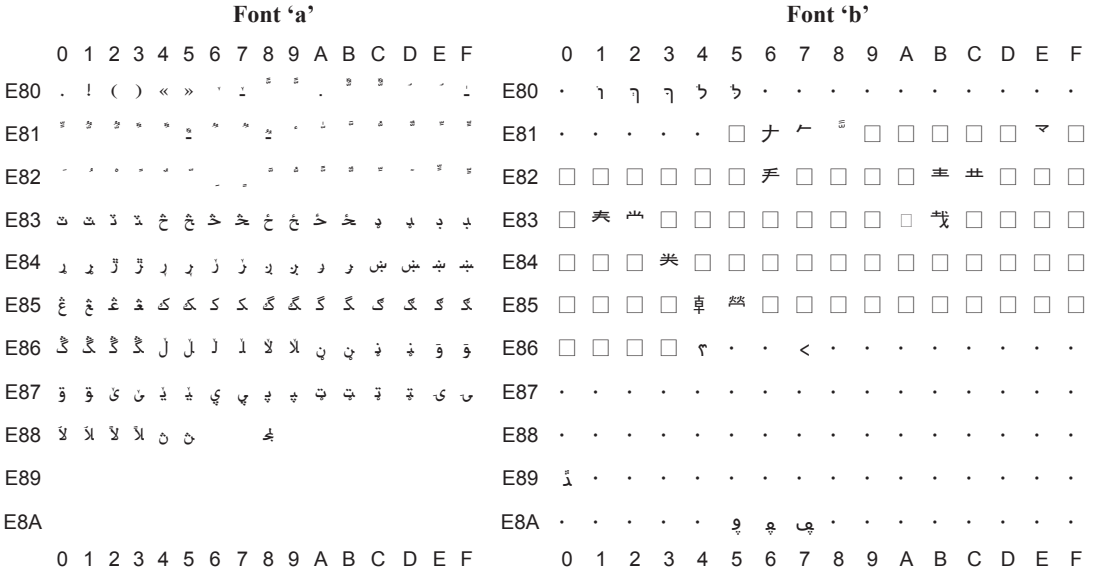
Table 0.2.10 Example of the character/glyph distinction in Unicode

Character	**Sample glyphs**					
a	*a*	*a*	**a**	ɑ	ɐ	a

form, while every single appearance of the letter is regarded as a ‘glyph variant’. This distinction, then, is crucial indeed for manuscript studies, as the assignment of individual ‘letter shapes’ occurring in handwritten sources to ‘abstract’ character values may always be a matter of dispute, especially in a diachronic perspective: we may think, for example, of the emergence of minuscules from majuscules over time, or of ‘new letters’ from former ligatures. As a matter of fact, the decision of the Unicode Consortium to treat the ‘minuscule’ *a* as a character in its own right, with a unique code point, and not to treat all the ‘minuscule’ variants of *a* as glyphs of the one (‘majuscule’) character *A*, which has another code point, may be justified for practical (and traditional) reasons, but it may be problematical indeed for manuscript studies concerning the first millennium. It may be even more problematical when it comes to scripts that are less ‘fixed’ than Latin.

To be sure, the problem of assigning letter forms as appearing in a handwritten context to ‘abstract’ units is not intrinsically determined by digitization, and it is by no means confined to it: just like a scholar of today, who has to decide by what code point he would represent the glyph he ‘reads’ in a manuscript, a scholar using pen or pencil in transcribing a manuscript would have had to decide for an ‘abstract’ character, too, at least when handing his transcript over to a typesetter. There is indeed an important difference, however, in that the purpose of typesetting was limited to a reproduction in print, whereas a digital encoding can be used for other purposes such as automatic indexation as well; here, the consistency of the encoding becomes crucial indeed (cf. below). Another difference concerns the way restrictions could be overcome when necessary, those of a typesetter’s letter case of old and those of an encoding standard of today: the typesetter may have resorted to the production of new types if this was deemed unavoidable (cf. the approaches summarized in the case study on the edition of the Berlin Turfan manuscripts, Ch. 3 § 3.9), and the ‘digital’ scholar, to the tedious process of convincing the Unicode Consortium that a character (not a glyph!) is missing in their standard (cf. the problem of a ‘different letter for *ą* and initial *y*’

Table 0.2.11 16-bit font mapping: The ‘Private Use Area’ of Unicode



in Indian and Iranian manuscripts of the *Avesta*, thematized in case study Ch. 3 § 3.5). Be that as it may, the problem of distinguishing abstract ‘characters’ from ‘glyphs’ as their ‘representations’ is actually one of the history of scripts, their analysis and their usage in general, not of digitization. The development of the Unicode standard has contributed a lot to this question by enforcing thorough investigation, and many of us have been involved in the process of its extension. However, it is a pity that this has often not been determined by scientific reasoning alone but by practical (or even economic) considerations, thus leaving inconsistencies and shortcomings that we still have to cope with.

One such inconsistency lies in the fact that the encoding facilities Unicode provides are not always ‘unique’. This is especially true for the huge amount of combinations of (Latin, Greek, Cyrillic etc.) characters with diacritics it intends to cover, many of which can be encoded ‘as such’, that is as so-called ‘precomposed characters’, or as combinations of the respective ‘basic character’ and the diacritic(s) it carries. For example, the German *ä* can be encoded as the Unicode character no. 226 (U+00E4) or as a sequence of *a* = no. 97 (U+0061) and the ‘umlaut’ diacritic (‘diaeresis’, U+0308); in a similar way, *r* with a macron above and a dot below (*ṝ*) can be encoded as such as no. 7773 (U+1E5D) or as a sequence of *r* (U+0072), macron above (U+0304), and dot below (U+0323), or even as a sequence of *r* with a dot below (*ṛ*, U+1E5B) and a macron above (U+0304). It is true that the different ways of encoding the same ‘composed character’ are essentially equivalent according to the definition of the standard—with the ‘precomposed’ units being considered as the first choice—and should be treated as such by Unicode-based systems; however, users cannot rely upon this in all cases yet, depending on system or software peculiarities.

A similar problem is posed, for example, by Arabic characters, given that Unicode provides code points for both the different ‘surface’ forms they may appear in within words (isolated, final, initial, medial, for example ع, ـع, عـ, ـعـ; U+FE81 to FEF4) and an ‘idealized’ representation of the underlying ‘abstract’ character (identical in shape with the ‘isolated’ variant) which is meant to be adapted automatically to the context (for example ع, U+062A). Here, too, the different ways of encoding the same character are essentially equivalent according to the definition of the standard, with the ‘idealized’ representations to be used preferably wherever possible.

Another problem that may be crucial in the application of Unicode is the persistence of at least one area that is designed for font mapping. This is the so-called ‘Private Use Area’ (PUA), which comprises 6144 code points for non-predefined characters (in the blocks U+E000–EFFF and F000–F7FF). This area can be assigned *ad libitum* by companies, user groups, or individuals, with the result that additional information is again necessary to distinguish the characters ‘encoded’ in it. Table 0.2.11 shows what can happen when different fonts are applied to visualise PUA encoded characters; in the worst case, the intended information will again be lost. The use of the ‘Private Use Area’ should therefore be avoided wherever possible.

2.1.2. Electronic texts and their structuring

Depending on their envisaged use, electronic texts to be produced and used in oriental manuscript studies require special attention as to their structuring beyond character encoding, too. To clarify what this means, it is helpful to look again at the Greek text we have dealt with above (see Table 0.2.2). Even without any knowledge of the language and script, we will immediately have the impression that this text consists of verses. This is clearly indicated by two signals we are used to in reading poetical texts, namely the relative shortness of lines (with no full justification), and the numbers 1, 5, and 10 attached to the respective lines (in the Greek rendering). There are many further elements of textual structure involved, however. First, we will easily guess that the text consists of several sentences, partially extending across verses and partially consisting of subordinate clauses and phrases: this is indicated by the punctuation marks used. Then, we will be able to state that the text consists of 51 words, in their turn indicated either by empty spaces between them or by punctuation marks adjoining their first or last characters. This may all sound trivial, but as a matter of fact, it can be crucial indeed for textual materials to consider the function of their internal elements and to 'mark them up' accordingly when preparing them for further usage; and this should be done as consistently as the encoding of the characters appearing in words.

So what elements are we talking about? Among the basic elements of every kind of text, we have already mentioned words (consisting of characters when written down), phrases, clauses, and sentences; on a higher level, we will have to deal with sections, paragraphs, chapters, text parts, and the like. For many of these elements, we intuitively adapt signals we have been used to since we were at school, such as spaces indicating word boundaries, full stops indicating sentence breaks, or 'hard' line breaks indicating the end of a section or paragraph. For a consistent encoding of a digital text to be used in a (critical or diplomatic) edition, in an electronic corpus, or for other purposes, this may not be sufficient, though, especially when the contents of oriental manuscripts are concerned. An appropriate example may suffice to illustrate why.

Fig. 0.2.2 shows the upper half of the front fly-leaf of the codex Vienna, ÖNB, Cod.Vind.georg. 2, a Georgian palimpsest manuscript stemming from the Monastery of the Holy Cross at Jerusalem. The leaf in question originally pertained to another codex from the same site, which is kept today in the Dumbarton Oaks Research Library in Washington, DC (MS WAS.1.2), and which represents a menaion covering the months of December to February, starting, in accordance with the Greek Synaxarion, with the commemoration of St Ananias of Persia and SS Onesimus and Solomonus (Solochonus) of Ephesus (see Gippert et al. 2007a, xii–xvii). Even without any knowledge of Georgian, and even neglecting the bad state of preservation especially of the upper part of the page, people experienced with mediaeval manuscripts will easily recognise that there are two different scripts used side by side in it, a majuscule and a minuscule, the former mostly appearing in the four red lines under the ornamental braid of the top, and the latter, mostly in the black text below. A closer look will reveal that even within the black text, there are some red elements, mostly dots accompanying other dots in black, but also some (majuscule) letters (in the fourth line); on the other hand, the first line contains a black letter in a red environment. One might further guess that lines five and ten contain a majuscule letter extending into the left margin, the first in red and the second in black; beyond that, the first text line shows a hanging initial in black, in its turn enclosed by an ornamental structure that might represent another majuscule letter. The colour of the latter is neither red nor black but the same (purple) colour as that of the ornamental heading on the top, and this very colour also appears in an attention mark in the shape of a shaft cross in the left margin; different from the text characters, it is only the contour-lines of these elements that are coloured, not their solid bodies.

As a matter of fact, none of these features is accidental, all of them being related to the meaning and the functions of the textual elements they pertain to. To start with, the four lines in red represent what we might call a heading (actually, it is exactly this use of red ink that has led to the emergence of the word 'rubric'). It begins with the indication of 1 December as the date the following text relates to; the (dative-locative) case form of the month name, *deḳembersa*, appears written in red, while the single character following it in black with an overbar attached to it is the letter *a* in its numerical value, '1', denoting the day of the month. The same letter appearing enclosed at the beginning of the line represents the word-final vowel of *ttuesa*, the word for 'month' in the dative case form corresponding to *deḳembersa*, 'in the month of December'; and its ornamentally-shaped enclosure in violet colour is the word-initial letter of the same word, *t*. The overbar above the *a* here marks the suspension of the characters between *t* and *a* in *t*(*owes*)

Fig. 0.2.2 Vienna, ÖNB, Cod.Vind.georg. 2, front fly-leaf (excerpt)

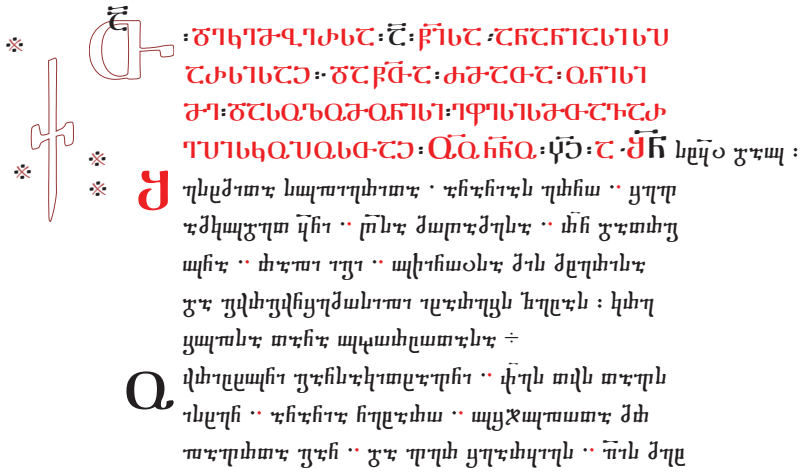
a, not the numerical use of *a* = '1' as in the indication of the day; as a matter of fact, the two overbars seem not to be identical, both being curved a bit differently. Note that between the abbreviated word form and the month name, and also on both sides of the numerical *a* and elsewhere within the rubric, we can detect double dots in black, always used as separators but not necessarily in the same way as a colon (or any other punctuation mark) would be used in modern European languages (including modern Georgian); they simply serve to denote boundaries between major meaningful elements (words, phrases, or clauses).

The text of the rubric continues with the names of the saints commemorated, all in the genitive case as if depending on a head noun like 'commemoration': *çmidisa : ananiasi sṗarsisay : da çmidata : ʒmata : onisime : da solomonisi : epesis mtavareṗisḳoṗostay* 'of Saint Ananias the Persian and of the Saints, the brothers Onesimus and Solomonus, the archbishops of Ephesus'. Note that the word for 'saint' in its singular and plural forms appears abbreviated here, with a similar overbar marking the suspension (*ç̃isa / ç̃ta*), as do many other common words in both the rubric and the main text. What follows in the fourth line of the heading, are elements of prayers (*upalo čueno* 'our Lord', again abbreviated: *o̅o č̃no*; and *šeiçq̇alen* 'have mercy', written *š̃n* with the first character in red and the second together with the abbreviation mark, in black); between them we find the indication of a 'mode' to be used in singing (*: q̃y :* = *qmay a̅*, lit. 'tone (or voice) 1', with the noun written in black), and, as the first textual elements written in minuscules, the (abbreviated) *incipit* of the master hymn (*heirmos*) sung in that 'mode' (*sṭ̃q̇y dau:* = *siṭq̇uay dausabamoy*, 'the boundless word').

The main text block then consists of hymns of praise addressed to the commemorated saints, with the initial letters of the individual strophes extending into the margin, as majuscules; the first initial is in red, the others in black. The red dots (or combinations of red and black dots) denote boundaries between individual verses while the end of strophes is indicated by more complex arrangements of punctuation marks (⁖, ÷, and the like, in black). The most complex arrangements of dots, quincunxes (⁘) in black with a red cross overlaid, are found in the left margin, encircling the long-shaft cross in purple; as a matter of fact, the latter is likely to represent a character rather than the cross, namely the Georgian majuscule letter *k* (ⴊ) standing for 'Christ', *krisṭe*, or even its Greek equivalent, the *Chi-Rho* symbol, adapted in shape to the Georgian *k*.

With up-to-date computer systems and text processing software, it may well be attempted to reproduce the contents of a manuscript page of this complexity as it is, both on the screen and on a (colour) printer; Table 0.2.12 shows to what extent the 'WYSIWYG' principle ('what you see is what you get') can be achieved having appropriate fonts at hand. It must be stressed here, however, that some of the characters implied are not yet represented in Unicode (as of January 2014) so that the encoding remains arbitrary to a certain extent. This is true, for example, for the peculiarly shaped *k* symbol (with a loop to the right at its top) standing for *krisṭe*, which is replaced by a mere *k*-letter here (Unicode does provide a code point for the *Chi-Rho* symbol, U+2627, which might as well have been used). It is also true for the combinations of a quincunx with an overlaid cross (the former does have a code-point, U+2059, but the latter has none);

Table 0.2.12 Near-to-facsimile rendering of MS Vienna, ÖNB, Cod.Vind.georg. 2, front fly-leaf (excerpt)



what is more, the co-occurrence of two colours within the combinations makes it impossible to encode them as 'precomposed' characters. A more important deficiency of the Unicode standard of today is the lack of code-points for the different types of overbars appearing in numerical notations and abbreviations (over one character, over two characters, etc.) in mediaeval manuscripts, not only of Georgian provenance.

It must be stated off-hand that such a near-to-facsimile representation of the contents of a manuscript has only a very limited use as it can only be deployed as part of a 'diplomatic' edition (see Ch. 3 § 3.11 for this type of editions). For most other purposes, the 'surface-oriented' aim to reproduce the visual appearance of a given manuscript page will be deemed subordinate to a consistent registration of the meaningful elements contained in the texts and their functions. This is true, first of all, for the preparation of 'critical' editions that are based on the collation of several manuscripts. In this process, described in more detail in Ch. 3 of the present handbook, one would typically ignore the distinction of majuscules and minuscules as well as the different colours and sizes as appearing in our example. Words written across line breaks (with or without hyphenation marks, as usual in Georgian manuscripts) would be re-joined; in addition, one would resolve the abbreviations and, possibly, also the values of numerically used letters. Depending on the specific conventions of the individual scholarly traditions, one might further adapt the system of punctuation appearing in the manuscript with that used in modern orthography, including the corresponding division into sentences (or, in the case of metrical texts, verses) and the use of a modern script. For the fly-leaf of the Vienna codex, we should thus arrive at a rendering like that displayed in Table 0.2.13a. For the purpose of illustration, the Table contains the same text in both the modern Georgian *mxedruli* script and in a Roman transcription; note that the Old Georgian digraph ⴍⴗ (lit. *ow*), which represents the plain vowel *u*, is rendered by the single letter ჳ = *u* here as usual in modern Georgian editions.

The rendering thus achieved consists only of the most basic elements of textual contents, namely words (separated by spaces), clauses and sentences (separated by punctuation marks), and paragraphs (separated by hard line breaks). A 'plain text' of this type can indeed be used for several purposes, as the basis for a 'critical' text edition to be produced, as the basis of collation with other witnesses (automatic or manual, see Ch. 3 § 2.2), or as the basis for (automatic) indexation (Ch. 3 § 2.6.5). For the latter purpose, however, the 'annotation' of some more information will be required, depending on what kinds of indexes are to be generated. For a mere word index that ignores the affinity of a given (inflectional) word form to the corresponding lexicon entry (the lemma), it will still be necessary to apply a system of reference to the individual units of the text, that is chapters, paragraphs, sentences and the like if the indexation is meant to refer to its 'internal' structure, or production units, folia / pages, columns, lines and so on if it is meant to refer to its 'external' representation in a given manuscript—without such a referencing system, the index would be a mere assemblage of all word forms occurring, which would be rather worthless, especially if the text has a considerable length. The establishment and application of a consistent referencing system may also be helpful for later comparison of a given text with parallel sources. A good example for this is the referencing system used for Biblical texts today, which consists of the indication of a given book, chapter, and verse, and which has substituted older systems such as that of the Ammonian section numbers. In an ideal case, the different systems of reference relevant to a given text should be combined with

Table 0.2.13 Rendering of Vienna, ÖNB, Cod.Vind.georg. 2, f. 1a (excerpt)

(a) Plain text rendering

თთუესა დეკემბერსა 1.	*ttuesa deḳembersa 1.*
წმიდისა ანანიასი სპარსისაჲ და წმიდათა ძმათა ონისიმე	*ċmidisa ananiasi sṗarsisay da ċmidata*
და სოლომონისი ეფესის მთავარეპისკოპოსთაჲ.	*ʒmata onisime da solomonisi epesis*
	mtavareṗisḳoṗostay.
უფალო ჩუენო! შეიწყალენ!	*upalo čueno! šeiċqalen!*
ქმაჲ 1: სიტყუაჲ დაუსაბამოჲ...	*qmay 1: siṭquay dausabamoy...*
შესხმითა სულიერითა, ანანიას ერნო, შევამკუდეთ	*šesxmita sulierita, ananias erno, ševamḳudet ḳovelni*
ყოველნი წმიდასა მოწამესა, რომელმან დათრგუნა ძალი	*ċmidasa moċamesa, romelman datrguna ʒali igi*
იგი უჩინოჲსა მის მტერისა და გჳრგჳნ-შემოსილი	*učinoysa mis mṭerisa da gwrgwn-šemosili ixarebs*
იხარებს ზეცას კრებულსა თანა უჯორცოთასა.	*zecas ḳrebulsa tana uqorcotasa.*
ურიცხუნი განსაკითხავნი...	*uricxuni gansaḳitxavni...*

(b) Overlapping hierarchies (non-compliant)

```
<line n='5'><hymn n='1'><strophe n='1'><verse
n='1'>šesxmita sulierita, ananias erno,</verse> <verse
n='2'>šev</line><line n='6'>amḳudet ḳovelni ċmidasa
moċamesa,</verse> <verse n='3'>romelman datrg</
line><line n='7'>una ...</verse>
```

(c) Overlapping hierarchies (compliant)

```
<line n='5' /><hymn n='1'><strophe n='1'><verse
n='1'>šesxmita sulierita, ananias erno,</verse> <verse
n='2'>šev<line n='6' />amḳudet ḳovelni ċmidasa
moċamesa,</verse> <verse n='3'>romelman datrg<line
n='7' />una ...</verse>
```

each other as in the online edition of one of the oldest Georgian codices, the so-called 'Sinai Lectionary' of the Universitätsbibliothek Graz (Austria), provided by the TITUS project (Graz, UBG, 2058/1; Gippert et al. 2007b), which provides the references both to the position in the manuscript ('Manuscript page' and 'line') and to that of the Gospel passage concerned ('Book', 'Chapter', 'Verse') side by side (see fig. 0.2.3). In addition, the online text contrasts the 'diplomatic' rendering of the manuscript text (in Old Georgian majuscules) with a transcript into 'modern' style (*mxedruli*). The index produced on this basis is incorporated in a search engine which can be accessed, for example, by clicking upon a word form (in *mxedruli*), which will yield a list of all occurrences of the given word form within the same text, with clear indication of their position (see <http://titus.uni-frankfurt.de/texte/textex.htm> for a description of the applicable methods of use of the TITUS search engine, and fig. 0.2.4 for the output of the query for Georgian *ċigni* 'book, epistle, letter').

More sophisticated types of annotations must be applied if an index is to subsume word forms under their respective lemmas and if it is meant to differentiate common nouns from several types of proper names (personal names, toponyms, ethnonyms etc.), as usual in modern text editions. In this case, the word forms in question must be 'marked up' in a special way, with the corresponding information being added in an underlying structure. This is the approach taken by the 'Text Encoding Initiative' (TEI), a 'consortium which collectively develops and maintains a standard for the representation of texts in digital form' (see <http://www.tei-c.org>) and which comprises, among others, a 'Special Interest Group' concerning manuscripts (see <http://www.tei-c.org/Activities/SIG/Manuscript/>). The foundation of the TEI approach, outlined in extensive 'Guidelines for Electronic Text Encoding and Interchange' (present issue: 'P5'; <http://www.tei-c.org/release/doc/tei-p5-doc/en/html>), is the application of the so-called 'eXtensible Markup Language' (XML), an extremely flexible markup system developed by the 'World Wide Web Consortium' (W3C; <http://www. W3.org/XML/>) since the 1990s in extension of former standards such as SGML ('Standard Generalized Markup Language') and HTML ('Hypertext Markup Language', the markup system used predominantly in web pages to this day). The basic structural element of these markup languages consists of so-called 'tags', i.e. information units stored, in angle brackets, either on both sides of a text element to be marked up ('start-tag' and 'end-tag') or as independent entries ('empty-element tag'); these tags will usually not be rendered as such on the screen or in print but serve the purpose of controlling the output 'from behind'. To mark, for example, that a given word in a text is meant to be output in bold characters in an HTML-based web page, it has to be enclosed in two corresponding tags, which are and respectively, denoting the beginning and the end of the bold-faced area. With an empty-element tag, one can add the information that there is a line-break at a given position; the corresponding HTML tag is
. In contrast to this, XML exhibits two differences. First, empty-element tags must here be terminated by a slash within the brackets (
), thus distinguishing them from start-tags, which have no slashes. Second, and this is the major advantage of XML, the tags to be used can be chosen *ad libitum*, provided the choice is declared in either a 'Document Type Definition' (DTD)

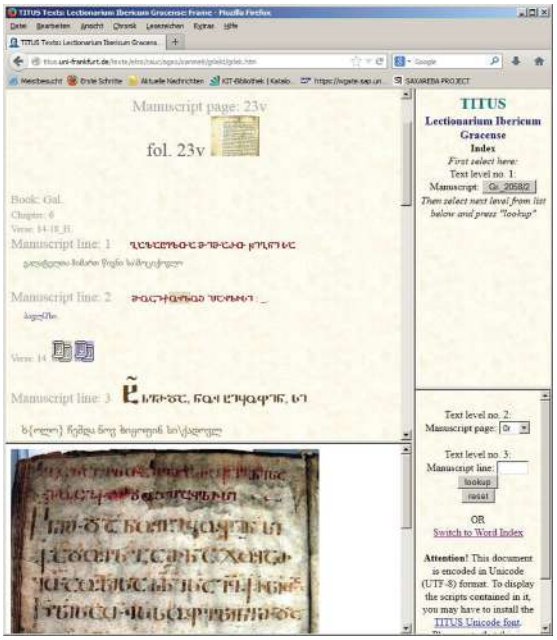


Fig. 0.2.3 Online edition of the Graz Sinai Lectionary

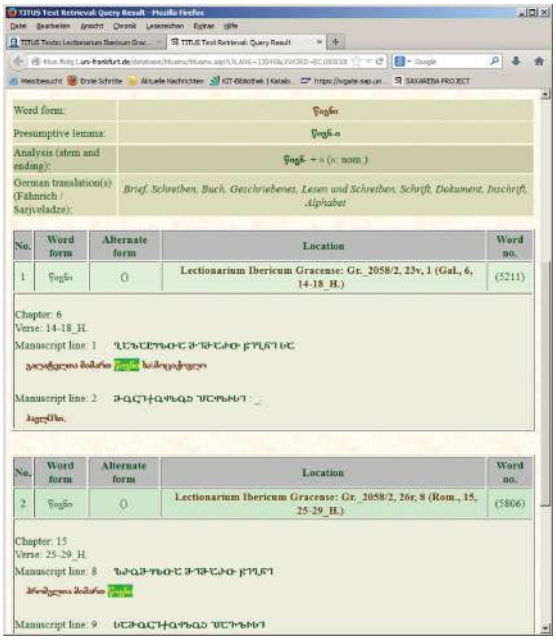


Fig. 0.2.4 Search engine output (*çigni* 'book')

or an 'XML Schema Definition' (XSD). This allows, for example, the use of a more explicit <bold> tag instead of <b>, or <line-break /> instead of
. Unlike the fixed set of tags acknowledged by the HTML standard, which was mostly addressed towards screen output and did not therefore contain many content-related tags, XML can thus be conceived to further distinguish several types of meaningful text elements such as indications of dates (in our Georgian menaion example, <date>*ttuesa deḳembersa* 1</date>), personal names (for example, <anthroponym>*ananiasi*</anthroponym>), ethnonyms (<ethnonym>*sp̣arsisay*</ethnonym>), hymn incipits (<incipit>*siṭq̇uay dausabamoy*</incipit>), or verses (<verse>*šesxmita sulierita, ananias erno*</verse>), with a view to a particular rendering in the output, to proper indexation, or to other purposes.

An even more powerful feature of the markup languages is the possibility of adding 'attributes' to the tags, consisting of a denominator and a value. These can be output-oriented as in the case of the HTML 'font' tag which can imply information as to the size, colour, and other features of the font the marked-up text is to be displayed in (in our manuscript, for example, *deḳembersa*). Beyond this, an appropriate XML tag may contain lexical, grammatical, or other content-related information (for example, <word lemma='deḳemberi' morph='dat_sg'>*deḳembersa*</word>). The flexibility of XML even allows for a combination of both types of information (<word lemma='deḳemberi' morph='dat_sg' fonttype='mrglovani' fontsize='12' fontcolour='red'>*deḳembersa*</word>). By the way, it is true that much 'markup' information that is linguistic can be added automatically, by applying so-called 'parsers' that analyse the given text on the basis of programmed grammatical rules and lexicons; however, in the field of oriental manuscript studies and the languages relevant to them, the development of tools for these purposes is not yet very much advanced.

Another important feature of XML is that taggings can further be nested, thus allowing, for example, to account for the change of the font colour in the abbreviated imperative form *šeiçq̇alen* 'have mercy' in our text, which might be tagged as <word expanded='šeiçq̇alen' lemma='šeçq̇aleba' morph='impv_aor'><chunk fontsize='14' fontcolor='red'>*š*</chunk><chunk fontsize='14' fontcolor='black'>*̃n*</chunk></word>. (As a matter of fact, several more sophisticated ways of annotating abbreviated word forms have been designed in the TEI-P5 guidelines.)

A peculiar problem of XML is that hierarchically organized taggings must not overlap in the sense that a start tag Y must not fall between a superior sequence of a start tag X and an end tag X if the end tag corresponding to Y does not (schematically: <X> … <Y> … </X> … </Y>). This is especially crucial for the parallel markup of different referencing systems ('internal' and 'external' references in the sense outlined above). If in our Georgian example, we wanted to mark up both the units of the text structure (for example, verses) and their distribution on the manuscript page, we should arrive at exactly this problem right from the second verse on; what is more, there are line breaks within words that would have to be accounted

for. Table 0.2.13b shows the resulting picture for the first three lines of the hymnal text, which would not be XML-compliant. A possible way out of this is the use of empty-entity tags for one of the overlapping hierarchical referencing systems; in Table 0.2.13c, it is the ('external') line referencing that is treated this way, with an XML-compliant result (note that font colours and other similar parameters are ignored here).

Taking all the features of XML together, it is conceivable that the contents of a manuscript can be electronically annotated with them in such a way that both different forms of editions ('diplomatic' and 'critical', printed and online) and several kinds of indexes can automatically be derived from the annotated text (cf. Ch. 3 § 3.1 for relevant considerations). For the former purpose, this presupposes the design and application of so-called 'Extensible Stylesheet Language Transformations' (XSLT), which can be used to transform XML documents into HTML web pages, plain text files, or 'Extensible Stylesheet Language Formatting Objects' (XSL-FO) which can subsequently be converted to PDF or other output formats. For indexation, one may still have to rely upon special tools that are conceived to extract the targeted information. The more scholars show interest in these kinds of tools and methods, the more it is likely that we shall have them at hand for usage in the foreseeable future.

2.1.3. Manuscript related databases and their structuring

In recent years, XML has gained more and more ground in yet another domain that is relevant for manuscript studies, namely the structuring of databases. If we leave indexes used for the search of words or word forms in textual contexts aside, the typical field of application for databases concerning manuscripts is cataloguing. More and more manuscript catalogues are being conceived and compiled electronically today, both as a basis for printed output and for the integration in online search engines, portals, and the like (see Ch. 4 § 6), and the question of how to structure them may therefore be crucial. As in other fields of application, XML-based structures are in competition with so-called 'relational' databases here, and the decision in favour of one or other of them may not be easy to take.

The main difference between the two types of database consists in the fact that XML yields more flexible structures than relational databases, which are characterized by a consistent setup of 'records', that is entries. Typically, a record in a relational database comprises a fixed set of 'fields' that are identical throughout the whole collection of data of the same structure. The interrelation of these elements can easily be visualized in form of a table, with the rows representing records and the columns, fields; see Table 0.2.14 for an arbitrary example that is derived from the description scheme developed for the 'Union Catalogue of Oriental Manuscripts in German Collections' of the Göttingen Academy of Sciences (see Ch. 4 § 6.1 for more details). It is true that such a scheme can be extremely helpful to ascertain that no item of information is overlooked and that the data are kept consistent, for example, in their orthographical representation, throughout the records; there is a clear disadvantage, however, in that it may be difficult, if not impossible, to deal with manuscripts of mixed content, written by different scribes and/or at different times and places, etc. In other words, as soon as we take codices into account that consist of several 'production units' (see Ch. 4 § 4 for the concept underlying this term), the given scheme may all too soon prove to be too rigid to be expedient.

If we conceive the same database in an XML structure, we may indeed 'spread' the scheme much more easily according to the peculiarities of our objects. The 'shelf number' may still be the governing information, but we may insert any number of 'production units' below it, each with its own record of data. In addition, there is no limit as to the amount of data to be stored within a given field, different from relational databases where this may lead to problems. Table 0.2.15 may give an idea of such an approach, building upon the arbitrary example introduced above.

It will be clear from this example that an XML database has a certain disadvantage, too. This is the amount of data that has to be stored and processed in a clear-text structure of this type. This may be un-

Table 0.2.14 Relational database structure used in cataloguing (example)

shelf number	material	state of preservation	pages	format	lines	writing style	decoration	scribe	date	origin	author	title
1	parch.	III	142	17 × 23	26	maj.	+	Io.Zos.	981	Sinai	anon.	Gospels
2	paper	II	255	16 × 24	29	min.	–	unknown	1231	Šaṭberdi	Mi.Mo.	Hymn.
3	parch	IV	183	18 × 23	25	maj.	+	Io.Xax.	X	Ṭao	anon.	Hagio.

Table 0.2.15 XML database structure used in cataloguing (example)

```
<shelfnumber n='1'>
  <productionunit n='1'>
    <material>parchment</material>
    <stateofpreservation>III</stateofpreservation>
    <pages>1r-126v</pages>
    <format>17 × 23</format>
    <lines>26</lines>
    <writingstyle>majuscules</writingstyle>
    <illumination n='1' page='3r'>Matthew</illumination>
    <illumination n='2' page='38r'>Mark</illumination>
    <illumination n='3' page='64v'>Luke</illumination>
    <illumination n='4' page='101r'>John</illumination>
    <scribe>Ioane Zosime</scribe>
    <date>981</date>
    <origin>St. Catherine's Monastery, Mt. Sinai</origin>
    <author>anonymous</author>
    <title>Gospels</title>
  </productionunit>
  <productionunit n='2'>
    <material>parchment</material>
    <stateofpreservation>III</stateofpreservation>
    <pages>127r-139v</pages>
    <format>17 × 22.5</format>
    <lines>28</lines>
    <writingstyle>majuscules</writingstyle>
    <scribe>Ioane Zosime</scribe>
    <date>981</date>
    <origin>St. Catherine's Monastery, Sinai</origin>
    <author>anonymous</author>
    <title>Lection index</title>
  </productionunit>
  <productionunit n='3'>
    <material>parchment</material>
    <stateofpreservation>IV</stateofpreservation>
    <pages>140r-142v</pages>
    <format>17 × 22.5</format>
    <lines>29</lines>
    <writingstyle>minuscules</writingstyle>
    <scribe>Ioane Zosime</scribe>
    <date>981</date>
    <origin>St. Catherine's Monastery, Sinai</origin>
    <author>Ioane Zosime</author>
    <title>Colophon</title>
  </productionunit>
</shelfnumber>
<shelfnumber n='2'>
  <productionunit n='1'>
    <material>paper</material>
    <stateofpreservation>II</stateofpreservation>
    <pages>1r-255v</pages>
    <format>16 × 24</format>
    <lines>29</lines>
    <writingstyle>minuscules</writingstyle>
    <scribe n='1'>unknown</scribe>
    <scribe n='2'>Giorgi</scribe>
    <date>1231</date>
    <origin>Šaṭberdi</origin>
    <author>Mikael Modreḳili</author>
    <title>Hymnary</title>
  </productionunit>
</shelfnumber>
...
```

problematic if the database is only meant to be the basis for printed or online output; for other purposes such as, for example, retrievability via hypercatalogues (see Ch. 4 § 6.2), relational databases may still be regarded as superior, given that they can be accessed much faster due to preindexation. However, with the steadily increasing storage capacity and processing speed of modern computers, this advantage may vanish soon.

2.1.4. Digital imaging

No field relevant to oriental manuscript studies has profited more from technological progress in the digital age than imaging. A clear witness to this is the fact that the amount of high-quality images of manuscripts that are available online has been increasing exponentially since the late 1990s, and many of us use such images every day without thinking too much about their structural properties. Nevertheless, it may be worthwhile here to summarize a few basics concerning the processes involved.

No matter what quality is to be achieved, digital imaging presupposes the dissolution of the visual appearance of a given object into a bulk of tiny dots, so-called pixels, each of them characterized by a certain degree of light intensity of different colour components, mostly red, green, and blue, exposed either individually or in groups (stacks). The number of picture cells (pixels) available on the camera sensor is the basis for the calculation of the data a digital image comprises, usually called its 'resolution': while by the end of the twentieth century, an amount of two megapixels (1,600 × 1,200 pixels, with an aspect ratio of 4:3) was still beyond reach, cameras with a resolution of 50 megapixels (8,176 × 6,132 pixels with the same ratio) are no longer exceptional today. With such a resolution, even an extremely large manuscript page of 82 × 61 cm could be photographed and reproduced in printed form without any visible loss of information, the resolution still yielding 10 pixels per millimetre in printing. For the complete rendering of the same page on a computer screen, much lower resolutions would be sufficient, given that a normal screen resolution of 1280 × 960 pixels equals to no more than 1.23 megapixels; however, the great advantage of large-resolution digital images is that they can be enlarged in screen output so that individual sectors of the manuscript page can be displayed in even much larger size than that of the original.

The calculation by pixels (or dots) per centimetre (or per inch, differentiated by a factor of 2.54) may be misleading, however. In the early years of manuscripts digitization, when the resolution of digital cam-

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eras was not yet sufficient for this purpose, attempts were made to achieve the same goal by applying optical scanners with much lower resolutions; for example, a flatbed scanner with a surface of 21 × 29.7 cm (the measure of A4 paper) and a resolution of 600 dots per inch (dpi; the metrical equivalent would be 236 dots per centimetre) yielded a digital image of (4960 × 7015 =) 34.8 megapixels, and even with 300 dpi the image still had (2480 × 3057 =) 8.7 megapixels. However, the application of flatbed scanners for the digitization of manuscripts was not always possible due to conservation concerns, either because of the extreme light exposure those scanners work with or because of the threat of damaging the binding of the codices etc. Therefore, an intermediate solution was sought in the application of a hybrid approach which made use of traditional (film) photography by producing colour slides as the basis for digitization; this approach was, for example, applied in one of the earliest projects aiming at an online edition of manuscripts comprising colour images of the originals, namely the project concerning the Tocharian manuscripts of the Berlin Turfan collection, which have been published on the TITUS server since 1999 (see <http://titus.fkidg1.uni-frankfurt.de/texte/tocharic/tht.htm>). The resolution that could be achieved on this basis in the late 1990s was 2700 dpi, a value seeming much higher indeed than the 600 dpi of a flatbed scanner; however, we must consider that the surface of the underlying colour slides was much smaller than that of any manuscript page and that the scanner resolution is always relative to the size of the scanned object: when a colour slide of 24 × 36 mm containing an image of an A4-sized manuscript page was scanned at the resolution of 2700 dpi, the resulting image comprised (2551 × 3827 =) 9.7 megapixels, which was not much more than the resolution of a 300 dpi scan of the same page on an A4 flat-bed scanner or a digital image of it with a resolution of 10 megapixels (Table 0.2.16 lists some noteworthy figures concerning the digitization of an A4-sized manuscript page). Still, the production of colour slides had a big advantage, given that they can be used as a secondary ('analog') storage medium in order to preserve the contents of a large amount of manuscripts and that they remain available for scanning with higher-resolution scanners for a long time, with no need to touch (and contaminate) the original documents. It must be underlined though that all this depends on the quality of the film used and that only a few colour slide films have proven to sustain the quality of the images they contain over a longer period of time.

The same holds—and even more so—for the digitization of microfilms, an approach that has been undertaken with great effort until the present day (for example, the digital collections of manuscripts at the Bayerische Staatsbibliothek, Munich, are partly based on microfilms 'in a bitonal or grey-scale quality' instead of 'full colour copies' of the original manuscripts; see <http://www.digitale-sammlungen.de/index.html?c=sammlungen&kategorie_sammlung=1&l=en>). This may be acceptable in cases where the original manuscripts have been lost or are no longer or not easily accessible for other reasons, as in the case of the microfilms of the manuscripts of St Catherine's Monastery on Mount Sinai which were produced in the 1940s on behalf of the Library of Congress and parts of which have now been digitized for online retrieval (see, for example, the collection 'Microfilms des manuscrits géorgiens du Mt Sinai' provided by the Université Catholique de Louvain, Belgium, <http://www.e-corpus.org/eng/notices/96559-Microfilms-des-manuscrits-g%C3%A9-orgiens-du-Mt-Sinai.html>). In other cases, however, the quality of microfilms, especially those produced during extensive microfilming campaigns as in the case of the Sinai manuscripts, is hardly sufficient to meet the requirements of in-depth manuscript studies. This is all the more true since the microfilms used in such campaigns were usually monochrome, thus obscuring information on the use of different (coloured) inks, which may be crucial as a text structuring element in many cases (see above). In any digitization project, the question of whether and to what extent microfilms may be a usable basis should therefore be pondered seriously. The production of new digital images directly from the original manuscripts will nearly always yield much better results today (see also Ch. 5 § 7 for a detailed treatment of the processes involved).

In the recent past, special methods of digital imaging have gained importance in oriental manuscript studies, especially in the analysis of palimpsests. Based on the fact that parchment as the typical support material of palimpsests fluoresces in ultraviolet (UV) light (see General introduction § 2.3), it was mostly UV photography that was used until the end of the twentieth century to enhance the contrast between the parchment surface and the ink of the underwriting, with more or less satisfying results. By the beginning of the twenty-first century, UV photography has been superseded by so-called 'multispectral imaging', a process that builds upon the production of several images that are restricted to a certain wavelength of the visible and the invisible light (ultraviolet and infrared), and the digital comparison of these images. The main principle of multispectral imaging consists in the fact that the resonance of any object differs with

Table 0.2.16 Digitizing a manuscript page of A4 size

A4-page	11,69 × 8,27 inch	29,7 × 21,0 cm
colour slide / microfilm image	1,42 × 0,94 inch	3,6 × 2,4 cm
Microfilm / slide scanner, 1200 dpi	1704 × 1132 pixels	2 megapixels
Flatbed scanner, 300 dpi	3507 × 2480 pixels	8.7 megapixels
Microfilm / slide scanner, 2700 dpi	3834 × 2538 pixels	9.7 megapixels
Digital camera, 12 megapixels	4200 × 2800 pixels	11.7 megapixels
Microfilm / slide scanner, 4000 dpi	5680 × 3760 pixels	21.35 megapixels
Flatbed scanner, 600 dpi	7014 × 4960 pixels	34.8 megapixels
Flatbed scanner, 1200 dpi	14028 × 9920 pixels	139.2 megapixels

respect to different wavelengths, depending on the consistence of its colour. By applying a photographing method that is restricted to a certain range of the spectrum, a specific resonance may be retained or suppressed. In the case of palimpsest manuscripts, the effect that can be gained from this predisposition depends on three factors: the colour resonance of the upper script, that of the lower script, and that of the background, i.e. the parchment surface. One might expect that the first two are the most decisive factors in this constellation, as in many cases it will be desirable to 'enhance' the lower script in contrast to the upper script covering it. This, however, is not always possible in parchment palimpsests of oriental provenance as both the lower and the upper scripts were usually written with the same type of inks, which results in similar resonances. Thus the application of multispectral imaging must concentrate upon two aims, a) increasing the contrast between the (erased) lower script and the background, and b) exploiting the difference of several images showing the same object to reduce the preponderance of the upper script. Normally, a set of three images (one in the UV or violet range, at a wavelength of less than 440 nm; one in the yellow or green range, at a wavelength of between 500 and 600 nm, and one in the red or near-infrared range, at a wavelength of above 700 nm) will be sufficient for this purpose. Several projects concerning oriental palimpsests have successfully adapted multispectral imaging since 2002 (see General introduction § 2.4), and the methods and facilities implied are steadily developing.

References

Gippert et al. 2007a. Web sources: Gippert et al. 2007b; <http://www.digitale-sammlungen.de/>, last access October 2014; <http://www.e-corpus.org>, last access October 2014; <http://www.tei-c.org/>, last access October 2014; <http://www. W3.org/XML/>, last access October 2014; <http://titus.fkidg1.uni-frankfurt.de>, last access October 2014

2.2. Instrumental analysis in manuscript studies (IR)

Physico-chemical analyses of writing materials offer insight into various questions associated with historical, cultural and conservation aspects of manuscript studies. The catalogue of questions includes authenticity, dating, or attribution of various parts of the text to different scribes, relation between primary and secondary texts, and so on. Similarly, preservation of the manuscripts requires knowledge of the composition of the original materials vs. old repairs, identification of damage, as well as recognition of natural ageing and degradation processes. The material sciences can contribute data about the chemical compositions of the writing materials, elucidation of the techniques of their production and the absolute age of organic components, as well as characterization of corrosion effects, evaluation of conservation treatment, and monitoring of the preservation state.

It is probably impossible now to pinpoint the first analytical studies of objects of historical interest. It seems, however, that metal studies of pre-historic finds in the 1870s belong to the earliest documented chemical investigations. In 1888 the first chemical laboratory, today known as Rathgen Research Laboratory, was opened in Berlin to assist conservation. Within the following fifty years scientific studies in archaeology and conservation became established mostly within the frame of Egyptology, as witnessed by numerous editions of the standard textbook *Ancient Egyptian Materials and Industries* first published by Alfred Lucas in 1926 (1962[4]).

In 1946 Willard Libby published the first paper on the decay of radiocarbon, which can be viewed as a revolution in the studies of organic artefacts: he showed that organic matter carries an internal clock and, therefore, can be dated within the range of approximately fifty thousand years. It took some forty years to improve the measurements methods that allow for reduction of the material tested, to standardize and to calibrate this technique (<http://www.c14dating.com/>). Despite the fact that it is an inherently destructive analysis, it is universally accepted in the studies of manuscripts.

In the 1990s another scientific breakthrough—DNA sequencing—looked very promising not only for identification of the precursor species for parchment but for a range of historical questions such as relation between the species and their geographical origin. This technique is, however, still under refinement and is not routinely employed in the field of manuscript studies (Bower et al. 2010). Recently, researches from the department of archaeology at the University of York developed a radically new method that requires only minute amounts of collagen to determine the species of animal used in parchment production (Fiddyment et al. 2014). We hope that this technique will find a broad application in the field of cultural heritage.

One of the great shortcomings of the radiocarbon and DNA methods is their sensitivity to contaminations. Radiocarbon analysis of a contaminated sample can easily result in an error of hundreds of years. Therefore, both techniques should be coupled with non-destructive material analysis to reduce the chance of sampling contaminated material.

Over the last two decades, the impact of material studies has increased enormously with the industry-driven development of so-called 'non-destructive technology' (NDT) that does not require extracting samples for testing. Further technological developments have led to the invention of NDT methods using extremely small measurement spots. Alongside their advantages, however, these methods have obvious limitations when deployed to analyse objects whose composition displays heterogeneity of the same order of magnitude as the measurement spot. Therefore their application as a random single-shot measurement should be avoided. Since protocols for routine measurements pertaining to X-ray intensity, measurement time and minimal signal-to-noise ratio similar to those current in the medical sciences have yet to be established, presently available results must be interpreted with extreme caution. Denker et al. (2006) offer a good introduction to relevant technical investigations in the field of arts and cultural heritage.

The most popular non-destructive techniques can be roughly subdivided into optical and vibration spectroscopy for the identification of chemical compounds, and X-ray emission techniques for the identification of elemental composition. Other techniques such as electron microscopy to study surface morphology and X-ray diffraction (XRD) to identify pigments are traditionally used when extracting samples is allowed. XRD is a method based on the fact that X-rays' interaction with crystals results in patterns that are specifically characteristic of the crystal structure of the material tested.

Optical properties reflect the interaction of a material with light from ultraviolet (UV), visible (VIS), and infrared (IR) regions of the electromagnetic spectrum. IR reflectography has been traditionally used to study soot-based pigments or carbon inks: the colour of soot inks is independent of the illumination wavelength in the range 300–1,700 nm; plant inks lose opacity between 750 and 1,000 nm, whereas iron-gall inks become transparent only at a wavelength > 1,000 nm. Similarly, multispectral imaging for the visualization of palimpsests can allow one to differentiate between soot-based and tannin-based inks, since only the latter become transparent in the infrared region of the spectrum. A conventional multispectral imaging set-up employs LED illumination with up to thirteen different wavelengths ranging from UV to near IR region (Christens-Barry et al. 2011). To incorporate ink differentiation into routine manuscript digitization workflows, one could adopt a simplified 2- or 3-wavelength reflectography, since the main goal is to investigate the opacity in the spectral range 700–1000 nm. An easy way to add such functionality to the routine inspection of manuscripts by scholars is to use a hand-held USB microscope equipped with a 940 nm light source, or a pocket multispectral camera. It should be stressed, however, that pure soot inks can be unambiguously identified by reflectography at a wavelength > 1,000 nm. It is distinguishing between plant and iron-gall inks that is challenging and requires additional tests in the range 750–1000 nm. It has become customary to refer to this range as 'near infrared' since commonly used digital cameras are equipped with silicon detectors that lose sensitivity around 1,000 nm.

Vibration spectroscopy (IR and Raman) allows identification of molecules and their structure by supplying specific information on vibrations of atoms in the molecules and is therefore routinely applied in order to screen unknown materials. In the first technique, a molecule absorbs a portion of the irradiated infrared light, hence its name, IR spectroscopy. In the second technique, Raman spectroscopy—named after the Indian physicist Sir Chandrasekhara Venkata Raman—monochromatic light in the ultraviolet,

visible, or near infrared ranges of the electromagnetic spectrum hits the sample and loses part of its energy. The difference in energy corresponds to the molecule vibration. Since the mechanisms of the interaction between light and matter differ from one technique to the other, these techniques complement each other. Historically, IR spectroscopy has been commonly used for the investigation of organic materials. It is a well-established method for classifying binding media in inks and pigments, surface treatments, and adhesives. To perform a conventional measurement (in so-called 'transmission mode'), a thin or powdered sample is placed in the beam pass, and the amount of transmitted light is detected as a function of wavelength or frequency, resulting in an infrared spectrum. Hence, this method requires samples to be extracted from an object. To reduce the sample size, special diamond cells to be placed in the beam path were developed. Rapid technological progress in this field led to the appearance of non-destructive methods based on the detection of the IR-radiation reflected by the sample, thus eliminating the need to extract samples from the object. Examples of these techniques are Attenuated Total Reflection Fourier Transform Infra-Red (ATR-FTIR) spectroscopy (Marengo et al. 2005) to study surfaces, fibre-optic FTIR in reflection (Miliani et al. 2007), and synchrotron-based FTIR spectroscopy (Salvadó et al. 2005; Bartoll et al. 2008). The miniaturization of infrared light sources and detectors brought a new generation of portable FTIR spectrometers, for example a hand-held Exoscan (*A2 Technologies* 2011).

Raman spectroscopy has proved useful in studies of decorated manuscripts, since tabulated Raman data for inorganic salts and minerals allow for a quick and unequivocal identification of (inorganic) pigments (Brown – Clark 2004; Baraldi et al. 2009). Reliable Raman identification of mediaeval black inks started to emerge only during the past decade (Lee et al. 2008). Raman studies of the inks show that soot, plant and iron-gall inks have characteristic Raman spectra that provide a recognition pattern (Bicchieri et al. 2008). Unfortunately, mobile tools designed for on-site use by non-specialists are not yet available. Nevertheless it is to be hoped that the ongoing analysis of historical ink samples by means of conventional techniques will ultimately lead to improvements in the mobile equipment and the establishment of a database of different inks.

Elemental analysis by X-ray emission techniques relies on the study of characteristic patterns of X-ray emissions from atoms irradiated with high-energy X-rays or particles: X-ray Fluorescence (XRF), Particle Induced X-ray Emission (PIXE), and Energy-dispersive X-ray spectroscopy (EDX). When the external excitation beam interacts with an atom within the sample, an electron of the inner shell is ejected, creating a vacancy. In the next step, another electron from an outer shell fills the vacancy. The energy of the emitted X-ray fluorescence is characteristic for a certain element, whereas the signal intensity allows one to determine the amount of the element in the sample. It is noteworthy that each technique has its applicability limits and different penetration depths, so that excitation by electrons (EDX), conventionally used with electron microscopy, is limited to the study of surfaces (but capable of detecting light elements), whereas excitation by X-rays (XRF) has a greater penetration power and allows one to detect elements with $n > 13$, that is elements heavier than aluminium. Though XRF is one of the most suitable methods for obtaining qualitative and semi-quantitative information (relative to the major element) concerning a great diversity of materials, it should be remembered that it is not suitable for the determination of the elemental composition of organic materials since their main constituents (carbon, oxygen, nitrogen, and hydrogen) cannot be detected with this technique. Therefore, it is advisable to use both XRF and EDX techniques for such studies. Indeed, new scanning electron microscopes are often equipped with both instruments.

Today XRF is undoubtedly one of the most popular techniques used on-site because it benefits from the availability of a variety of transportable instruments ranging from single-spot to high-resolution scanning equipment, as well as from a wealth of knowledge and experience that has been accumulated in the characterization of various writing materials. Recently, I compared three mobile XRF (Bruker) spectrometers used for manuscript studies (Rabin 2014).

The low-resolution, portable instrument TRACER SD-III is relatively cheap, light and easy to operate. In many cases it provides one-shot analysis, and it is best used with homogeneous materials. Its major shortcomings are low sensitivity and low spatial resolution.

ARTAX (Bronk et al. 2001) was specially designed for the study of art objects and has proved its efficiency for a decade now. It is a robust device that weighs some 80 kg but can be transported to the site where the objects must be studied. Its 70 µm X-ray beam and scanning facility enables the study of fine differences when a heterogeneous or degraded object is the object of investigation.

The Jet Stream M6 instrument presents a further development in the XRF field. Fast scanning in combination with two microscopes and a variable X-ray excitation spot allow one to obtain large images

accompanied by spatial elemental distributions that are presented graphically during measurement. In this way, one area scan provides information about all the materials simultaneously, including degradation patterns of each material. Since the device is rather new on the market, its full capabilities have not yet been explored. In the future, a small optical multispectral camera will be integrated into XRF equipment, leading to the possibility of making a simultaneous test of the optical properties of the object under study.

A note on the classification of inks

Soot, plant, and iron-gall inks form different typological classes of historical black writing materials used in manuscript production. Soot ink is a fine dispersion of carbon pigments in a water-soluble binding agent; plant-based ink consists of tree bark (tannin) solution; iron-gall ink, produced by mixing iron(II) sulphate with a tannin extract from gall nuts, presents a boundary case between soot and plant ink—a water soluble preliminary stage (similar to inks from the second group) oxidizes and evolves into a black, insoluble material (similar to the carbon pigments of the first group) when the writing is exposed to air. Each ink class has distinct properties that would readily permit their easy differentiation, if only the inks used throughout history always belonged to just one of these classes. Carbon inks do not penetrate the substrate (whether papyrus, parchment or paper) and stay well localized on the surface. In contrast, plant inks and iron-gall inks are absorbed by the substrate, and the degree of their absorption depends to a great extent on the nature of the substrate.

Iron-gall inks are best studied by the means of the XRF technique. Natural vitriol, the main component of the historical iron-gall inks, consists of a mixture of metallic sulphates (iron sulphate, copper sulphate, manganese sulphate, and zinc sulphate) with relative weight contributions characteristic of the vitriol source or purification procedure (Krekel 1999). One uses this very property of the iron-gall inks to compare them and to distinguish among them. Specifically, the development of the fingerprint model based on the qualitative and quantitative detection of inorganic components of iron-gall inks allows their reliable classification (Hahn et al. 2004, 2008b).

In addition to inks of pure classes, mixed inks containing components of different classes are well known. In such cases, the ink usually has a type-defining component and ‘picture smearing’ additives. In this respect, a recipe from Dioscorides is remarkable among ancient Roman recipes for the production of soot inks. Along with soot (‘condensed smoke’) and gum, the recipe mentions a copper compound: chalcanthon (Zerdoun Bat-Yehouda 1983, 80). Indeed, PIXE studies of ancient Greek papyri from the Louvre collection identified copper in the inks. Without supporting evidence from other analyses, these inks were classified as metal-gall ones (Delange et al. 1990). In contrast to iron, however, copper does not produce a black precipitate upon reaction with gallic acid. The term ‘metal-gall’ is therefore misleading; only ‘iron-gall’ should be used.

PIXE and micro-X-Ray Fluorescence (μ-XRF) studies of the Dead Sea Scrolls revealed a number of documents written with inks containing large amounts of copper. In this case, however, the use of infrared reflectography unequivocally proved the soot nature of the inks and helped to avoid erroneous classification (Nir-El – Broshi 1996).

The difficulty and high costs of soot-ink production resulted in various attempts to replace them. We believe that the early appearance of the plant inks can be correlated with such attempts. In some cases, small quantities of soot were added to improve their colour. Some mediaeval Arabic and Jewish recipes for soot inks contain such additives as vitriol and tannins (Schopen 2006).

Even more gradual is the transition from the purely plant (that is tannin) inks to the iron-gall inks since a small addition of vitriol to a tannin ink would produce an imperfect iron-gall ink. Moreover, metals like iron and copper can occasionally be present in the tannin inks due to the water or tools used in the production process. Though a full elucidation of the composition of such inks requires the combination of XRF, Raman and IR reflectography (Rabin et al. 2012), the determination of the main components can be accomplished using their optical properties alone, i.e. their opacity in the spectral range 700–1000 nm.

References

Baraldi et al. 2009; Bartoll et al. 2008; Bicchieri et al. 2008; Bower et al. 2010; Bronk et al. 2001; Brown – Clark 2004; Christens-Barry et al. 2011; Delange et al. 1990; Denker et al. 2006; Fiddyment et al. 2014; Hahn et al. 2004, 2008b; Krekel 1999; Lee et al. 2008; Libby 1946; Lucas 1962; Marengo et al. 2005; Miliani et al. 2007; Nir-El – Broshi 1996; Rabin 2014; Rabin et al. 2012; Salvadó et al. 2005; Schopen 2006; Zerdoun Bat-Yehouda 1983. Web sources: *A2 Technologies* 2011; <http://www.c14dating.com/>.

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2.3. Methods in palimpsest research (FA)

Several methods can be applied in order to read faded or erased writing, or different layers of writing on parchment. Once chemicals were used to make ink traces visible, but later damaging effects were noticeable. Nowadays, great success can be achieved with modern imaging techniques.

2.3.1. Chemical reagents

In the nineteenth century, three substances were mainly used: oak-gall tincture, various liver of sulphur tinctures, and Giobert tincture.

(1) *Oak-gall tincture*, an alcohol-based essence of oak apples, brightened the old metallic inks so that the faded writing gained in legibility. It made the unwritten parchment brownish due to tannic acid, which brought about corrosion of the ink, and produced an increasing ink damage (fig. 0.2.5). Oak-gall tincture was used, for example, by Cardinal Angelo Mai (1782–1854), and Barthold Georg Niebuhr (1776–1831).

(2) *Liver of sulphur tinctures*, based on the principle that the metallic traces of the *scriptura inferior*'s ink precipitated through contact with the various sulphide solutions, helped to freshen up the optical effect of the old ink traces. Three types of these tinctures have been employed.

(a) *Liver of sulphur* is a mixture of potassium polysulphide and potassium sulphate, produced from potassium carbonate and sulphur, and was applied as a solution to parchment. It had the effect of precipitating metal ions as sulphides. However, the traces of potassium carbonate left as a rule in this process formed potassium hydrogen carbonate in combination with water. Both salts produced a sediment in the form of a thin film on the surface of the parchment.

(b) *Calcic liver of sulphur* is a mixture of calcium polysulphide and calcium sulphate, produced by a combination of calcium carbonate and sulphur. It possessed the property of precipitating when in contact with sulphides with corresponding metal ions, but at the same time the calcium sulphate crystallized as gypsum in contact with water.

(c) *Volatile liver of sulphur* consisted of ammonium hydrogen sulphide in solution. The ammonium hydrogen sulphide solvent in water was also referred to as sulphurated ammonia or hydrosulphuret of ammonia. The palimpsests treated with volatile liver of sulphur display no damaging changes to the parchment surface that would be worth mentioning.

Liver of sulphur tinctures were used, among others, by Barthold Georg Niebuhr (1776–1831), Wilhelm Grimm (1786–1859), Karl Pertz (1828–1881), Hugo Duensing (1877–1961), and Martin Flashar (1885–1914).

(3) *Giobert tincture*, a weak acid solution of potassium hexacyanoferrate(II), named after the Turin chemist and mineralogist Giovanni Antonio Giobert (1761–1834). It consisted of six parts of water, one part of hydrochloric acid and an eighth part of potassium hexacyanoferrate(II).

The weak acid solution of potassium hexacyanoferrate(II) reacted in contact with the iron(II) sulphate of the ink to produce a deep blue precipitate, so-called Prussian blue. The deep blue, almost black, discolouration of the *scriptura superior* came about through both of the oxidation stages of the iron. The greenish discolouration of the *scriptura inferior* had to do with the precipitates of the iron(II) sulphate in form of hydrous copperas. Partial oxidation from bivalent iron with its blue colour to trivalent iron produced the green colouration. Giobert tincture has caused the greatest damage. The large patches of light-to-dark-blue-greenish-blue discolourations are typical, especially when little care had been exercised (fig. 0.2.5). A striking example of its use is the famous *Codex Ephraemi Syri rescriptus* (Paris, BnF, Grec 2), on which not only Giobert tincture but also oak-gall tincture was employed (Albrecht 2010 and 2012, 165 n. 28).

Giobert tincture was used, among others, by Amedeo Peyron (1785–1870), Ferdinand Florens Fleck (1800–1849), and Constantin Tischendorf (1815–1874).

For more on this topic see Albrecht 2012; Fuchs 2003; Gullath 2003, 83–85; Lo Monaco 1996, 709–717; Gardthausen 1911, 106–109; Posse 1899, 4, n. 1; Wattenbach 1896, 310–315.

2.3.2. Modern imaging techniques

The 'Erste internationale Konferenz zur Erhaltung und Ausbesserung alter Handschriften' in St Gall in 1898 marked a turning-point in palimpsest research: photography was now recommended as the essential tool for scholarly research (Smith 2012). At the beginning, analogue photographs were used, later, digitized analogue photographs. The digital imaging of manuscripts began in the 1970s (cf. Benton et al. 1979).

The use of photography was first tried out in palimpsest research at the Palimpsest Institute of the Abbey of Beuron, founded in 1912. Raphael Kögel (1912) developed a new photographic process that he named 'Kontaktoxydationsmethode'. In the last analysis he also used the inks' reaction to chemical processes. The acidic and metallic inks reacted in combination with an aniline solution, with the aniline salts being precipitated. The First World War interrupted the work at Beuron.

Since then, people have mostly been content to use ultra-violet (UV) light for decipherment purposes. UV-light interacts with the parchment by fluorescence: while the ink traces absorb incident light photons, the parchment reflects them. As a result, the contrast between ink traces and parchment becomes enhanced. The German model 'UV-Handlupe' is commonly used as a standard UV-lamp for library usage (most European libraries feature these old 'Handlupen' with a waveband of 320–380 nm. 2 UV-lamps, each with 4.00 W, i.e. 8.00 W. Cf. also <http://www.carlroth.com>: UV-Handlupe, Art. 1199.1: kurzwellige Leuchtstoffröhre: 254 nm; langwellige Leuchtstoffröhre: 366 nm (320–400 nm)). However, the heat output of these conventional UV-lamps, as well as tungsten halogen or xenon lamps, is enormous; it affects the parchment and causes undulations during longer UV-radiation because it alters the humidity of the parchment.

Therefore, modern LED technology was tried out in research, and is now used in all current projects that deal with the photographic analysis of palimpsests. This lighting method emits very low thermal energy. Furthermore, no additional band-pass filters, which would decrease the optical quality, have to be used since the lighting source itself is monochromatic with narrow wavebands at distinct wavelengths. In this way, sets of images taken at different wavelengths can be compared with each other digitally in order to further improve the discernibility of the underlying scriptures and to reduce the visual prominence of the overlaying texts. For this method, known as 'multispectral imaging' (Gippert 2007), different approaches are available on the market. New systems were developed especially during the 'Rinascimento Virtuale' European research project, which ran from 2002 to 2004. Today, five different multispectral lighting and camera systems are in use, which work in the ultra-violet, visible and infrared (UV-VIS-IR) spectrum of light: 1) the 'MuSIS HS' camera of DySIS, formerly Forth-Photonics; used, among others, for Rinascimento Virtuale, and in the decipherment of the Caucasian Albanian palimpsests of Mount Sinai (Gippert et al. 2007a, 2009; Gippert 2010a); 2) the 'Mondo Nuovo' and 'RE.CO.R.D' system of Photoevolution, formerly Fotoscientifica Record; used for, among others, Rinascimento Virtuale; 3) the 'EurekaVision' system of Equipoise Imaging, LLC/MegaVision, Inc., used for, among others, the Archi-

Fig. 0.2.5 Leipzig, UB, Cod. gr. 2, f. 10r (left: Giobert tincture damage, right: oak-gall tincture damage), © FA & Universitätsbibliothek Leipzig.

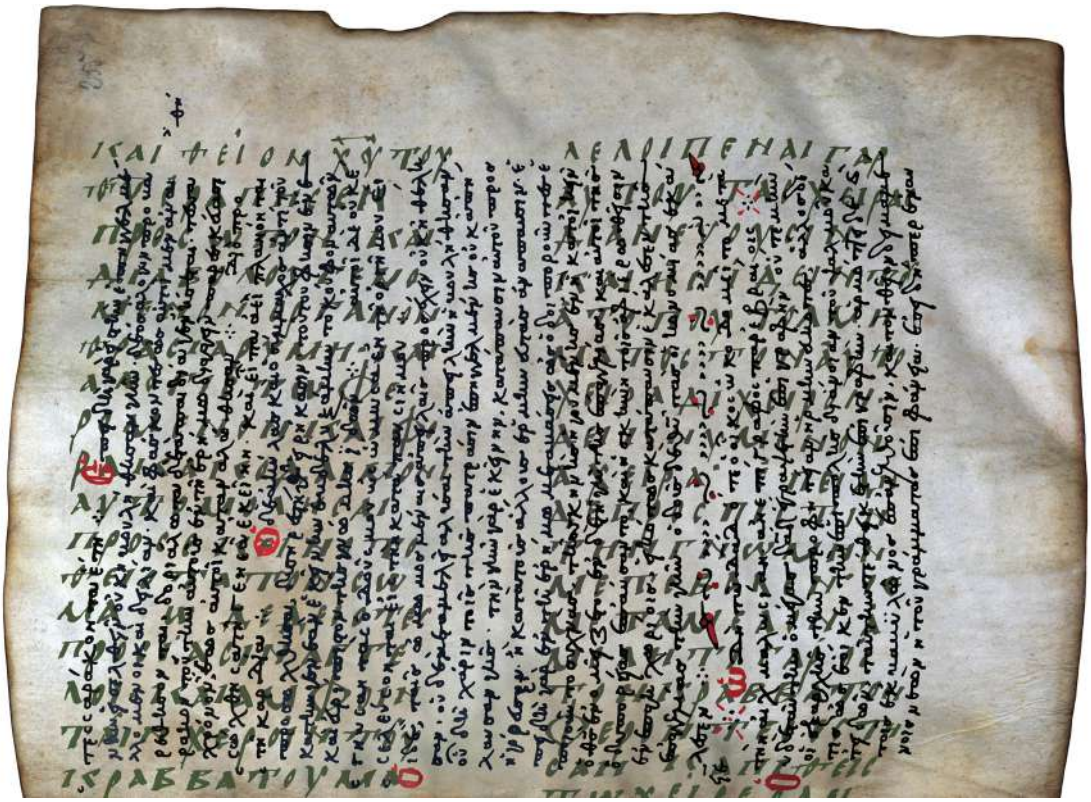


Fig. 0.2.6 Oxford, Bodleian library, MS. Auct. T. 4. 21 (Misc. 259), f. 255r (multispectral image), © FA & Bodleian Library.

medes project; 4) the EMEL 'Next-Generation System', Stokes Imaging Inc., used for, among others, the Mount Sinai palimpsests project; 5) the MSI Revelator of MWA Nova GmbH, used for, among others, the *PALAMEDES* project (Albrecht 2014). For more bibliography see Deckers – Grusková 2010, nn. 1–5 (older literature), Mairinger 1981, 2000, 2004.

All these imaging systems and methods—using the behaviour of light reflection and absorption by ink traces—can be divided into three major categories: 1) cameras with band-pass filters (for example VASARI, CRISATEL, MuSIS HS) plus lamps; 2) lamps with band-pass filters (for example, Rofin Polilight, SPEX CrimeScope, Lumatec Superlite) plus camera; 3) multiple, distinct lamps without filters plus camera (for example EurekaVision system, Next-Generation system, MSI Revelator).

The new systems of category three use distinct monochromatic lighting scenarios without band-pass filters for multi- or full spectral imaging (fig. 0.2.6). The biggest challenge in older approaches was caused by the fact that the overlaying *scriptura superior* hides certain parts of the underlying *scriptura inferior*. However, new techniques are being developed for making the layers of scriptures distinguishable. For instance, X-ray Fluorescence (XRF) imaging has been tried out during the Archimedes project (Bergmann 2011). This method measures the XRF, which is recorded when the parchment is hit by an X-ray beam. The beam penetrates the overlying ink and recovers the underlying writing. However, the contrast of the resulting images is not good enough, and it takes too much time in order to be achieved for more than single leaves (Deckers – Glaser 2011).

References

Albrecht 2010, 2012, 2014; Benton et al. 1979; Bergmann 2011; Deckers – Glaser 2011; Deckers – Grusková 2010; Fuchs 2003; Gippert 2007, 2010a; Gippert et al. 2007a, 2009; Gullath 2003; Lo Monaco 1996; Mairinger 1981, 2000, 2004; Gardthausen 1911; Posse 1899; Smith 2012; Wattenbach 1896.

3. The manuscript traditions

This section introduces in a synthetic way the individual manuscript cultures considered in the handbook, providing the basic geographical, chronological and cultural coordinates. It also prepares for any other subsection dealing with the respective manuscript culture(s) in the subsequent chapters. As in chapters 1, 2, and 4, the language traditions are arranged alphabetically: Arabic (including manuscript cultures using the Arabic script as the main script), Armenian, Avestan, Caucasian Albanian, Christo-Palestinian Aramaic, Coptic, Ethiopic, Georgian, Greek, Hebrew, Slavonic, and Syriac.

3.1. Manuscripts in Arabic script (VSR)

The written heritage in Arabic script and language is the origin of a complex of related manuscript cultures and traditions that share the adoption and use of the same script and salient features. The manuscript in Arabic script cannot be dissociated from the development of writing in some dozens of languages by an indefinite number of ethnic groups and people over twelve centuries. As a matter of fact, Arabic codicology was never a field distinct from Arabic palaeography (see Ch. 2 § 2), and graphical phenomena were mainly evaluated in their relationship with the culture from which they arose—above all the Islamic one—both because of their symbolic and aesthetic value and for their deeply rooted function as a vehicle of textual transmission.

The study of Arabic codicology (understood as the codicology of manuscripts in Arabic script) has so far been mainly stimulated by philological and literary approaches, which have mostly focused on single cases rather than developing systematic studies and quantitative analyses. It must be pointed out that the variety of specific cases cannot be easily standardized, being characterized by a strong specialization of techniques and practices of formats and genres. Production was more often of individual than of serial character, and it was only in the course of time that the manufactured books assumed more uniform features, through the gradual application of craft techniques, and conformed to a regular standard.

Arabic codicology is, therefore, an absolutely virgin field of study, the boundaries of which are hardly outlined. The only exception is represented by the corpus of the ancient Qurʾānic manuscripts produced during the first two centuries of Islam, more deeply investigated through the systematic analysis of scattered fragments and folia, mostly motivated by palaeographical interest, but even by some early codicological phenomena associated to their production (Déroche 1992, 1999, 2009, 2012).

The production of Arabic manuscripts embraces, without interruption, the period from the seventh to the nineteenth century; in some communities in North Africa, western and sub-Saharan Africa (see Ch. 4 § 2.1.1), Bohra in western India, or Yemen it extends until the early twentieth century. From the eighteenth century on manuscripts coexisted with printed books—the latter introduced in the Islamic world in 1730.

Essential historical stages, corresponding to formal and stylistic developments as well as to dynastic characterizations and the succession of local political authorities, may be divided into four periods: the era of the Umayyad, Abbasid and early Shiite Fatimids (seventh to tenth centuries), the era of the late Fatimids and the Seljuk Turks (eleventh to thirteenth centuries), the era of the Ilkhanids, Timurids and Mamluks (thirteenth to fifteenth centuries), the era of the Ottomans, Safavids, Mughals and Qajars (sixteenth to twentieth centuries).

With regard to dating, there is no evidence for dated documents before the ninth century; the most ancient datable witnesses belong to the seventh to ninth centuries, the earliest fragments of Qurʾānic codices being those which have more extensively been studied as representatives of the decisive founding phase. The largest extent of the extant amount of dated or datable manuscripts in Arabic script—from the twelfth/thirteenth to the nineteenth century—has not yet emerged from its obscure anonymity, apart from a few exceptions concerning specific collections or individual books.

Manuscripts in Arabic script surviving to this day cover nearly every aspect of thought and culture. The largest part of these manuscripts belongs to the field of the religious sciences, ranging from Qurʾānic commentaries to manuals of prayer, most of which were exclusively transmitted in manuscript (i.e. non-printed or unpublished) form. The other major categories concern language and literature, philosophy, natural and mathematical sciences, medicine, alchemy, and science of materials and techniques. Here again much is still unedited or not established in a definitive critical form.

The Arabic language attested in all fields of knowledge is also used in non-Islamic areas, either independently or in parallel with other languages. Distant regions, different ethnic groups and languages, from the

Atlantic Ocean to the China Sea, from the strait of Zanzibar to the banks of the Volga, constitute the forge of several million manuscript volumes, whose range and worth are largely underrated or still unknown.

The Christians of the Middle East copied religious texts alongside Arabic in Syriac and Coptic from the eleventh century on, during the eighth/tenth centuries bilingual Greek-Arabic manuscripts are attested, with translations of Christian texts, of biblical and patristic writings, from Greek into Arabic, for the use of Arabophone Christian communities. The Arab-Christian manuscripts show different features from the Arab-Islamic tradition, especially regarding their textual transmission. The Jews transcribed texts in classical or Judaeo-Arabic, next to those in Hebrew, the latter in some cases in Arabic characters.

The contribution of the Persian component in the production of manuscripts from the eleventh century, and more pervasively from the thirteenth century onwards, and that of the Turkish one from the fourteenth or fifteenth century, initially follows the patterns of the Arabic religious tradition in Arabic and then runs an independent route, especially for literary, historical and scientific texts; in the regions ruled by Persian dynasties of Turkish origins, book production expressed the most luxuriant fancy and the most original creative spirit. Persian manuscripts are to be found beyond the borders of Persian-speaking countries, written either in the lands where the people spoke Persian or in Arabic-speaking lands, such as Syria, Iraq, and Egypt, and eventually in the Ottoman Empire. A significant number of Persian manuscripts, with a regional identity, are still kept in those places where they were written, Iran, India and Pakistan, the greatest amount of them still remaining uncatalogued or even unknown.

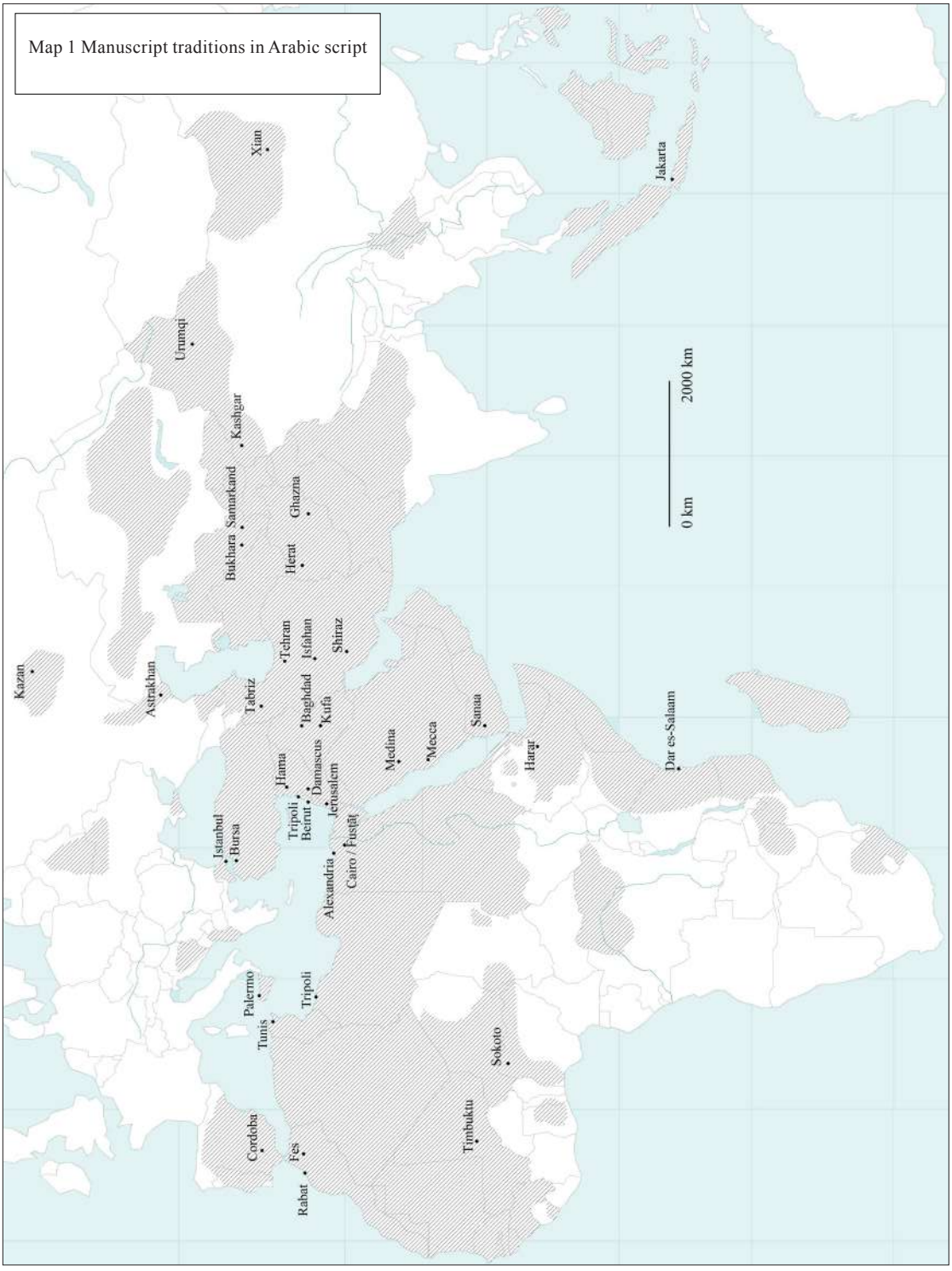
Turkish manuscripts were written in Arabic script until the second half of the nineteenth century; approximately 60,000 of them survive in Turkey, many of which dating from the end of the Ottoman period have not been either examined or roughly catalogued.

Over one hundred languages coming from different linguistic groups and areas employed Arabic script for writing their texts, eventually developing their own manuscript tradition, each one covering a wide range of content, and spanning several centuries, among others, Berber and its varieties; Swahili and some Niger-Kordofanian languages; Sudanese, Nilo-Saharan; the African Arabic dialect known as *ḥasaniyya*; Malagasy; the Chadic Hausa; Turkish languages such as Azeri, Kazakh, Turkmenian, Kirghiz, Qarluq or Chagatai, Uyghur, Uzbek, Karakalpak, Kumyk, Tatar, Kipchak, Bashkir; numerous Indo-European languages including Albanian and ancient Romance languages (Aljamiado-Arabic script), some Slavonic languages such as Serbo-Croatian, Belorussian, Indo-Iranian languages such as Urdu, Kurdish, Tajik, Punjabi, Kashmiri, Sindhi, Pashto, Baluchi, Saraiki; the Caucasian Lak, Avar, Circassian; Malay, Acehnese and other languages from Indonesia and Malaysia; Javanese, Mongol (few examples); there also exists a Chinese adaptation of the Arabic script (Xiao'erjing; Déroche – Sagaria Rossi 2012, 1–7; Mumin – Versteegh 2014).

The regions where manuscripts were produced are obviously those in which the largest amount of the total manuscript heritage is still kept and preserved, for the matrix of such collections is strongly linked to the territory, to the Islamic substratum grafting onto the pre-existing ones, and to the language—particularly in border areas—as is the case of some countries of Central Asia, former Soviet Republics, Southeast Asia, China, Eastern Europe, sub-Saharan Africa, southern Spain, and the Maghreb. The largest and richest deposits are found of course in those countries where Islam was implanted with unchallenged supremacy for more than thirteen centuries, in mosques, madrasas, libraries, Islamic institutions of any kind and in a wealth of inestimable private collections. Some 800,000 manuscripts at least are kept in Turkey, the country which owns the largest number of codices, Iran, India, Egypt, Iraq and Saudi Arabia; more than 130,000 units survive in the Maghreb; for other African countries no definite figures have yet emerged, but the extant items can be estimated in tens if not hundreds of thousands.

From the sixteenth century onward, Europe acquired a significant portion of manuscripts in Arabic script coming from oriental collections, selected by criteria of genre, content, origin or artistic value. Coming from the most influential and prolific cultural warehouses of Arabic manuscripts, Persian and Turkish included, they offer a limited sample, while marginal productions, as well as those of linguistically and literarily decentralized areas, are less well represented and consequently less studied. In Europe the richest and largest collections are the German, French, English, Bosnian, Dutch, Italian, and Spanish ones; in the Russian Federation there are about 30,000 manuscripts in Arabic script; the Far Eastern countries preserve more than 40,000 items; North American collections keep about 22,000 codices.

Considering the extreme difficulty of assessing the real extent of Arabic manuscript production—seven million units according to a recent estimate—it should be remarked that any census is approximate,



mostly based on partial catalogues and local inventories, if not on the preliminary calculation of material not otherwise registered, and estimated—whenever reported—at a glance. Archival documents and manuscript volumes are often counted together without proper distinction.

Arabic codicological literature—developed with an increasing impetus in the past twenty years— is rather discontinuous and fragmentary, because research has been limited to specific aspects and based on narrow and non-homogeneous sampling. Catalogues of manuscripts in Arabic script provide, to a large extent, insufficient codicological information, never detailed enough and conceived neither to support nor to plan research on the material features of manuscript production. They rarely offer detailed codicological descriptions, and do not allow in-depth archaeological investigation. It is therefore necessary to focus

directly on the manuscripts, and to compare them with the data provided by the literary sources, mostly in Arabic, Persian, and Turkish (cf. Ch. 4 §§ 2.1 and 2.8).

An increased international effort in the indexing of manuscripts in Arabic script can be observed over the past years, and is witnessed by tools realized with different methods and techniques. A significant example is the *Fichier des manuscrits moyen-orientaux datés* (FiMMOD), a card index of 338 dated manuscripts in Arabic script, published by the École pratique des Hautes Études (ed. Déroche 1993–2000), unfortunately incomplete. Beyond some attempts of digitizing published catalogues, database cataloguing projects have been set up by the Wellcome Library in London, with its online catalogue of the Medical manuscripts of the Haddad Collection (<http://library.wellcome.ac.uk/Haddad/browse_table.asp>). Several other projects for online cataloguing and digitizing can be found in Egypt, Mali, Turkey, Uzbekistan, and Yemen, in addition to the Daiber collection in Tokyo and the geographically distributed database projects such as the West African Manuscripts initiative (<http://www.westafricanmanuscripts.org/index.html>). Similar outstanding efforts can be observed in Iran, with one of the richest collections of Islamic manuscripts in the world (<http://www.islamicmanuscript.org/files/Irani_Akbar_TIMA.pdf>). Organizations dedicated to cataloguing and research on manuscripts are The Islamic Manuscript Organisation (TIMA) and al-Furqān Islamic Heritage Foundation, the latter having promoted a main reference work, that is the *World Survey of Islamic Manuscripts* (Roper 1992–1994), that indexes and describes catalogues and collections all over the world (ed. Brinkmann – Wiesmüller 2009, 21–28).

Instrumental analysis, though applied on a narrow-range of specimens and with different sampling methods, has provided the first reliable results for inks and pigments, mostly in miniatures (Déroche – Sagaria Rossi 2012, 13–25; Roger et al. 2004; Chaplin et al. 2006; Barkeshli 2008; Espejo Arias et al. 2008; Khan – Lewincamp 2008; Sloggett 2008; see also Ch. 1 § 2).

As far as handmade Middle Eastern papers are concerned—whose components are still to be identified—microscopic and spectroscopic analysis may help to detect the structure and morphology of the fibres (Colini 2008 and 2011; Barkeshli 2008; Espejo Arias et al. 2008; Kropf – Baker 2013).

Though quantitative codicology is being increasingly adopted during these latest years, it has been far from being systematically applied to the production of manuscripts in Arabic script, except for some local collections and on a narrow range of specimens. The main attempts in this direction dealt with Middle Eastern papers (Irigoin 1988, 1991, 1993; Loveday 2001; Humbert 2002); although marked by very different methodological approaches, the quantitative investigation on some mediaeval Yemeni papers (D'Ottone 2006) and that on a few Egyptian papers from the fifteenth century (Kropf – Baker 2013) may also be mentioned. Other scientific inquiries on colours (Roger et al. 2004; Espejo Arias et al. 2008) evidenced the need of statistical approaches to gather and compare the results.

Quire numbering systems and catchwords have been described and classified from a number of Arabic manuscripts dated before the fifteenth century (Guesdon 2002).

The attempts at describing and arranging binding typologies (Weisweiler 1962; D'Ottone 2007; Viola 2007; Scheper 2014, forthcoming) and decoration patterns (Vasilyeva 2009) have been mostly carried out with conservation and art historical aims.

The terminology employed for defining and identifying Arabic manuscript books and codicological phenomena reflects the development of Arabic codicological studies. In Arabic, Persian, and Turkish there is over-abundance of words related to book manufacture, but the terms and definitions found in mediaeval and modern sources (often multiple and overlapping) do not always describe clearly the nature of the materials and actions involved in the processes. On the other hand, a classification and selection of native terms is still a premature objective (an Arabic-English glossary ordered according to Arabic roots is given by Gacek 2001 and 2008), since the knowledge of the sources, associated with the recent activity of comparing written texts and the material features of the manuscripts, is in its very beginning (a selected Arabic-Italian glossary, with Arabic and transliterated terms may be found in Déroche – Sagaria Rossi 2012, 293–298).

The lack of terminological uniformity corresponds to the lack of uniformity in the physical description of Arabic manuscripts. Some aspects have been described basing on the example of western manuscripts and applying criteria which are valid for already codified and deeply investigated manuscript traditions and cultures. Material features, such as writing supports and instruments, quires, foliation, pagination, forms and formats, page layouts, ruling, may fall into common categories already standardized in other manuscript studies areas. As to decoration and binding, usually more freely described, it would be suitable to define the proper elements and distinct structural patterns.

References

Barkeshli 2008; Brinkmann – Wiesmüller 2009; Chaplin et al. 2006; Colini 2008, 2011; Déroche 1992, 1999, 2009, 2012; Déroche et al. 2000; Déroche – Sagaria Rossi 2012; D'Ottone 2006, 2007; Espejo Arias et al. 2008; *FiMMOD*; Gacek 2001, 2008; Guesdon 2002; Humbert 2002; Irigoin 1988, 1991, 1993; Khan – Lewincamp 2008; Kropf – Baker 2013; Loveday 2001; Mumin – Versteegh 2014; Roger et al. 2004; Roper 1992–1994; Scheper 2014, forthcoming; Sloggett 2008; Vasilyeva 2009; Viola 2007; Weisweiler 1962; Web sources <http://library.wellcome.ac.uk/Haddad/browse_table.asp>; <http://www.westafricanmanuscripts.org/index.html>; <http://www.islamicmanuscript.org/files/Irani_Akbar_TIMA.pdf>, last access May 2014.

3.2. Armenian manuscripts (DK)

The vast majority of the estimated 31,000 bound Armenian manuscripts, representing some 34,000 discrete items (Kouymjian 2008a, 211; 2011b, 91; 2012a, 19), date from after 1600. More than 80% of the manuscripts have been included in detailed or summary catalogues devoted to the various collections (see Ch. 4 § 2.2). Theoretically, the earliest manuscripts should date from the fifth century CE, when in its first decade the very phonetically comprehensive Armenian alphabet was invented by the monk Mesrop Maštocʿ, but no securely identified or dated manuscripts or fragments have survived from before the ninth century, from which there are two surviving dated manuscripts. Fewer than twenty manuscripts are dated or assignable to before the year 1000. All Armenian manuscripts contained a scribal colophon, written at the moment of copying, and very often other colophons by the painter, patron, or binder. In a short study devoted to the statistical analysis of Armenian manuscripts (Kouymjian 1983), it was determined that just over 59% of all surviving Armenian manuscripts are precisely dated by colophon, and many more can be closely dated through the names mentioned in defective colophons. A more careful counting of the largest collection, at the Matenadaran, the state repository-museum of manuscripts in Yerevan, results in 55% exactly dated manuscripts (Kouymjian 2012a, 20). The discrepancy between the latter figure and the higher one of 59% in the earlier study is probably due to the use of the number of manuscripts rather than the larger number of discrete items in the indexes (*Matenadaran abridged catalogue* = Eganyan et al. 1965–2007, I, manuscripts nos. 1–5,000, rather than the 5,418 items listed in the index). This mass of precise data puts Armenian manuscript studies both at an advantage and a disadvantage in comparison to other traditions in which colophons were less systematically used. The advantage is the relative precision with which we can analyse trends and phenomena related to manuscript studies. The disadvantage is a diminished urgency for developing codicological criteria as tools for dating manuscripts. Consequently, the study of parchment, paper, ruling, quire formations, and related material aspects of manuscripts has lagged behind the study of texts, decorations, and even the bindings.

Armenian manuscripts are preserved in public museums and libraries and monastic collections in Armenia, the Near East, Europe, and the United States. The most important collections are the Matenadaran, the 'Repository of Ancient Manuscripts', in Yerevan (11,000 manuscripts), the Library of the Mekhitarist Brotherhood at San Lazzaro, Venice (4,000), the Armenian Patriarchate in Jerusalem (4,000), the Library of the Mekhitarist Brotherhood in Vienna (1,200), the Armenian Catholic Monastery of Bzummar in Lebanon (1,000), the Armenian Monastery at New Julfa, Isfāhān (1,000), and the Catholicosate of Etchmiadzin (1,000). Important collections of fewer than 1,000 manuscripts are kept at the Oriental Institute, St Petersburg, the Bibliothèque nationale de France, Paris, the Bodleian Library, Oxford, the British Library, London, the Chester Beatty Library, Dublin, Tübingen Universitätsbibliothek, the Catholicosate of Cilicia, Antelias, Lebanon, University of California, Los Angeles, and the Biblioteca Apostolica Vaticana. Hundreds of other libraries have small, but at times artistically very important, collections, for instance the Freer Gallery of Art in Washington, the Pierpont Morgan Library and Museum in New York, the Walters Art Gallery in Baltimore, USA, and the John Rylands Library in Manchester, UK.

From a methodological perspective, the abundant data in carefully prepared catalogues provides a solid mass of evidence to which statistical analyses can be applied. The thoroughness, and thus the usefulness, of these manuscript catalogues is a legacy of a generation of Armenian scholars trained in German universities at the end of the nineteenth and the beginning of the twentieth centuries, and to the majestic first volume of the catalogue of manuscripts of the Armenian Mekhitarist Brotherhood in Vienna, compiled by Fr. Yakob Tašyan (1895). It set a high standard of description, one followed to the present: in ad-

dition to a list of the texts, also the date, place, scribe, artist, patron, binder, size, material, script, number of columns and lines, quire structure, and decoration were indicated. However, ruling and pricking were ignored, though in the recent volumes of the *Grand* or *Master catalogue of the Matenadaran* (Eganyan et al. 1984–2013, manuscripts 1–2,700), at least watermarks are noted and photographic samples of the various hands accompany each entry.

Nearly all Armenian manuscripts and collections are listed in Bernard Coulie's *Répertoire des bibliothèques et des catalogues de manuscrits arméniens* (1992, supplements 1995, 2000a, 2004). A master list of catalogued Armenian manuscripts, a project initiated by Michael Stone and Bernard Coulie, waits to be completed. With well over 20,000 manuscripts repertoried with basic information on text, date and place of execution, material, number of folia, and size, serious work on Armenian codicology can move forward.

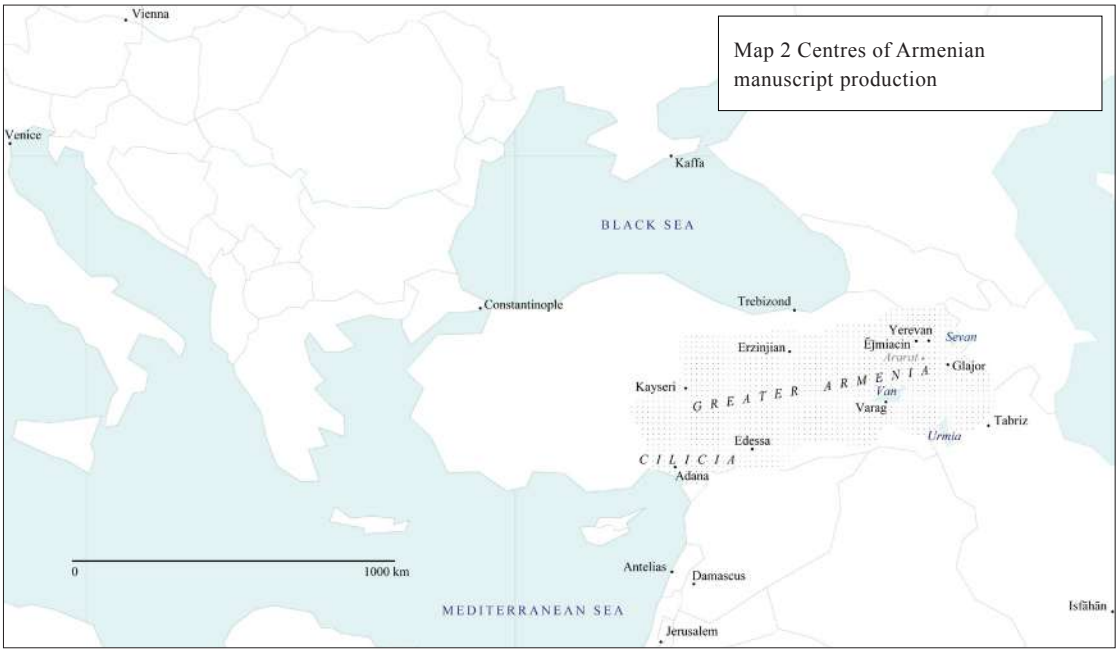
Codicology is a very new and little explored domain of Armenian studies. No manual exists, not even a substantial general article. Recent research has been confined to two specialized areas, manuscript structure and binding (Merian 1993), and palaeography (*Album* 2002). There have also been studies devoted to pigments (Orna – Mathews 1981; Mérian et al. 1994b; Mathews – Orna 1992–1993) and to a much lesser extent inks. Little or no attention has been paid to writing surfaces, ruling, pricking, quire structure, folding, page layout, or textile linings of bindings (Dournovo 1953; Tarayan 1978). Illuminations and manuscript decorations have fared better, but mostly in the domain of art history rather than codicology (Kouymjian 1996a, 1023–1042). Nevertheless, analyses based on statistics from published manuscript catalogues (Kouymjian 1983), concerning codicological features such as manuscript size (Kouymjian 2007a, 42 Table), material (parchment or paper), script (majuscule or minuscule), or quire type (Kouymjian 2012a, Tables 1–2), can yield very precise information on the chronology of the transition from the dominance of one support to the other, of a change in quire type, shift from one script to another, and so on.

An earlier statistical study surveyed three groups of dated manuscripts covering the years 1200 to 1800 in ten-year periods: the first was based on 6,030 items from the 10,408 manuscripts of the Matenadaran published in the abridged catalogues; the second on 7,973 dated manuscripts from a total of 13,944 in a variety of repositories; the third based on 16,744 manuscripts, which included the manuscripts from the large collection of the Armenian Patriarchate of Jerusalem, but only for the years 1310 to 1620 (Kouymjian 1983, 433, fig. 1). The proportionate number of manuscripts for any period graphically resembles each other very closely, and thus the Matenadaran, perhaps because of its size and diversity, affords an accurate reflection of the whole and can be used to project results valid for all Armenian manuscripts. The manuscript production grew steadily (for example from 69 items in the twelfth to 392 in the thirteenth century, and the true difference must have been much more before the destruction of libraries mentioned in mediaeval sources, see Orbelian 1864, I, 191 as well as the massacres of 1894-1896 and the Genocide of 1915-1923, when tens of thousands of manuscripts perished). The growth slowed down in the fifteenth century, coming nearly to a halt in the first decades of the sixteenth century, because of the enormous unrest caused by the Ottoman–Safavid wars (Kouymjian 1982; Kouymjian 1997, 14–21). The decline was followed by the sudden and dramatic increase in production, already beginning in the second half of the sixteenth century, but continuously accelerating until the late seventeenth century: a nearly 400% increase, from 1,030 to 4,072 manuscripts (Kouymjian 1983, figs. 1–2).

This remarkable growth in manuscript production reveals the rise of the new dynamic mercantile middle class (Aslanian 2011) as early as the late sixteenth and early seventeenth centuries (Kouymjian 1994). The data also very clearly show that the majority of extant Armenian manuscripts date after 1600: 67% from the large, original sampling, 78% from a more recent targeted sampling (Eganyan et al. 2007), and 66% from the 1,800 manuscripts included in the first five volumes of the *Master catalogue* (Eganyan et al. 1984–2013).

The third quarter of the seventeenth century brought about another decline in the copying of Armenian manuscripts. Yet, though there is a roughly 35% decrease in manuscript production in the eighteenth century, the absolute number of surviving eighteenth-century codices is more than the combined quantity from both the fifteenth and sixteenth centuries. Nearly 10% of surviving and catalogued Armenian manuscripts were written or copied in the nineteenth century. In this respect, little thought has been given when conducting statistical analyses to whether all manuscripts kept in a repository should be included.

We can assume that up to 1700 almost all manuscripts were executed by a scribe working from an earlier copy; there are very few autograph copies. On the contrary, a large portion of eighteenth- and



Map 2 Centres of Armenian manuscript production

nineteenth-century Armenian manuscripts contain an original composition by an author (memoir, account book, dictionary, translation), a unique item that perhaps should have a special place in the statistical examination of the history of the last centuries of manuscript production.

Even though the first Armenian printed book dates to 1512, the old technology—copying by hand—continued to grow until 1675 and was much practised until the mid-nineteenth century. For more than three centuries the two technologies, printing and scribal copying of manuscripts, worked in a close, symbiotic relationship (Kouymjian 1983, 2008b). One explanation for the persistence of the manuscript tradition is that the cheap, in some cases free, labour of the monastic scribe was more economical than the purchase of expensive printed volumes. Furthermore, after the mid-nineteenth century, copies were made mostly by scholars who were not scribes, an obsolete profession along with the scriptorium.

Data mined from published manuscript catalogues and other data abundantly available online for the history of early Armenian printing can be used statistically to establish a history of Armenian manuscript production and observe a number of phenomena related to the long transitional period from the handmade book to the mechanically produced one.

References

Album = Stone et al. 2002; Aslanian 2011; Coulie 1992, 1995, 2000a, 2004; Dournovo 1953; Eganyan et al. 1965–2007; Eganyan et al. 1984–2013; Kouymjian 1982, 1983, 1994, 1996a, 1997, 2007a, 2008a, 2008b, 2011b, 2012a; Merian 1993; Mérian et al. 1994b; Mathews – Orna 1992–1993; Orbelian 1864; Orna – Mathews 1981; Tarayan 1978.

3.3. Avestan manuscripts (AC)

The Avestan (Zend, Old Bactrian) language has been used for over two millennia for the Zoroastrian religious cult. It takes its name from the *Avesta*, the collection of the sacred text of Zoroastrianism (see also Ch. 3 § 3.5).

The chant accompanying the Indo-Iranian sacrifice is an oral composition. It took its present form probably in Achaemenid times in Eastern Iran, was then imported into western Iran and from there exported to other areas of the Achaemenid kingdom. For centuries, the ceremony was memorized and recited in different areas so that different ways of reciting the same text emerged. The version of the political centre (the region of Fārs) spread over a wide area and became the standard ceremony which appears in our manuscripts. However, alternative versions existed, as shown by the Sogdian *Aṣəm Vohū*. A Sogdian fragment includes this prayer in a phonetic shape quite different from the standard version, showing notable archaisms and some influences of the Sogdian language (Gershevitch in Sims-Williams 1976).

Thus, in the early centuries CE the need emerged to represent the liturgy correctly in writing. The exact date of the introduction of the Avestan script is disputed, but the sixth century CE is the most widely ac-

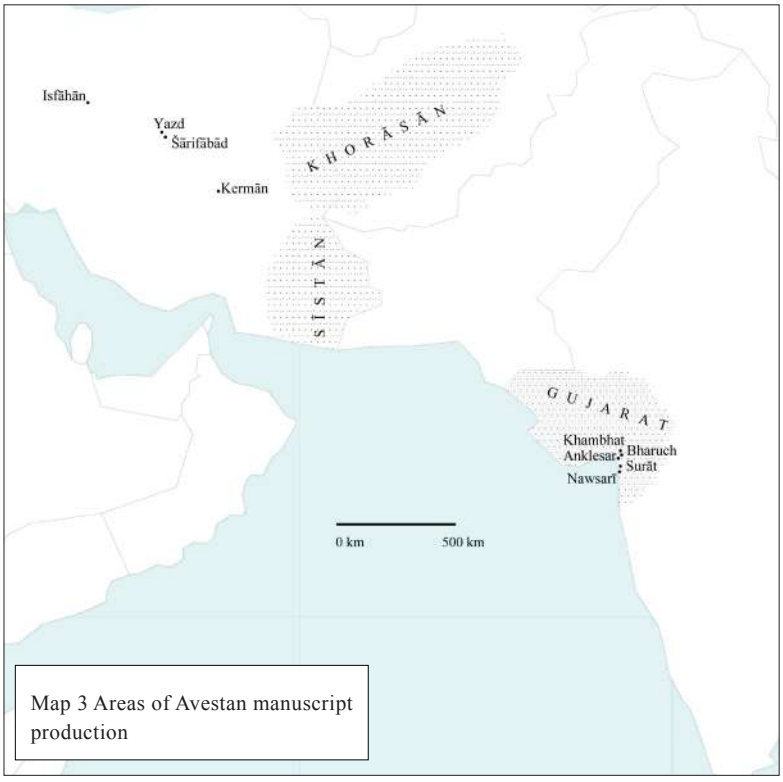
cepted proposal (Cereti 2008; Panaino 2012, 79–80). It was invented by the Zoroastrian clergy mainly on the basis of the script used in the Zoroastrian Church for Middle Persian (Pahlavi). It was a phonetic script with fifty-four letters created to reproduce the phonetic nuances of the recitation of the Avestan texts in Fārs; thirty of the symbols are variants of the thirteen Pahlavi letters in their cursive form (Hoffmann [K.] – Narten 1989). This was the beginning of the written transmission of Avestan texts. It is unclear, however, which texts were written down at the time of the invention of the Avestan script: the *Great Avesta*, in order to preserve a copy of the collected writings, or the different liturgies, so that the manuscripts served (as was later the case) as tools for learning the ritual.

The two main types of Avestan text are (1) the long liturgy with the complete description of one or several variants of the main Zoroastrian liturgy in honour of Ahura Mazdā (which reached its current form, or at least a similar one, most likely already in Achaemenid times, sixth to fourth centuries BCE); and (2) a collection of minor rituals and other ritual texts not included in the long liturgy (these rituals are quite heterogeneous and no dating for the creation of this type of collection has yet been possible).

The manuscripts can be further classified according to their use. (1) Liturgical manuscripts were used for the ritual instruction of priests. They were not intended to be exact copies of their originals, but rather to adapt perfectly to the current practice. They include complete descriptions of the ceremony, not only the recitative in Avestan, but also instructions in different languages (in Middle and New Persian, in Iran; in Middle Persian in Avestan script—easier to read than the Middle Persian one—and Gujarati, in India) and even indications concerning alternative texts for special days or ceremonies. (2) Exegetical manuscripts contain the text of the basic liturgy as well as a translation and commentary (usually in Pahlavi or Sanskrit). As Avestan fell out of use, it became increasingly difficult to understand; the earliest commentaries go back to pre-Islamic Iran (Sasanian times). These translations and commentaries were initially transmitted orally in liturgical schools, but eventually they were committed to writing. There are some exegetical manuscripts with other variants of the long liturgy, but they only include the sections that needed to be translated. (3) Liturgical and exegetical content could be combined in one manuscript. The oldest testimony to the ceremonies as we find them in extant manuscripts is the colophon in a manuscript copied before 1020 CE, probably near Isfāhān, in western Iran (Cantera – de Vaan 2005), which refers to a manuscript of the combined type (or using a Pahlavi expression, manuscript *pad zand ud nērang*, Cantera 2013b). It was then probably sent to India at the beginning of the sixteenth century, when the Zoroastrian community in the Indian diaspora was seeking advice in Iran about the performance of the long liturgy and the meaning of the Avestan recitative. The oldest extant Avestan manuscripts copied in Iran date from the end of the sixteenth century, corresponding to a certain improvement of the living conditions of the community under the Safavids.

There is a further type of Avestan manuscript, but one that is only very scarcely represented. In Sasanian times there was a collection of works written in the Avestan language and arranged scholastically in three groups of seven books. This collection is described in the Pahlavi literature of the ninth century, but it is lost. Only very few extant manuscripts of the Avesta contain texts that belonged directly to the *Great Avesta* of twenty one books. They are fragments of longer books dealing with liturgical instruction, like the *Hērbadestān* and *Nērangestān*. It was once assumed that the liturgical and exegetical manuscripts go back to this Sasanian collection and that they are only 'surviving fragments'. However, this view has now been definitively abandoned (Kellens 1998, 476–478; Panaino 1999; Cantera 2004, 21–22; Kellens 2012; Panaino 2012, 84–85; Tremblay 2012, 100–101).

In the seventh century, Iran became Islamic, and the Zoroastrian community began to face pressure, in particular after the Abbasids came to power in the second half of the eighth century. Around the ninth century, a part of the community settled in India; Maharashtra and Gujarat have been important centres of Zoroastrianism ever since. It is in India that the oldest extant manuscripts were copied, probably because all earlier Iranian manuscripts are lost. At the beginning of the thirteenth century, a priest came from India to Sīstān and obtained an exegetical manuscript of the *Vidēvdād*, which he brought to India. The colophon of the manuscript Copenhagen, Royal Library, Cod. Iran. 7 (K7) informs us further that an Iranian priest, Rōstam Mihrābān Marzbān Dēnyār, copied in the second half of the thirteenth century a liturgical and an exegetical manuscript of the *Visperad* in Anklesar (India). The original manuscript is lost, but its old copy (K7) is preserved in Copenhagen. In the 1320s, another Iranian priest, Mihrābān Kaixōsrō, came to India and copied in Nawsarī and Kambay two exegetical *Yasna* and two exegetical *Vidēvdād* manuscripts. The oldest extant Avestan manuscripts written in India by an Indian priest (Pešotan Rām Kāmdīn



Map 3 Areas of Avestan manuscript production

Šahryār) are an exegetical *Yasna* and an exegetical *Visperad* included in a collective codex together with other Pahlavi works (M6; Munich, Bayerische Staatsbibliothek, Cod.Zend. 51a+b), copied in 1397. The oldest liturgical manuscripts copied in India appear in the second half of the sixteenth century (manuscripts 100 (Bombay, University Library, Geldner's B3) and 2210 (Bombay, Mulla Firuz Library, 8)), and they begin to be frequent only from the seventeenth century onwards. Collections of minor rituals do not appear before the end of the sixteenth century (manuscripts Navsari (Gujarat), Meherjirana Library, F1 and E1) in India.

Beginning at the end of the fifteenth century (and with greater intensity early in the seventeenth century), the Zoroastrian communities of India started to send messengers to the region of Yazd-Kermān (Iran) looking for advice in ritual and religious matters. At that time, it seems that nobody in the Indian communities was able to read Pahlavi, and the right performance of the rituals was not always clear. The answers of the Iranian priests were often accompanied by manuscripts that were then abundantly copied in India. The oldest manuscript sent was probably a manuscript of the *Yasna* combining ritual instructions and the translation into Pahlavi copied by Hōšang Syāwaxš, in Šārifābād, in 1495.

The oldest extant Avestan manuscripts in Iran date from the Safavid period and come from the same area: the region of Yazd and Kermān. The only mention of Avestan manuscripts in western Iran is the old colophon of the *Yasna* manuscript copied by Hōšang Syāwaxš, whose origin is the region of Isfāhān. Further, we can locate in Khorasan an important production of manuscripts around the beginning of the sixteenth century, but we know only copies of these manuscripts, produced in the region of Yazd and Kermān at the end of that century and, mainly, during the seventeenth century. Some of these manuscripts were sent to India during the seventeenth century, but most of them are still in Iran. Contrary to the long-lived assumption that there were no Avestan manuscripts in Iran, recently around fifty new Avestan manuscripts have been found there in private and public libraries, a major discovery (Ǧahānpūr 1997–1998; Mazdāpūr 1999; Cantera 2011, 222 and following; Mazdāpūr 2012).

From the points of view of codicology, palaeography and orthography, Avestan manuscripts from India differ considerably from those from Iran. In India, one must further distinguish between the manuscripts produced before the importation of Avestan manuscripts from Iran in the Safavid time and after it.

The basic source for information for Avestan manuscripts is still the *Prolegomena* to Geldner's edition of the Avestan texts (1896), but it is at many points outdated. For recent descriptions of the typology and history of the Avestan manuscripts, see Cantera 2011 and 2013a. Updated lists of Avestan manuscripts of the long liturgy that have been published in the last years are: Andrés-Toledo – Cantera 2012, Hintze 2012a, and Martínez Porro 2013. The largest collection of published Avestan manuscripts is the *Avestan Digital Archive* (<http://www.avesta-archive.com>).

References

Andrés-Toledo – Cantera 2012; Cantera 2004, 2011, 2013a, 2013b; Cantera – de Vaan 2005; Cereti 2008; Ǧahānpūr 1997–1998; Geldner 1896; Hintze 2012a; Hoffmann [K.] – Narten 1989; Kellens 1998, 2012; Martínez Porro 2013; Mazdāpūr 1999, 2012; Panaino 1999, 2012; Sims-Williams 1976; Tremblay 2012. Web source: *Avestan Digital Archive* <http://www.avesta-archive.com>. See also Ch. 3 § 3.5.

3.4. Caucasian Albanian manuscripts (JG)

The conversion of the southern Caucasus to Christianity by the end of the fourth century brought about the emergence of three manuscript traditions, two of which developed continuously for about 1,500 years, namely those of the Armenians and the Georgians, while the third one, that of the so-called Caucasian Albanians, ended before the turn of the first millennium by consequence of the conquest of the region by the Arabs. The very fact that the eastern neighbours of Armenians and Georgians, styled *albanoi* in Greek sources, developed a Christian literature in their own language and script in the fifth century under the influence of Mesrop Maštocʿ, the inventor of the Armenian script, was known only from historiographical sources until 1937, when a specimen of an Albanian alphabet was detected in an Armenian encyclopaedic manuscript of the thirteenth century (Yerevan Matenadaran, 7117; Abulaʒe 1938; Šaniʒe 1938; Gippert et al. 2009, I, II-1-5); a few epigraphic artefacts that were unearthed in excavations in present-day Azerbaijan in the late 1940s confirmed the use of that alphabet for the first time (Gippert et al. 2009, I, xx–xxi and II-85–91). It took another fifty years for the first (and only) manuscript remnants of Caucasian Albanian to be detected, in the lower text of two Georgian palimpsest codices discovered among the New Finds of the library of St Catherine's Monastery on Mount Sinai. The decipherment of these palimpsests, initiated by Z. Aleksiʒe in 1994 (Aleksiʒe – Mahé 1997; Gippert et al. 2009, I, xx–xxiii) and accomplished in the course of an international cooperation project between 1998 and 2008 (cf. the edition published by Gippert et al. 2009), brought to light that the 242 pages of the manuscripts Sinai, St Catherine, New Finds, georg. N13 and N55 that have an underwriting in the Albanian language and script are fragments deriving from two originally different codices, one a lectionary with lections mostly from the New Testament (Gospels of Matthew, Mark, and Luke; Pauline and Catholic Epistles), and the other about one-half of a manuscript containing the Gospel of John (see Ch. 3 § 3.11). From the remnants of these two parchment codices, both badly damaged by the fire that led to the detection of the New Finds in 1975, it is obvious that the Albanian manuscript tradition shared most of its characteristics (quire structure, page layout, text structure) with Armenian and Georgian codices of the sixth to ninth centuries; as the palimpsests are not dated otherwise, this is the only hint as to the time when the Albanian texts may have been written down.

References

Abulaʒe 1938; Aleksiʒe – Mahé 1997; Gippert et al. 2009; Šaniʒe 1938.

3.5. Christo-Palestinian Aramaic manuscripts (AD)

Documents in Christo-Palestinian Aramaic are little known (Desreumaux – Schmidt 1989). Christo-Palestinian inscriptions do not appear in the *Corpus inscriptionum semiticarum*, nor in any other epigraphic corpus, nor even in the bibliography of Semitic inscriptions (Delavault et al. 2010). The existence of Christo-Palestinian Aramaic texts is not mentioned in the manual by Albert et al. 1993 or in any of the works of Byzantine and Church history.

Even so, the existence of Christo-Palestinian texts has been known for a long time. Texts were published as early as the end of the eighteenth century: starting from Jacob Adler (1780), some real pioneers have discovered, read and edited the Sinai and Cairo manuscripts kept in western European, Russian and private collectors' libraries. The texts were the object of detailed philological and linguistic studies by such researchers as Anton Baumstark, Francis Crawford Burkitt, Matthew Black, and Rubens Duval, who were well aware of the literature and of the enlightening grammar by Friedrich Schulthess (1924). Moshe Bar-Asher (1977) reviewed the manuscripts and offered a number of philological, linguistic and chronological propositions. Alain Desreumaux (1979) proposed a first elementary catalogue of manuscripts and a study of inscriptions. Christa Müller-Kessler (1991) published a modern grammar based on that by Schulthess and on the relevant knowledge of Judaeo-Aramaic, as well as a re-edition of several manuscripts (Müller-Kessler – Sokoloff 1996a, 1996b, 1997, 1999).

Biblical texts in Christo-Palestinian Aramaic have been taken into consideration by New Testament textual critics since the beginning of the twentieth century (for example, in the editions of Augustin Merk, e.g. Merk 1957), yet, as in the presentation of Vaganay (1934), have continued to be designated as one of several Syrian traditions (siglum Syr^{sp})—even though Marie Joseph Lagrange and the Biblical School of Jerusalem (Lagrange 1925) had already detected the autonomy and the historical interest of these versions. In recent decades, these texts have been attracting increasing interest for their linguistic and philological peculiarity;

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consider here Bruce Metzger (1977), and the on-going project 'Marc multilingue' (<http://www.safran.be/marcmultilingue/>) directed by Christian Amphoux and Jean-Claude Haelewyck (the Christo-Palestinian versions do not yet appear, pending the integration of the manuscripts from the Sinai New Finds).

The Christo-Palestinian script, written from right to left, was based on the Syriac *ʾeṣṭrangēlā* script, in the style of biblical Greek uncial.

Judging by the known inscriptions, the distribution area of the Christo-Palestinian Aramaic documents is limited: Egypt, Sinai, Israel, Palestine, Jordan. The archaeological work of the Samra team (Humbert – Desreumaux 1998) and the remarkable historical analysis by Sydney Griffith (1997) brought the communities of Christo-Palestinian Aramaic speakers onto the scene of Late Antiquity in the Byzantine provinces of Palestine and Arabia (today Jordan). The centres of manuscript production were only a few: Jerusalem, Castellion (Hyrcania) in Khirbet Mird (Judaean desert), 'Abud (Samaria), St Catherine's Monastery on Mount Sinai and probably Antioch (see the map for Syriac below). A palimpsest inscription (under a Coptic painting) was found in the monastery inside the temple at Edfu in Upper Egypt. Manuscripts and inscriptions show that the language was used in common life as a *lingua franca*, in monuments as a public language (churches, monasteries, cemeteries), for liturgical readings as a translation language and as a language of theological works, always within the Chalcedonian communities of the Patriarchs of Jerusalem and Antioch.

References

Adler 1780; Albert et al. 1993; Bar-Asher 1977; Delavault et al. 2010; Desreumaux 1979; Desreumaux – Schmidt 1989; Griffith [S.] 1997; Humbert – Desreumaux 1998; Lagrange 1925; Merk 1957; Metzger 1977; Müller-Kessler – Sokoloff 1996a, 1996b, 1997, 1999; Schulthess 1924; Vaganay 1934. Web sources: <http://www.safran.be/marcmultilingue>, last access May 2014.

3.6. Coptic manuscripts (SE)

The language called 'Coptic' is the latest stage in the long history of the native Egyptian language, which was originally written using the Egyptian hieroglyphs, a large set of signs—partly alphabetic, partly syllabic, partly logographic—that was used also in cursive forms in the Egyptian Hieratic and Demotic writing systems. The writing system of the Coptic period was distinct from the earlier Egyptian systems in that it made use of the Greek alphabet, supplemented from out of the latest indigenous system (Demotic) by a selection of characters representing sounds that were foreign to Greek, there being usually six or seven supplemental characters, depending on dialect (see also Ch. 2 § 4).

What survives of Coptic literature is almost entirely religious in character and predominantly Christian by a wide margin. Along with the Greek alphabet, the Copts also took over the Greek scribal practices as well as the book forms that were typical of Christian Late Antique Egypt, first and foremost the papyrus codex. Almost without exception, Egypt is the provenance of Coptic manuscripts. Unfortunately, 'the extant remains of Coptic literature [are] quite without parallel among the literatures of the Christian east in their fragmentariness and dilapidation' (Crum 1905b, xxi–xxii; see further Emmel 2007). The number of Coptic manuscripts that can be dated with confidence to before the ninth century is not very large, but there are codices of both papyrus and parchment that very likely date from the fourth to sixth centuries, some perhaps from as early as the third century. It is difficult to estimate the precise numbers but we may say that there are at least 4,000 manuscripts and manuscript fragments dating from between the fourth and the eleventh centuries, possibly even a significantly larger number (a complete census remains a desideratum).

The Coptic alphabet developed out of a history of attempts to write the Egyptian language using the Greek alphabet, beginning soon after Alexander the Great's conquest of Egypt toward the end of the fourth century BCE. Thereafter, Egypt became a bilingual country, with Greek becoming the dominant language in politics and educated culture. The hieroglyph-based writing systems fell into disuse during the Roman period (which began with Augustus's conquest of Egypt in 30 BCE), and 'it is fair to say that after about 50 CE there was for most Egyptians only one means of recording things in writing: Greek … For two centuries or so, until the middle of the third century, Egypt witnessed the striking phenomenon of a majority population with no way of recording anything in its own language in writing' (Bagnall 1996, 235–236).

The beginning of the history of 'Coptic literature' is marked by the widespread use of a fully developed and more or less standardized writing system employing the supplemented Greek alphabet for the

purpose of writing Egyptian. The term 'Coptic' used for designating the language of this literature is a word that derives from ancient Greek *aigyptios* 'Egyptian', which passed through Coptic itself (as *gyptios*, or *kuptios*) into Egyptian Arabic and from there into the European languages (copto, copte, koptisch etc.). The oldest surviving examples of Coptic writing show clearly that the creators (or standardizers) of the Coptic writing system were thoroughly familiar with the conventions of Greek literary scribal practice, but also appropriately sensitive to features of Coptic that distinguished it sharply from Greek, especially in phonology and syllable structures. By means that are not entirely clear, the Coptic language—especially the literary language—came to borrow a very large number of words from Greek, for the most part adapting the loanwords to Coptic syntax (and sometimes adapting them also orthographically and even morphologically). Thus someone who can read Greek (in the uncial scripts typical of Late Antique literary manuscripts) will be able to 'sound out' a good deal of any Coptic text and will even come across many easily recognizable (Greek) words, without being able to understand even the most basic clauses, for lack of knowledge of Coptic vocabulary and grammar.

Learning to read widely in Coptic literature entails learning multiple dialects, which are distinct from one another not so much in terms of the writing system as such, which remained fairly constant from one dialect region to another, and also through the centuries from Late Antiquity into the Middle Ages, but rather in phonology (especially different vocalizations of identical or closely related words), somewhat less often in morphology, sometimes also in syntax. The greatest number of dialects is attested in manuscripts of the earliest period of Coptic's history, from the fourth (or late third) century up until the time of the Arab Conquest of Egypt in the middle of the seventh century. But even in this early period, one relatively neutral dialect, called 'Sahidic', emerged as a kind of 'standard Coptic' and eventually came to replace the other dialects in the written record of Middle and Upper (southern) Egypt. In Lower (northern) Egypt, two other dialects—'Fayyumic' and 'Bohairic'—became the standard literary dialects, but by this time the Egyptian populace was (for reasons not entirely clear) beginning to give up speaking Coptic in favour of Arabic.

After the fourteenth century, by which time Arabic had replaced Coptic as the medium of spoken communication for nearly all purposes—except in parts of the liturgy of the Coptic Church—Coptic manuscripts were almost always written in the Bohairic dialect, most often with an accompanying Arabic translation. In the present context, 'Coptic manuscripts' are manuscripts that contain, if not exclusively, then at least in large measure, text written in the Coptic language (even if accompanied by texts in Greek or Arabic or any other language). Beginning not long after the turn of the first millennium, Copts had already begun translating selected parts of their ancestral literature into Arabic and composing new theological, pastoral and liturgical texts also in that language. But for the most part, the large number of 'Copto-Arabic' (or 'Egyptian Christian Arabic') manuscripts of the twelfth and later centuries are not treated here, while 'Coptic-Arabic' bilingual manuscripts have been considered as a part of the Coptic manuscript tradition proper.

On the whole, the Coptic-Arabic bilinguals served liturgical or devotional purposes, and so such books continued to be produced even after Coptic had lost almost all chance of ever again being a language of ordinary daily life anywhere. Although printing Coptic with movable type became possible in Europe (specifically in Rome) in 1629, by which time type fonts for Arabic also existed, the Coptic Church in Egypt did not begin printing its bilingual liturgical and devotional books until late in the nineteenth century, at which time the Coptic manuscript tradition proper came to an end.

Surviving Coptic manuscripts from the Middle Ages with a known provenance were mostly preserved in a small number of ancient monasteries, especially those in the Wādī al-Naṭrūn (northwest of Cairo), the Monastery of St Antony on the Red Sea and the Monastery of St Shenoute in Upper Egypt. Not infrequently, the older manuscripts in these repositories survived only as the remains of dismembered books that had long since been discarded and treated as waste paper (or waste parchment). Significant numbers of such manuscripts and fragments were acquired, one way or another, by western missionaries and travelling antiquaries and scholars, beginning in the sixteenth century. Most of the major European national museums and libraries, as well as a number of universities, own at least some Coptic manuscripts. Very large collections outside of Egypt are in Naples (Biblioteca Nazionale), Rome/Vatican (Biblioteca Apostolica Vaticana), Vienna (Österreichische Nationalbibliothek), Paris (Bibliothèque nationale de France), London (British Library) and New York City (Pierpont Morgan Library and Museum); in Egypt, the most salient

Map 4 Area of Coptic manuscript production

collections are in Cairo (Coptic Museum, Coptic Patriarchate, Institut Français d'Archéologie orientale).

Early mediaeval and also Late Antique Coptic manuscripts, including the earliest surviving papyrus and parchment codices, have been discovered by means of excavation, very often by treasure-hunters rather than by trained archaeologists, for which reason they are often without provenance. Among the large quantities of papyri (sometimes including parchment)—mostly in Greek—that have been excavated from Late Antique and early mediaeval urban sites in Egypt since the beginning of scientific papyrology toward the end of the nineteenth century, there is a relatively small but nonetheless significant amount of Coptic material, some of it literary rather than documentary. Such finds are almost always fragmentary, a description that unfortunately applies in one way or another to the remains of Coptic literature in general. For this reason, much of the study of Coptic manuscripts—whether from the point of view of codicology and palaeography, philology and textual criticism, digitization, cataloguing or preservation—is geared specifically to dealing with fragments, whether they are torn scraps of codex leaves, or leaves deriving from dismembered—and perhaps not otherwise extant—codices, or fragments of some author's otherwise lost work, or a work from an otherwise lost corpus, and so on.

In order for the study of Coptic manuscripts to advance, there is a great need for scholars to organize and to systematize the large quantity of data that has been published during more than two hundred years of scholarship, and to increase the database in a systematic and methodologically informed manner. There is still much basic research to be carried out (in some cases by revising and augmenting work done by previous generations of scholars), both in the form of cataloguing and describing manuscripts—whether in the so often fragmentary condition in which they are now to be found in the many different collections, or as partly notional codices reconstructed from fragments that might now be scattered among any number of those collections—and in the form of publishing the texts. There are Coptic manuscripts that have been in Europe for up to four hundred years and more that have not yet been (properly) published. Editorial practice in connexion with Coptic texts has more or less gone along with the practices of Greek papyrology, which has been both advantageous and disadvantageous for the field of Coptic studies in general. In any case, there is urgent need for clarifying what textually relevant information needs to be drawn from the Coptic manuscripts and how that information should be recorded and presented. The application of digital technology to Coptic texts is partly keeping pace with work in other languages, and there are encouraging signs both of an awareness of the need to coordinate the efforts of widely dispersed Coptologists, and of a willingness to try to do so. Given the amount of basic research and publication that has yet to be accomplished, it should occasion little surprise that methodologically sophisticated textual criticism of Coptic sources, carried out in a systematic and well founded manner, has scarcely begun.

References

Bagnall 1996; Crum 1905b; Emmel 2007; see also Ch. 1 § 5, Ch. 2 § 4.

3.7. Ethiopic manuscripts (ABa)

Writing was adopted by the Semites settled in Ethiopia—meaning the area between the northern highlands of the Horn of Africa and the Red Sea, corresponding to the present-day states of Eritrea and Ethiopia, the

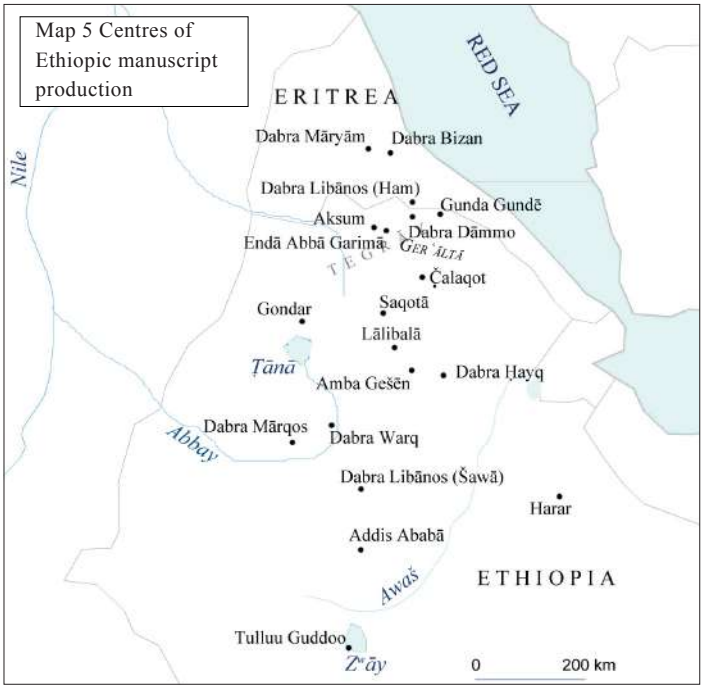
northern Tegrāy region of the latter in particular—as early as the first millennium BCE, much earlier than the date of the earliest surviving manuscripts. The existence of an extensive literature going back presumably to the fourth century CE, consisting mostly of Christian biblical and patristic texts translated from Greek, certainly implies the existence and use of manuscripts. Yet there is little positive evidence for the nature of the earliest practices, forms of books or the materials used (see Ch. 1 § 6). Our witnesses for the Aksumite period (first to seventh centuries CE) are mostly inscriptions. While Greek script and language were used for inscriptions and legends on coins, Sabaean script features in some royal inscriptions written in the Ethiopic language as a purely ideological device, neither Greek nor Sabaean are attested in Ethiopian manuscripts. In the second and third centuries CE, inscriptions emerge written in a non-vocalized Ethiopic script. The Ethiopic language (Geʿez) and the vocalized Ethiopic script as they appeared by the fourth century, on the eve of the Christianization of Aksum (mid-fourth century), are, apart from certain specific features, very near to the language and script used later on for centuries as the literary language of the Christian kingdom of Ethiopia. While little or no evidence of interaction with Coptic manuscript culture has been registered so far, there was very strong interaction with the Egyptian Christian Arabic manuscript culture, which played a pivotal role in providing materials and inspiration to the mediaeval and pre-modern Ethiopian literary activity, starting from the thirteenth century at the latest. No interaction is discernible with the coexistent Ethiopian Islamic manuscript culture (see Ch. 4 § 2.1.1.2).

Two parchment codices, the so-called Abbā Garimā Four Gospels manuscripts, recently dated to the sixth century CE at the latest by radiocarbon dating, are believed to be the earliest surviving Ethiopic manuscripts and provide evidence that the codex form was introduced and used early (see Ch. 1 § 6.2.3). They are all the more important since they are also decorated with paintings. In keeping with this evidence, as early as the ninth century CE an Arab tradition connects the word *muṣḥaf*, meaning 'Qurʾān book in codex form', to the Ethiopians, to whom the invention of this book form is attributed. In fact the Arabic term *muṣḥaf* was borrowed from Ethiopic *maṣḥaf*, that is 'book' or 'writing' in all its possible meanings (Sergew Hable Selassie 1981; Bausi 2008a, 521–524).

At present, there is no evidence suggesting any use of scrolls prior to the introduction of the codex in Ethiopia (see also Ch. 1 § 6.2.2), and, consequently, nothing to suggest that there was a passage from one form to the other as it happened, for example, for Greek.

Particularly remarkable in the Ethiopic manuscript culture is the use of manuscripts (particularly Four Gospels manuscripts, so-called 'Golden Gospels') to preserve notes regarding the institution (usually a monastery or a church), the place or the region where the codex was kept. Such notes may be inserted in empty spaces or on blank leaves and/or copied onto separate leaves or quires that were then later bound into the codex (Bausi 2010e; Fiaccadori 2014).

There are only approximate estimates of the number of Ethiopic manuscripts in the Eritrean and Ethiopian regions. The distribution of manuscripts across this vast territory, with a very limited concentration in bigger central institutions and an extremely marked tendency to wide dissemination, is a feature that seems to go back to the time of the establishment of the first monastic settlements in the Late Antique period and that was perpetuated in mediaeval and later periods. This situation means a substantial density of manuscripts also in rural and isolated areas and hinders any attempt to get a precise and comprehensive view of the total number of manuscripts that still exist. The rough estimate of 200,000 extant manuscripts in codex form (that is excluding scrolls; see Sergew Hable Selassie 1981, 35) is based on the assumption that the minimum number of manuscripts necessary for every church for religious services amounts to a few dozen. Given the number of present-day parishes ranging from at least 13,000 to 32,350, the larger average number of manuscripts preserved in the libraries surveyed in the past years, and the persistent use of older as well as new manuscripts along with printed books, this calculation seems probably underestimated. Monastic libraries also have not yet been systematically explored: the figures of approximately 200 manuscripts for Dabra Ḥayq Eṣṭifānos, around 570 manuscripts for Dabra Bizan, formerly approximately 800 and now approximately 220 manuscripts for Gunda Gundē, around 1,000 in the Patriarchate and several hundred at least for the churches of Dabra Mārqos, Čalaqot, or the cathedral church of Aksum Ṣeyon may provide some hints. The two largest modern Ethiopian libraries of major institutional importance are found in Addis Ababa, the Library of the Institute of Ethiopian Studies and the National Archives and Library of Ethiopia. They have rich manuscript collections, approximately 1,500 and 850 manuscripts, respectively, which are, however, on the same scale as is typical of a very rich monastic library.



By far the majority of Ethiopian manuscripts were produced in the Christian Kingdom of Ethiopia, with the exception of a few small, but not insignificant Ethiopian monastic communities in Egypt (where several Coptic monasteries hosted Ethiopian monks), Palestine (Jerusalem), Cyprus, and Rome. The manuscript production of these communities reflected to some extent their respective environments, and is, for example, marked by a more extensive use of paper instead of parchment, as can be seen from the figures of the older Vatican and Borgian collections, where the ratio of paper manuscripts to parchment manuscripts is much higher than the average value in indigenous collections, which is close to zero (Grébaut – Tisserant 1935, 1936, with 283 described entries and 55 paper manuscripts, with a peak in the sixteenth and seventeenth centuries of 22 paper manuscripts out of 46 manuscripts in total, that is 47.82%).

As appears from approximate estimates, in the absence of any comprehensive and reliable statistics, the large majority of the extant Ethiopic manuscripts does not antedate the seventeenth century. Manuscripts antedating the sixteenth century are rare, and older ones are extremely or even exceptionally rare. Actually it must be emphasized that—excepting the two Abbā Garimā Gospels and less than a handful of possibly twelfth-century examples—only for the period from the thirteenth century to the present do we have a substantial continuum in the evidence. The scarcity of older Ethiopic manuscripts is attributed by Ethiopian tradition, not without reason, mainly to the disruptions caused by the Muslim occupation of historically Christian areas in the mid-sixteenth century. Massive damage also occurred during the Ethiopian-Italian war of 1935–1941, which destroyed approximately 2,000 churches. On the other hand, manuscript books remained the norm of book production until the first half of the twentieth century and the practice of making manuscript books still exists at present. As a consequence, along with codicological, palaeographic, and philological analysis, ethnographic observations may also be taken into consideration (Mellors – Parsons 2002a, 2002b), provided, of course, that one remains aware that practices need not have been the same all across the centuries.

The vast majority of Ethiopic manuscripts that have been investigated and published so far are found outside Ethiopia and Eritrea. The number of manuscripts abroad may amount to several thousand, most of them described in printed catalogues (Beylot – Rodinson 1995, Wion et al. 2006, Bausi 2007; see also Ch. 4 § 4). The four largest collections in Europe are those of the Biblioteca Apostolica Vaticana, the Bibliothèque nationale de France, the British Library and the Staatsbibliothek Preußischer Kulturbesitz, Orientabteilung, in Berlin. The Vatican Library, which was the first collection to be catalogued in printed form, has 1,082 manuscripts, at the least, plus the largest collection of Ethiopian scrolls in the world. The Bibliothèque nationale de France has over 1,000 manuscripts, including scrolls. The British Library has at least 624 manuscripts. The Staatsbibliothek in Berlin preserves 328 manuscripts plus an important microfilm collection of 182 items from the Lake Ṭānā monasteries. Other European and North American institutions hold important collections of Ethiopic manuscripts (Manchester, Oxford, Frankfurt, Munich, St Petersburg, Moscow, Uppsala, Oslo, Florence, Milan, Parma, Rome (besides the Vatican), Athens, Princeton, Baltimore, etc.). Very important are also the collections hosted in Jerusalem, with probably more than 800 manuscripts (569 preserved in the Ethiopian Archbishopric of Jerusalem, 162 in the monasteries of Dabra Gannat and 33 in that of Dayr al-Sulṭān).

As far as microfilms are concerned, the collection of the Ethiopian Manuscript Microfilm Library (EMML), with 9,238 manuscripts, is the most important one. The first 5,000 items have been catalogued

in printed form and another volume is forthcoming. The EMML collection is hosted by the Hill Museum and Manuscript Library (HMML), Saint John's University, Collegeville, Minnesota, which has grown in the course of the last four decades into a major centre for the study, recording, digitization, and cataloguing of Ethiopic manuscripts (among others). It has recently digitized several important collections (for example, the monastic library of Gunda Gundē). More digitization efforts have been sponsored by the Arcadia Fund within the framework of the Endangered Archives Programme (EAP) of the British Library. *Mazgaba seelat*, Deeds Project, University of Toronto, stores several thousand images and historical collections of interest to art historians. The *Ethiopian Manuscript Imaging Project* (EMIP), started in 2005 and has located and digitized scattered smaller collections in the possession of university libraries, dealers and private owners, mostly in North America, but also in England, Israel and Kenya. Quite recently, starting from 2009, the European Research Council-sponsored project *Ethio-SPaRe: Cultural Heritage of Christian Ethiopia: Salvation, Preservation, Research*, University of Hamburg, has acquired high quality digital images of more than 2,000 Ethiopic manuscripts from the area of particular historical importance of eastern Tegrāy, in northern Ethiopian highlands (Nosnitsin 2013a, 2013c).

References

Bausi 2007, 2008a, 2010e; Beylot – Rodinson 1995; Fiaccadori 2014; Grébaut – Tisserant 1935, 1936; Mellors – Parsons 2002a, 2002b; Nosnitsin 2013a, 2013c; Sergew Hable Selassie 1981; Uhlig – Bausi 2007; Wion et al. 2006.

3.8. Georgian manuscripts (JG)

Although autochthonous historiography claims that writing was adopted by the Georgians as early as the third century BCE, there is no proof so far that their language was given written form before the conversion to Christianity in the fourth–fifth centuries CE, all written documents of older times being either Greek or Aramaic (or in both languages side by side, as in the famous bilingual inscription of Armazi of the first century CE; Çereteli 1941; Gippert – Tandaschwili 1999). The oldest extant sources written in Georgian are stone inscriptions of the fifth century discovered in the Monastery of the Cross near Jerusalem (inscription of *c.*452; Çereteli 1960; Gippert – Tandaschwili 2002) and in the cathedral of Bolnisi in Lower Kartli (South-East Georgia; inscription of around 493; Musxelišvili 1938, 325–343; Gippert – Tandaschwili 1999–2002; Gippert 2014a); the script used is the fully developed Old Georgian majuscule named *mrglovani*, 'round [script]', which was also the sole script used in the first centuries of the Georgian manuscript tradition up to about the ninth century. A minuscule variant derived from it, named *nusxuri* 'manuscript [script]' or *nusxa-xucuri* 'ecclesiastical [script] of manuscripts', appeared by about the same time, with majuscules continuing to be used as initials, in titles, and the like (*asomtavruli*, lit. 'capital letter[s]'). The combination of *nusxuri* and *asomtavruli* remained in use in religious writings up to the nineteenth century, whereas in secular contexts (but also in colophons), a cursive variant of the minuscule has been used since about the tenth century; this latter script, named *mxedruli* 'knights' [script]', is the one still in use today. With but few exceptions, the Georgian scripts were used only for the Georgian language in manuscripts. Exceptions are, among others, Greek *incipits* of hymns transcribed into Georgian (Gippert 2014b), sporadic cases of a sister language of Georgian, Svan, appearing in secondary notes of a mediaeval Gospel manuscript (Gippert 2013, 101–102), or a seventeenth century Turkish Bible written in *mxedruli* (hitherto unpublished, but see Luffin 2014).

The Georgian manuscript tradition, which developed continuously for about 1,500 years since the invention of the Georgian script and which is attested by about 75,000 manuscript leaves that survive until the present day, has proven to be extremely valuable as a witness of both Christian religious thought and Near Eastern narrative skill; it has preserved a noteworthy amount of early versions of the Gospels and hagiographical, homiletic, and hymnographic texts, mostly translated from Greek. In spite of their importance, Georgian manuscripts have remained under-studied in many respects, especially concerning their history, structure, and composition. Many of the observations assembled in the present handbook must therefore be regarded as preliminary.

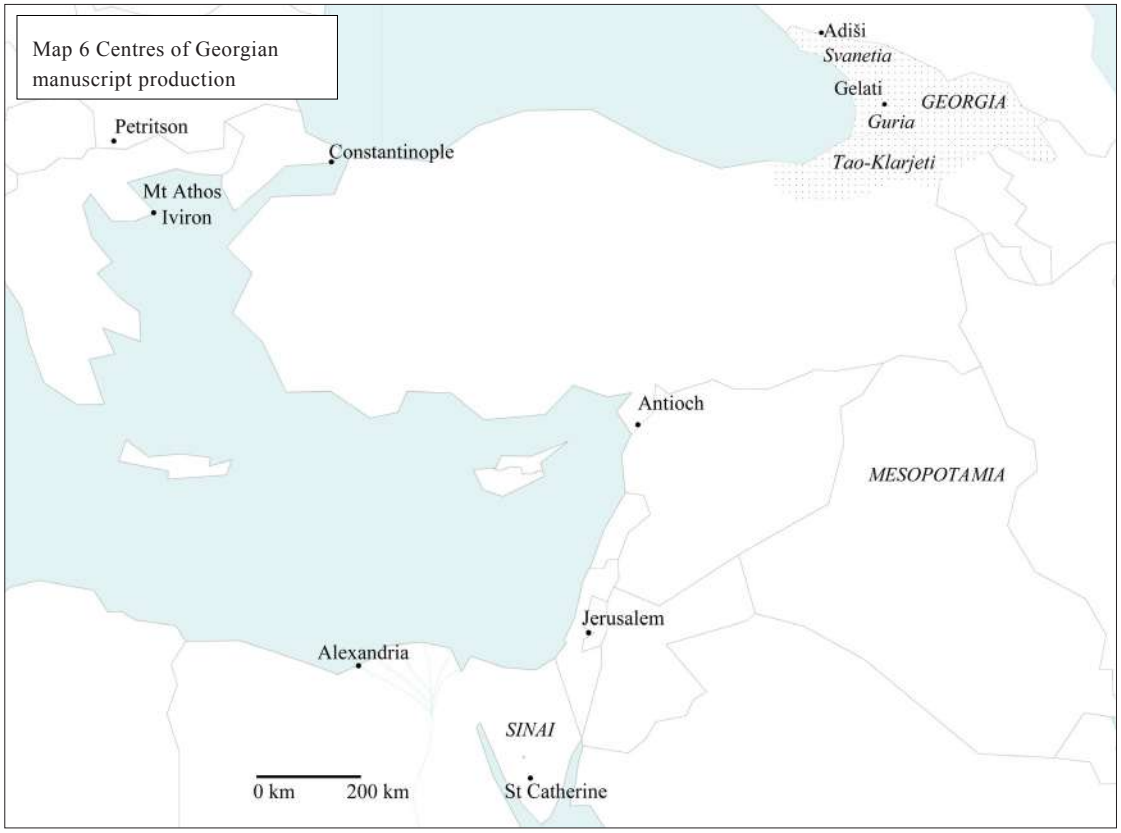
The oldest dated Georgian manuscript known so far is the manuscript 32-57-33+N89 of the Georgian collection of St Catherine's Monastery on Mount Sinai, a multiple-text parchment codex (*mravaltavi* 'multi-headed'; Gippert forthcoming) in *mrglovani* script written in St Sabas' Laura near Jerusalem in

863/864 (Šaniʒe 1959). However, there are clear indications of greater age in many other Georgian manuscripts. This is especially true of the so-called *xanmeṭi* and *haemeṭi* periods covering approximately the fifth to eighth centuries, which are characterized by the occurrence of special verbal and nominal affixes consisting of the letters *x* (*kh*) and *h*. Nearly all manuscripts exhibiting these traits have come down to us only in palimpsest form; an exception is the famous 'Sinai Lectionary', which represents an intermediate stage with both *xanmeṭi* and *haemeṭi* forms occurring side by side (Šaniʒe 1944; Imnaišvili 2004, 47–69; Gippert et al. 2007b; Gippert et al. 2007a, xxvi n. 89; see below). Another guide to the (relative) chronology of undated Old Georgian manuscripts is palaeography (Gippert et al. 2007a, xxvi; see Ch. 2 § 6).

Nearly all manuscript codices that have come down to us from the Old Georgian period (up to the thirteenth century) have religious contents, which implies that they were written by clergymen, in churches or monasteries, either in what may be styled the Georgian homeland (south of the Caucasus) or elsewhere in the Christian Near East. The most crucial role in the early centuries was played by Jerusalem, where Georgian monks had settled as early as the fifth century; the Monastery of the Cross, erected there by Georgians in the eleventh century, was dissolved only at the end of the nineteenth century when its library was taken over by the Greek patriarchate. Other centres of the production of Georgian manuscripts abroad were St Catherine's Monastery on Mount Sinai, where Georgians worked continuously between about the ninth and the fourteenth centuries, and the monastery of Iviron ('Iberians', i.e. Georgians' [monastery]') on Mount Athos, which was founded by Georgians in the tenth century. Among the 'autochthonous' centres of Georgian manuscript production, the most outstanding were the provinces of Ṭao-Ḳlarǯeti and Šavšeti in eastern Anatolia, both now belonging to Turkey. There are clear indications that all these centres kept close contacts with each other throughout the Middle Ages.

Manuscript codices with non-religious content came into being by the beginning of the thirteenth century, one of the oldest specimens being a paper codex containing, among other things, the Georgian translation of an Arabic astrological treatise (Ḳaranaʒe et al. 2010, 39). The same century witnessed the Georgians' endeavour to participate in the philosophical dispute about the neo-Platonism of the time, with the schools of Gelati (in West Georgia) and Iqalto (in East Georgia) producing relevant manuscript books. While all these books were still written in ecclesiastical *nusxuri*, the secular *mxedruli* was used in codices containing the products of both original and translated poetry and prose literature, among them Shota Rustaveli's epic *Vepxisṭqaosani* ('The One [knight] in the Panther's Skin'), the Georgian adaptation of Gurgānī's Persian romance of *Vīs u Rāmīn* (*Visramiani*), and other specimens of courtly literature. Different from the religious (Christian) tradition that visibly linked the Old Georgian production of manuscripts to the Byzantine world, the secular tradition was strongly influenced by Islamic or, more precisely, Persian models, a fact that is evident not only from the textual contents, but also from the layout of the manuscripts, the illustrations they contain, and other features (Gippert – Tandaschwili 2014, 11–12). With the introduction of printing in the middle of the eighteenth century, the production of manuscript books in Georgia started to decrease gradually, and it reached its end during the second half of the nineteenth century.

Only in rare cases have Georgian manuscript books been preserved where they were originally written. This is true, for example, of the major part of the Georgian manuscript collection of St Catherine's Monastery on Mount Sinai, which comprises around 250 catalogued codices (the actual number is considerably smaller due to losses and due to the fact that several items of the so-called New Finds of 1975 actually belong, as fragments, to codices registered earlier). Other collections that have remained in their original locations are those of the Iviron Monastery on Mount Athos (*c*.85 items) and of the Monastery of the Holy Cross in Jerusalem (*c*.160 items, now kept in the Greek patriarchate). On the other hand, most of the manuscripts that were produced in Georgia and eastern Anatolia have been assembled in four collections now hosted in the National Centre of Manuscripts in Tbilisi ('A': the collection of the former Ecclesiastical Museum; 'H': the collection of the former Museum of the Georgian Society for History and Ethnography; 'Q': the collection of the State Museum of Georgia; 'S': the collection of the former Society for the Promotion of Literacy among the Georgian Population; altogether *c*.9,000 codices; <http://www.manuscript.ge/index.php?m=73&ln=eng>, last access 2014). Minor collections within Georgia are those of the Historico-ethnographical Museum in Kutaisi (*c*.700 items), the Museum of Axalcixe (*c*.75 items), the Historico-ethnographical Museum in Gori, and the Historico-ethnographical Museum in Mestia. Three mediaeval manuscript codices (two evangeliaries, one lectionary) are known to have remained in the possession of mountain villages in the highlands of Svanetia (Kurashi, Lakhamula, Lakhushdi), where they are kept in the village churches (Gippert 2013).



Apart from the 'authentic' repositories, Georgian manuscripts are found throughout the world, in consequence of their removal mostly from Jerusalem and Mount Sinai. Noteworthy collections are hosted in Graz, Austria, Universitätsbibliothek (including the 'Sinai Lectionary' of about the seventh or eighth century, mentioned already above, MS 2058/1); Vienna, Österreichische Nationalbibliothek (including one of the most remarkable palimpsest codices originating from Jerusalem, Cod.Vind.georg. 2; Gippert et al. 2007a); Paris, Bibliothèque nationale de France; Leipzig, Universitätsbibliothek; Oxford, Bodleian Library; Birmingham, England, Cadbury Research Library, the Mingana Collection; Washington, DC, the Library of Dumbarton Oaks; and St Petersburg, Biblioteka Instituta Vostokovedenija Rossijskoj Akademii Nauk. Fragments of Georgian manuscripts that were reused as flyleaves or the like in non-Georgian codices are found, for example, in the Matenadaran in Yerevan, Armenia (Gippert – Outtier 2009), in the library of the Armenian monastery in New Julfa near Isfāhān, Iran (Outtier 2013) and in the Armenian patriarchate in Jerusalem (Outtier 1986).

References

Çereteli 1941, 1960; Gippert 2013, 2014a, 2014b, forthcoming; Gippert et al. 2007a; Gippert – Outtier 2009; Imnaišvili 2004; Ḳaranaʒe et al. 2010; Luffin 2014; Musxelišvili 1938; Outtier 1986, 2013; Šaniʒe 1944, 1959; Web sources: Gippert et al. 2007b; Gippert – Tandaschwili 1999–2002, 2014; Tbilisi, National Centre of Manuscripts, <http://www.manuscript.ge/index.php?m=73&ln=eng>, last access 29 November 2014.

3.9. Greek manuscripts (MMa)

The history of Greek manuscript books extends over a long time span, from classical Greece to at least one and a half centuries beyond the invention of western printing in the mid-fifteenth century. In terms of geography, Greek and Byzantine book making is not confined to Ancient Greece and Constantinople: depending on the time and historical events, it extends to Armenia, Georgia, Syria, islands of the eastern Mediterranean such as Cyprus or Crete, Greece with the monasteries of Mount Athos, the Slavonic nations of the Balkans and Russia, St Catherine's Monastery on Mount Sinai, Egypt, and both southern and northern Italy (see also Ch. 2 § 7).

The existence of books in the Greek language and script may be inferred from written sources, vase paintings and isolated and fragmentary examples (see Ch. 1 § 8 and Ch. 2 § 7) in fifth-century BCE Greece,

that is some three centuries after the archaic Greek alphabet was created on the model of the Phoenician alphabet. The use of writing was originally limited to the preservation of mainly religious or administrative texts, recorded on hard materials and kept in temples and other archives; the oldest evidence concerning book-rolls and a book trade in Athens's marketplace and civic centre (*agora*) dates from to the fourth century BCE (Plato, *Apol.* 26). Between the Hellenistic period and Late Antiquity, papyrus (and also parchment) rolls achieved wide diffusion in the Graeco-Roman world: eastern and western *volumina* bear witness to a common ground of manufacturing practices, with some structural differences clearly standing out (Turner 1977).

The long-term transition from roll to codex started at the beginning of the Christian era and was fully accomplished between the fourth and fifth centuries CE: it preceded a period of political, economic and cultural decline, caused by the disintegration of the political and administrative structures of the Roman Empire. The consequences were also felt in Byzantium, from 324 CE the capital of the new Christian empire, where literacy remained quite widespread until the Turkish conquest in 1453, favoured by the extent and pervasiveness of the imperial bureaucracy. Byzantine society was in fact pervaded by a deep-rooted 'bookish mentality' (Cavallo 1982, xi): the existence of a wide audience of both religious and secular readers ensured the transmission of the Classical cultural heritage on which much of Byzantine literature was based; illiterates, to whom books were personally inaccessible, enjoyed them indirectly through liturgical rites, where the Bible was exhibited (Cavallo 2006).

Most scribes were monks (Cutler 1981; Ronconi 2012, 661–663); but Byzantine monastic book production, unlike its Latin counterpart, rarely took on an organized form, the most renowned exception being the metropolitan Monastery of Saint John the Baptist of Stoudios, founded in the mid-fifth century, where reading and writing activities were regulated by the monastic constitution (*typikon*: *PG* 99, 273 B–C; 119, 1740 C–D). More individualistic modes of monastic experience prevailed, such as those practised on Mount Athos, where the monks lived in independent groups or families; only a few large monasteries are known to have housed a significant library with books beyond the everyday liturgical necessities, usually a simple room where books were kept together with other objects.

Byzantine society knew of no strict separation between secular and monastic circles: monks could maintain relations with the outside world and many lay people—even high-ranking ones, including some emperors—might end their life in a monastery. Books were never produced for the exclusive use of religious circles, as was the case with many Latin *scriptoria*: monasteries could receive book commissions from the outside world, as part of a range of secular and monastic scribal performance, which also involved laymen (school teachers, notaries, major and minor scholars…) and occasionally also women. In the Late Byzantine period books might also be written in collaboration by several hands within specific scholarly circles, which has led it to be supposed that manuscript copying was a kind of learned activity, in the form of a collective appropriation of the transcribed texts (Cavallo 2001a, 2004c). Greek scholars of the fourteenth to sixteenth centuries were often active as scribes (Cavallo 1982; Hunger 1989; Reynolds – Wilson 1991; Wilson [N.] 1983, 1992; Waring 2010).

The lack of local writing schools and the interdependence between the secular and monastic worlds are reflected in the highly homogeneous material and scribal features of Byzantine books: at variance with the Latin west, specific artisanal and graphic patterns, styles and trends are more the exception than the rule, and they can only rarely be referred to a given centre or area. Apart from being poorly marked by local peculiarities, Byzantine books exhibit from Late Antiquity until at least the twelfth century (and in some ways even later) a substantial stability in their methods of manufacture, being a mirror of the conservatism that permeated Byzantine civilization. The fact that the scholars acting as book scribes were sometimes the same people who performed public functions may result in a clear osmosis between book and documentary scripts, especially from the eleventh century onwards.

The Greek codices that have come down to us are an essential source for the knowledge of ancient Greek and Byzantine civilization; and yet, as with all other manuscript cultures, we lack reliable estimates of both the quantity of the original Greek manuscript production and of the share of it that survives. The figure of over 65,000 volumes recently calculated in the course of the Diktyon project (<http://www.diktyon.org/en>) is compatible with the estimate of 55,000 volumes suggested by Alphonse Dain (1949, 1975); these and any such figures are most likely to remain merely approximate, given the absence of information on the number of codicological units composing each extant volume. Only twenty-five out of something more than six hundred libraries or collections (*c*.4%) possess more than 400 codices, while

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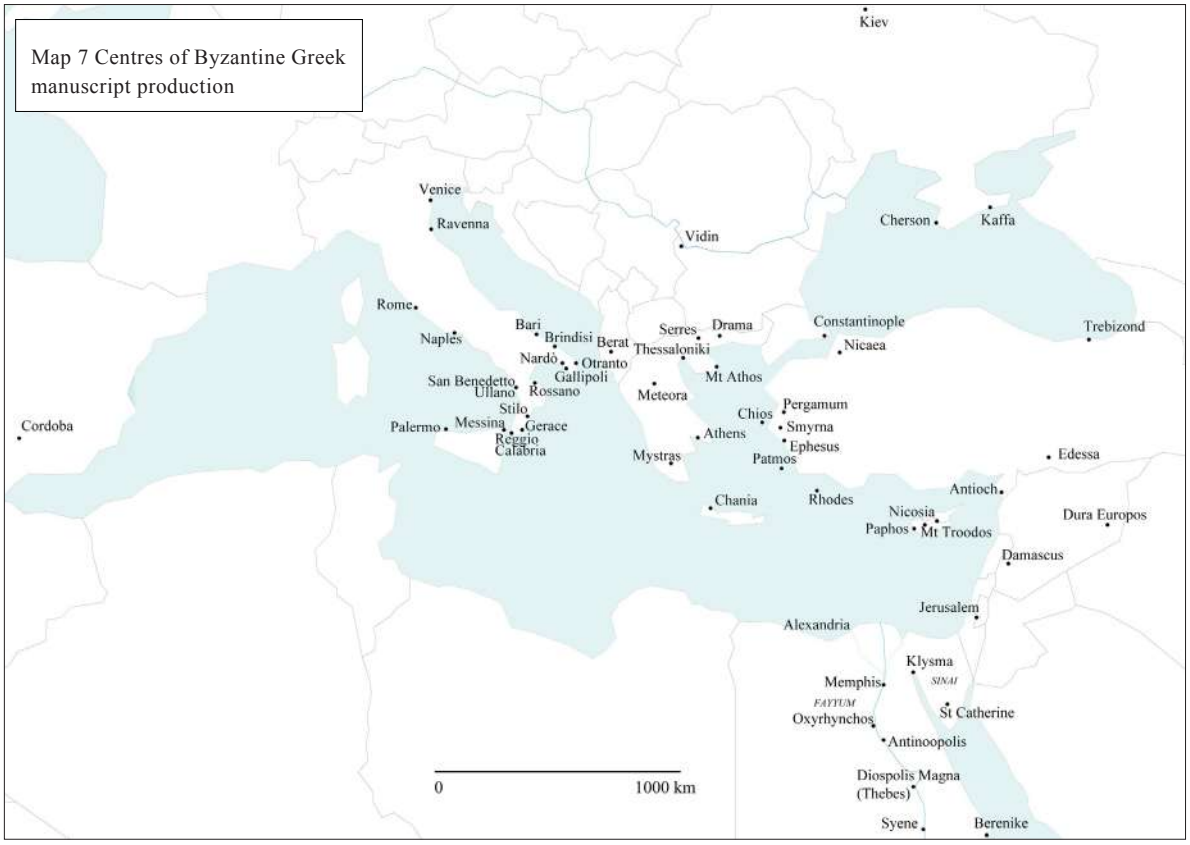


Map 7 Centres of Byzantine Greek manuscript production

about 230 (i.e. more than one third) own only a single codex. In Italy, the number of Greek manuscripts written in or preserved in Europe during the centuries preceding the fall of Constantinople was enriched by those that were brought or produced in the fourteenth and fifteenth centuries by Greek and Latin scholars who were responsible for the creation of the major Italian collections of Greek manuscripts still owned by the most important libraries of the Italian peninsula (among which are the Biblioteca Apostolica Vaticana, the Biblioteca Nazionale Marciana in Venice, and the Biblioteca Medicea Laurenziana in Florence). Similarly, in northern Europe, rich collections of Greek manuscripts began to develop between the sixteenth and seventeenth centuries: in Paris, London, and Oxford, and in Germany and Russia. In the east, large and still largely unexplored collections survived the Turkish conquest in the monasteries of Mount Athos and Meteora, or on various Greek islands. The manuscript collections of Athens, Mount Athos, the Biblioteca Apostolica Vaticana, and the Bibliothèque nationale de France in Paris, in this order, represent the richest collections, ranging from over 5,500 to about 3,600. Normally, though with significant exceptions, the quality of Greek manuscript catalogues (even some of the oldest ones) is acceptable or fairly good as far as the contents are concerned, but very heterogeneous with regard to the material features of the codices (Canart 2010; see Ch. 4 § 6).

Originally, it was sacred literature that was dominant among the contents of Greek codices (and is probably even more dominant among the surviving codices than was the case during much of the history of Greek manuscript book production). As is well known (and confirmed by the results of research centred on the ninth to twelfth centuries), liturgy, homilies and biblical exegesis are the best-represented categories throughout the ages; the Bible (both Old and New Testaments) is also constantly present, and only exceptionally contained in a single volume; more frequently it is divided into various volumes containing more or less standard combinations of books. Secular (Classical and Byzantine, literary and technical) production constitute, in all ages, a minority, probably less than ten per cent of the total quantity of books that were produced.

References

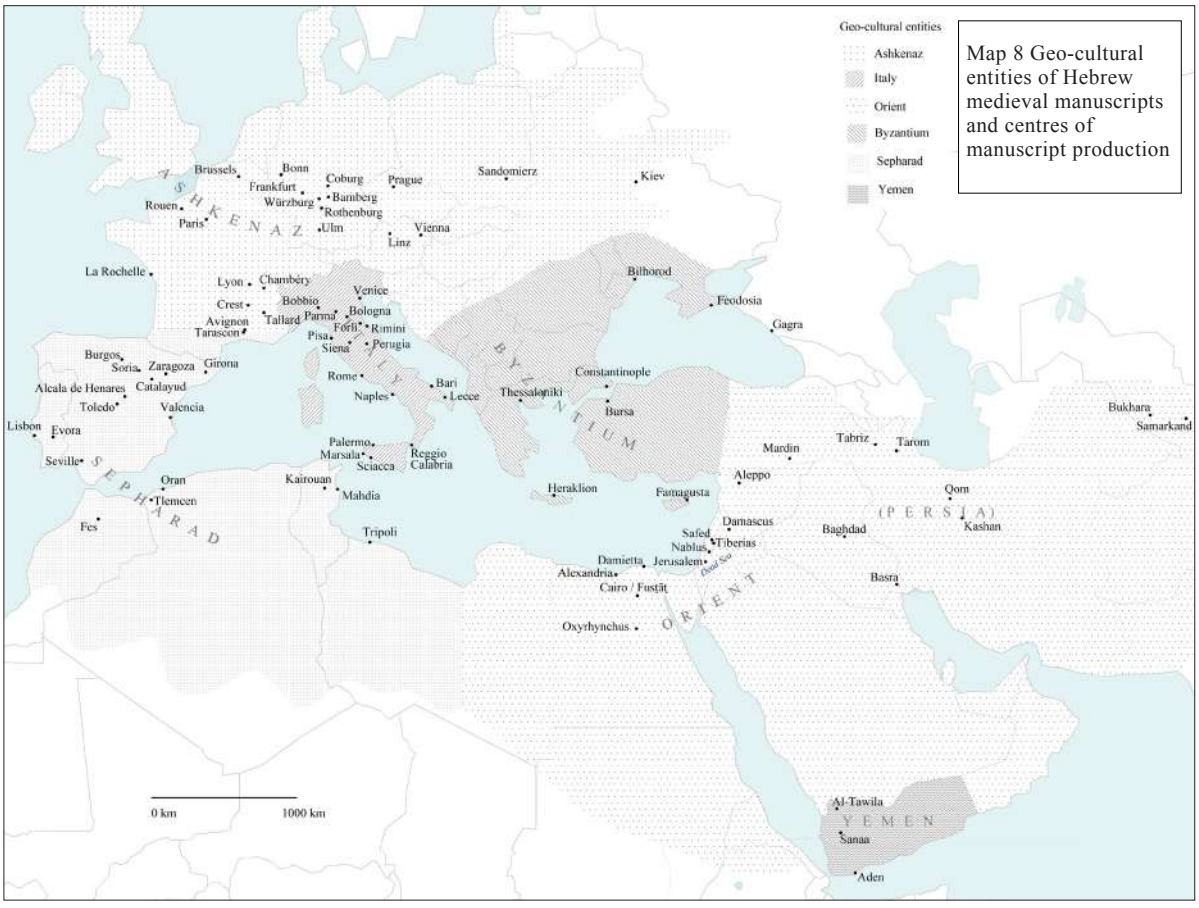
Canart 2010; Cavallo 1982, 2001a, 2004c, 2006; Cutler 1981; Dain 1949, 1975; Hunger 1989; Reynolds – Wilson 1991 (first ed. 1968); Ronconi 2012; Turner 1977; Waring 2010; Wilson [N.] 1983, 1992; <http://www.diktyon.org/en>, last access June 2014; see also Ch. 1 § 8, Ch. 2 § 7 and Ch. 4 § 6.

3.10. Hebrew manuscripts (MBA)

The position of Hebrew manuscripts among oriental traditions or definition is intricate. Hebrew is, of course, a Semitic language and Hebrew codices are written in a Semitic script. The Palaeo-Hebrew alphabet—a local variant of the Phoenician script, for which there is epigraphic evidence in Palestine going back to the tenth century BCE—was replaced by a Jewish variant of the Aramaic script adopted since the third century BCE in Syria, Palestine and Egypt; its most abundant attestation is the Judaean Desert Scrolls and associated documents. Ever since, this Hebrew script continued to be used, into the Middle Ages and until recent times, for the writing of Hebrew manuscripts and records, as well as for other languages when rendered in Hebrew characters, most notably Arabic. Yet due to historical circumstances, Jewish communities were scattered around the Mediterranean basin and farther eastward, westward and northward. The spread of the Hebrew script blurs the distinction between Orient and Occident since Hebrew manuscripts were produced in Yemen and the Maghreb in the south, in central, northern and eastern Europe to the north, eastward in Central Asia and as far west as England, and the Hebrew tradition became surrounded by the book civilizations of Islam and Christianity—the oriental and Occidental Islamic territories with their Arabic script and book lore, the Byzantine East with its Greek script, the Latin west, and other minor oriental languages and scripts.

Consequently, dealing with Hebrew manuscripts and Hebrew codicology inevitably involves manuscripts produced in both Orient and Occident, and their codicological and palaeographical typology is bound to relate to the typologies of the major host zones. Bridged by a shared script, a common culture and literature, as well as certain scribal traditions, Hebrew manuscripts are nonetheless separated by the different environments which affected the codicological practices of their makers. A considerable number of what must be classified as Hebrew manuscripts were written in Judaeo-Arabic using Hebrew characters, mainly in the Orient, but also in North Africa and Spain. Similarly, while Hebrew manuscripts were produced also in the Latin west, some of these western manuscripts in Hebrew characters are written in European vernacular languages, such as Yiddish (Judaeo-German; see also Ch. 4 § 2.7).

Between the rich finds of Hebrew books from Late Antiquity—namely the Dead Sea Scrolls and the fragments from the Qumran caves and the Judaean Desert, dating from the Hellenistic and early Roman



Map 8 Geo-cultural entities of Hebrew medieval manuscripts and centres of manuscript production

periods—and the earliest dated and datable surviving Hebrew codices, there is a salient gap of some eight hundred years with almost no extant evidence of the Hebrew book. Of the few dozen existing literary fragments dating from this gap, mainly papyri of the Byzantine period excavated in Egypt, not one derives from a codex, as post-biblical literature was mainly transmitted orally. The codex was adopted by the Jews in the Orient much later than it had come to be used by the Christians, not before the eighth century, or following the Islamic expansion. The number of the extant Hebrew codices, mostly mediaeval, is about 100,000 (including many composite manuscripts), plus more than 300,000 fragments, kept in some eight hundred collections, mainly in Europe.

Dated codices have survived from the beginning of the tenth century and thereafter, while some undated ones can be assigned to the ninth century. Thus the codicological typology of the mediaeval Hebrew manuscripts, based on the documentation *in situ* of almost all the extant explicitly dated manuscripts—more than 3,000 codicological units documented in 3,400 records, as each hand of a multi-hand manuscript was recorded separately, about half of them with indication of locality—is confined to the central and late Middle Ages.

The following statistics derive from SfarData <http://www.sfardata.nli.org.il>, the codicological database of the Hebrew Palaeography Project sponsored by The Israel Academy of Sciences and Humanities:

Corpus	*palaeographical units*	*codicological units (codices)*
Explicitly dated manuscripts until 1540 studied *in situ*	3142	2777
Unstudied dated manuscripts (partially recorded)	258	249
Unlocated or lost dated manuscripts	179	179
Extant dated manuscripts	3400	3026
Disqualified dated manuscripts	85	85
Studied undated colophoned or named manuscripts	1176	1068
Unstudied undated manuscripts, partially recorded	430	417
Total Hebrew manuscripts documented *in situ*	4318	3845
Selected dated and localized documents	1181	
Dated and localized paper Arabic manuscripts	143	143
Total records	6705	5029

References see Ch. 1 § 9; Ch. 2 § 8.

3.11. Slavonic manuscripts (RMC)

'Formerly', says a ninth-century writer known as the monk Chrabr, 'the Slavs had no writing, being pagan, but used marks and incisions for reckoning and divination; but when they were baptized, they were forced to write Slavonic with Greek and Latin letters, unsystematically (*bez ustroenija*)'. This short sentence indicates both the close connexion between writing and Christianity in the history of the Slavs, and that a genuine native tradition of literacy begins with the introduction of a native alphabet. There are early Slavonic inscriptions written with Greek letters, and the Latin-script manuscript known as the Freising Fragments (Munich, Bayerische Staatsbibliothek, Clm 6426, ff. 78, 158–161), written *c*.1000, probably testifies to a writing tradition that goes back to the activities of Frankish missionaries in Carinthia in the eighth century, but they are indeed unsystematic, as far as rendering the sounds of Slavonic is concerned, and peripheral to the writing cultures to which they belong, in which the normal languages of the written word are Greek and Latin. A distinctively 'Slavonic' tradition of literacy begins only with the invention of a writing system designed specifically for the Slavonic language—attributable beyond reasonable doubt to the work of St Cyril in 863—and it embraces only some of the Slavonic peoples. Those who received Christianity from the Franks received at the same time the tradition of Latin literacy, to which their vernaculars, like those of Western Europe, remained subordinate throughout the period of the manuscript book.

The alphabet devised for the Moravian mission conducted by St Cyril and his brother St Methodius is that which has come to be known as Glagolitic (see Ch. 2 § 9). The basic order of the letters follows that of Greek and Hebrew, but a large proportion of the characters have no equivalent in either of those alphabets. The actual shapes of the letters, however, are original: despite numerous attempts to trace their

antecedents, no scholarly consensus has ever been reached. It is generally agreed that nothing survives from the time of SS Cyril and Methodius, and that the earliest extant manuscripts must have been written at the end of the tenth or beginning of the eleventh century.

From the beginning, Glagolitic writing was closely connected with the Slavonic liturgy, and in consequence, when after the death of St Methodius in 885 the Slavonic liturgy was abolished in Moravia, the Glagolitic tradition there came to an end. (It was to be briefly revived in the Czech lands in the eleventh and fourteenth centuries.) It is possible that the Slavonic liturgy had been known in Bulgaria (and in the less politically organized lands between Bulgaria and the Adriatic) even before 885, and it is recorded that the Slavonic clergy expelled from Moravia shortly afterwards found a ready welcome there. Towards the end of the ninth century the Slavonic liturgy was adopted as its normal rite by the Bulgarian Church (which since the official conversion of the country in 864 had used Greek). However, the 'exotic' Glagolitic alphabet was evidently a stumbling block to the educated aristocracy in the Bulgarian capital of Preslav, already thoroughly immersed in Byzantine culture. The result was the development of Cyrillic, with letter shapes very closely based on Greek uncials (see Ch. 2 § 9). The Glagolitic tradition appears to have been maintained in western Bulgaria and Serbia until the middle or latter part of the twelfth century, but with the establishment of the Second Bulgarian Empire and the emergence of a united Serbian state (and later the Serbian national Church under St Sava), Cyrillic became the normal writing system in these areas. Thereafter, Glagolitic was confined to those areas of Croatia (along the Dalmatian littoral and on certain islands in the Adriatic) where a vernacular liturgy of the Western rite was maintained. The last Glagolitic service book was printed at Rome in 1905, and Glagolitic can still occasionally be seen used as a decorative alphabet.

Cyrillic was dominant in eastern Bulgaria from its inception and was also adopted by the Eastern Slavs at their conversion in the late tenth century. The Rumanians also used Cyrillic, having adopted Church Slavonic as their liturgical language and Middle Bulgarian as their chancery language (the earliest documents date from the fourteenth century); Cyrillic continued to be used for writing Rumanian until the nineteenth century.

It is evident that both Glagolitic and Cyrillic writing emerged from the Byzantine tradition—the former the invention of a Greek, and the latter in the cultural penumbra of the Empire. Paradoxically, the older of the two is the more modern in Byzantine terms: the layout and preparation of the oldest Glagolitic manuscripts show distinct affinities with Greek minuscule manuscripts of the ninth and tenth centuries, whereas those written in Cyrillic evidently depend on a more conservative local uncial tradition. The earliest examples of both types of manuscript may be studied in conjunction with the contemporary Byzantine book, with which they share many features in terms of their codicology (see Ch. 1 § 10), writing practice and (for Cyrillic at least) palaeography. Subsequently, however, Glagolitic book culture grew closer to that of Western Europe, to which it was united by religious and political ties, and by the fifteenth century the layout and decoration of Glagolitic codices, and even the ductus of their script, came to resemble those current in Northern Italy.

The Cyrillic book, by contrast, continued to evolve within the same cultural and religious sphere as the Greek book and reflects many of the same developments. This is not to deny the emergence of local traditions, principally Bulgarian, Serbian and East Slavonic ('Russian'), and within the latter the traditions of Novgorod vs. Kiev, or later Muscovy vs. the South-West; but these were never maintained in isolation, to the extent that some fifteenth-century Russian manuscripts are almost impossible to distinguish from their Bulgarian models. The religious pre-eminence of Constantinople, moreover, meant that all were receptive to Greek influence. A partial exception is the somewhat rustic and archaic tradition of Bosnia, which (with some notable exceptions) seems to have been relatively impervious to outside influences.

The Slavs were certainly aware of literacy in the cultures that surrounded them before they undertook to create a writing system for their own language, and this awareness is reflected in the vocabulary surrounding the book. The verb 'to write', *pisati*, means also 'to paint', a polysemy shared with the Greek *graphō*. Greek *grammata* has given Slavic *gramota*, meaning a 'document', 'writing' in general, or facility in it, the same semantic field as Latin *litterae.* The Slavic word for a 'letter', *buky*, is Germanic, and, most remarkably, it is the Chinese 卷, 'scroll' (in modern Mandarin *juàn*, but in earlier periods believed to have been pronounced more like *küen*), borrowed into Turkic and thence, with the Hunno-Bulgarian suffix *-ig-*, into Slavonic as *kŭnigy* (a *plurale tantum* meaning 'anything written') from which the singular

Map 9 Centres of Slavonic medieval manuscript production

kniga/kniha, the word for 'book' in modern Slavonic languages, is derived (Deleva 1997, see also Vasmer 1953–1958). The materials for writing have their native names insofar as they are objects from everyday life otherwise unrelated to the book, such as *pero* ('pen', literally 'feather'). The Greek word *chartēs*, which was borrowed very early into Old Bulgarian, was used to denote a number of writing surfaces; its development among the Balkan Slavs was the same as in Greek, so that *hartija* now means 'paper' (though Serbian also uses *papir*). In Russian *charat'ja,* a word which survived into the twentieth century, meant 'parchment', but this is now universally designated by the Western European borrowing *pergamen(t)*. The derivation of Russian *bumaga*, 'paper', is obscure, but certainly connected in some way with Greek *bambax*.

The extant Slavic manuscripts are estimated to number *c*.60,000–80,000, the largest collection being that of St Petersburg; about one third of them have been catalogued (see Ch. 4 § 2.9).

References

Deleva 1997; Vasmer 1953–1958; see also Ch. 1 § 10; Ch. 2 § 9.

3.12. Syriac manuscripts (PGB–FBC)

The history of the production of Syriac manuscripts in the strict sense, that is books in codex form, begins in the early centuries of the Christian era. The oldest dated Syriac manuscript was written in Edessa in 411 CE (London, British Library, Add. 12,150, parchment, 370 × 285 mm, 255 leaves) and contains patristic works of Clement of Rome, Titus of Bosra, Eusebius, and also a martyrology. The production of handwritten books continues to the present day and was still very common in the nineteenth century (in some cases as a result of requests from western scholars and missionaries); recent manuscripts in fact contain several ancient works, and in some cases they are *codices unici*.

The shape of the Syriac manuscript book was set early, and already the oldest manuscripts conform to some kind of formal perfection that later copyists sought to reproduce. Thus there is from the beginning

a Syriac kind of manuscript, distinct from the Greek type of manuscript, which was one of the models encountered by Muslim scribes when they developed their own written tradition. The history of the Syriac book is, therefore, an important chapter in the history of the book in the Near East.

The production areas of Syriac manuscripts coincide with the area of origin and dissemination of the culture of Syriac expression. But in addition to the main centres in the Near East (Turkey, in particular the region of Ṭūr ʿAbdīn in the southeast, Syria, Lebanon, Israel, Iraq, Iran, Egypt), there are also peripheral areas: eastward there are southern India (Kerala), Central Asia and China; westward there is Europe, in particular Italy and France. From both the quantitative and the chronological points of view, the peripheral areas are obviously characterized by a relatively limited and recent production; nevertheless, Central Asia preserved some older manuscripts (ninth century), while in Europe the production of Syriac manuscripts dates from the sixteenth century and is primarily a consequence of the contacts between the Roman Church and the Churches of the East.

Worth mentioning from the twentieth century are manuscripts intended to serve as models for printed books, a practice that was abandoned only recently with the adoption of the computer for typesetting Syriac texts. These twentieth-century manuscripts perpetuated the traditional layout, in some cases including the use of rubrics, a practice that necessitated the use of colour in Syriac printed books.

The number of Syriac manuscripts is difficult to assess, but it is estimated that more than 10,000 manuscripts are preserved, about 3,000 of which are dated. The distribution of these dated manuscripts over the centuries varies significantly, in keeping with the history of the Syriac Churches and in relation to material circumstances; for instance, almost all the dated manuscripts earlier than 1000 CE—about 166 in number—and many more undated ones, have been preserved in Egypt, thanks to its dry climate (Brock et al. 2001, 243; Brock 2012a, 25–28) and to the relatively calm political situation compared to the many invasions that Syria and Iraq had to endure. For instance, the concentration of Syriac manuscripts in the Syrian Monastery (Dayr al-Suryān) in the desert of Scetis (Wādī al-Naṭrūn, northwest of Cairo), began already in the Middle Ages, when (in 932 CE) its abbot Mushe of Nisibis brought from Mesopotamia some 250 manuscripts (Brock 2012b). The number of dated Syriac manuscripts from the fifth to the twelfth century is about 229; from the thirteenth to the nineteenth century, the number is about 1850 (Brock et al. 2001, 245: an estimate on the basis of catalogues of western collections).

Collections of Syriac manuscripts are found in monasteries and religious institutions throughout the Near East and as far west as Egypt, as in the above-mentioned Syrian Monastery (Egypt) and St Catherine's Monastery on Mount Sinai. Peculiar to the latter and linked to the presence in the monastery of monks from many different cultural and linguistic communities, is an overlay of languages within single manuscripts, when the parchment was reused for copying new texts (palimpsests); in addition, remains of Melkite Syriac literature have been preserved mainly in St Catherine's Monastery on Mount Sinai. Maronite Syriac manuscripts are kept in the collection of the Maronite Patriarchate, in Bkerké. The Holy Spirit University of Kaslik has established a library and assumed the task of gathering up small collections scattered in different churches and communities. Manuscripts of the Syriac Orthodox tradition are preserved in the region of Ṭūr ʿAbdīn, in southeastern Turkey, in the libraries of the monasteries of Dayr al-Zaʿfarān and Mor Gabriel, and in Mardin; other collections are in Jerusalem, Damascus, Aleppo and Charfet (Lebanon). East Syriac collections are kept in Iraq; as regards the Chaldean Church, the important library of the Patriarchate should be mentioned, as well as that of the monastery of Dora in Baghdad, where many manuscripts of churches and monasteries in northern Iraq had been gathered; since the recent war, the manuscripts have been transferred to Iraqi Kurdistan (the collection of Dora is back in the Monastery of Our Lady of Seeds in Alqosh where part of it originally came from). Finally, mention must be made of the Syriac communities of southern India, from both the Eastern and the Western Syriac traditions—whose many manuscripts are relevant for the history of Syriac book production as a whole—as several others were transferred from northern Mesopotamia to India.

In Europe, the most important collections are those of the Biblioteca Apostolica Vaticana—the oldest one being also particularly varied—and the British Library. In both cases manuscripts acquired in the eighteenth and nineteenth centuries from the Syrian Monastery in Egypt have an important place. They are the core of the British Library's collection, including some of the oldest preserved examples and mostly preserving the tradition of the Syrian Orthodox Church. The beginnings of the Vatican collection go back to the sixteenth century, and as the Church of Rome was involved in relations with all Syriac Churches

from that century on, the Vatican collection is also varied in confessional provenance. Smaller collections elsewhere in Italy (Milan, Biblioteca Ambrosiana; Florence, Biblioteca Medicea Laurenziana) are also important, because of certain particularly precious manuscripts. In Great Britain, also the Mingana collection (Birmingham) deserves mention. Other important collections in Europe are found in Berlin (Staatsbibliothek Preussischer Kulturbesitz) and Paris (Bibliothèque nationale de France): in general, their manuscripts are less old than those in the other collections that have been mentioned. The history of these collections in part reflects that of diplomatic relations between the relevant countries and the Near East: for instance, the close relations of France with the Levant certainly explain the large number of Maronite manuscripts in French collections (besides the Bibliothèque nationale in Paris, also for example in Aix-en-Provence, Bibliothèque Méjanes; Lyon, Bibliothèque municipale; Strasbourg, Bibliothèque nationale et universitaire). Conversely, the German diplomatic presence in Iraq and Iran is related to the proportionately greater number of Eastern Syriac manuscripts in German libraries, or in the library of Strasbourg. The role of American missionaries in Urmia in the nineteenth century and the recent emigration of Christians from the Middle East to the United States explain the formation of the majority of North American collections, among them that of Harvard University, Cambridge, MA (for a complete repertoire of places and collections that preserve Syriac manuscripts, see Desreumaux 1991).

References

Brock 2012a, 2012b; Brock et al. 2001; Desreumaux 1991 and Ch. 1 § 11.

4. Ethical and legal aspects of manuscript research

4.1. Ethics in research and conservation of oriental manuscripts (SI)

The professional ethical standards of researchers of manuscripts, persons in charge of manuscript collections, and those responsible for the conservation are not a recent invention. For many years questions have been raised concerning the methods and technical choices allowed in historical research, and these apply also to the treatment of documents in archives, libraries and museums.

At the end of the nineteenth century in France, the *Méthodique* school derived inspiration from German historians (see Bourdeau 1888) and dictated the first rules for the positivistic approach to historiography: August Comte stated that a historian must study all facets of history. The same general principles were applied in the twentieth century by the *Annales* school. A historian must neither judge nor interpret the past, but take witnesses as they are. There must be a total separation between the historian and the historical fact. History exists in and of itself, and we can therefore arrive at a historical fact. The work of a historian is to find and re-assemble the verified facts in order to constitute a history that will organize itself. At the end of the nineteenth century a number of historians were also palaeographers working in archives, and their work influenced the library and archival economy.

In archives and libraries, there has been for years a discussion concerning ethical rules to be respected. In the domain of museums, it suffices to recall the questions of the theoreticians of restoration. The most emblematic case is certainly the polemic that took place during the eighteenth and most of nineteenth centuries surrounding the return of the Laocoon group, the famous sculpture discovered in 1506. Gotthold Ephraim Lessing's publications, and then the work of John Ruskin (1819–1900) who expressed his unfavourable opinion concerning the restitution of the Laocoon by Giovanni Antonio Montorsoli in 1523, are the principal witnesses. In the twentieth century the need was felt to regulate and normalize these aspects at the heart of their respective international professional organizations.

4.1.1. General principles for scientific research

Each country has developed a professional code of ethics used by researchers, but at an international level, this regulation emerges at the heart of the International Council for Science which was founded between the two wars, in 1931, as a non-governmental organization dedicated to the international cooperation for scientific progress. In matters of applied ethics, this organization presents, on its internet site, a chapter dedicated to the freedom and the responsibility of researchers. At a European level, the European Research Council, which depends on the European Union, does not seem to have worked on this aspect of regulation (apart from the Ethics Review that mostly regards natural sciences and sensitive personal data), even though the European Science Foundation (the carrier of the Research Networking Programme COMSt) has put a lot of work into this question.

4.1.2. General principles for archives, libraries and museums

The international professional organizations have not all launched a process for the regulation of ethics. The International Council of Museums (ICOM) adopted its code of ethics for museums in 1986 while the International Federation of Library Association (IFLA) and the International Council of Archives (ICA) do not seem to have adopted, to this day, any similar code.

4.1.3. General principles for restoration

For manuscripts in particular, one must look at the text by the IFLA (*The Principles of Conservation and Restoration of the Collections in the Libraries*, 1979), as first presented at a congress in Copenhagen. A revised version was edited in 2012 in the context of the Preservation and Conservation (PAO) plan. The text of 1979 reminds us already of the importance of necessary measures of preventive conservation. For aspects of restoration, the essential principles were outlined in the 1980s and they remain valid today, even if they are not always easy to apply. The three core principles are repeatedly recalled in Chapter 5: (1) the reversibility of the treatment; (2) the safety of the products and materials used and (3) the honesty of the intervention.

4.1.4. The specific case of oriental manuscripts

Questioning the provenance of manuscripts

Researchers who work on oriental manuscripts, in Europe, Africa, or the Middle East, can be confronted by manuscripts that are in private collections and whose original provenance is uncertain. When ap-

proached by a private collector or vendor for an opinion regarding a manuscript of unknown origin, the researcher should question whether the manuscript has not been stolen from a library that has not yet been inventoried or catalogued—as one should also ask whether the document is authentic or a forgery. Otherwise there is a risk to encourage this type of theft—like a possible falsification—merely by providing scientific consultation.

Exhibition and religion

In the case of oriental manuscripts, we deal in most cases with items that are religious or are attached to a living religious practice. This creates additional issues for researchers, collection managers, and conservators. Thus, until recently there existed considerable religious reticence concerning the promotion of manuscripts. For example, a Druze community in Syria that venerates an *al-Ḫitma* manuscript (the complete book of *Rasā'il al-Ḥikma*, the sacred book of the Druze) refused any exhibition, as for them, this manuscript cannot be seen by non-Druze (according to Eldin 2013). The same limits are also valid for digital copies: a few years ago, a *fatwā* was proclaimed against the digitization of the Qurʾān and its diffusion in digital libraries. Today, mentalities have evolved, and the religious authorities usually accept museum and/or digitization practices, and even encourage them. An awareness has equally evolved that, by recording a manuscript in a database and making the information or a reproduction accessible to the general public, not only do we promote research but also protect the objects from a possible theft: a secure identification is created, and the object, if stolen, cannot be easily sold (Ipert 2005).

Restoration

Restoration is another domain with religious connotations. For example, can one use alcohol to soften the parchment leaves of a Qurʾān? Is it better replace an ancient binding on a Qurʾān to protect it or conserve it following professional rules? On the Sabbath, must one disconnect the electricity of a freezer where flooded Tora scrolls are conserved? After documentation and restoration, must manuscripts from a *geniza* be re-buried? Can a Christian liturgical book continue to be used by a community of monks after having been restored, at the risk of future deterioration? The conservator is often at a loss when confronted with these questions.

Whether for research, enhancing, or restoration of oriental manuscripts, it is sometimes difficult to follow the rules of ethics of the international professional organizations because these rules are most often conceived with a western perspective in mind. The only professional response is to explain well that researchers, museums and libraries cultivate scientific research, and, more specifically, that archives, libraries and museums are cultural institutions where all religions are respected, but that religions should not impose their rules.

References

Eldin 2013; ICOM 2004; ICSU 2013; IFLA 1979; Ipert 2005.

4.2. Legal framework for manuscript protection (MCo)

Strictly speaking, manuscripts are not a legal category. However, a number of legal texts at national, international and European level do refer to manuscripts. The UNESCO Convention of 14 November 1970 defines as cultural property: 'rare manuscripts and incunabula, old books, documents and publications of special interest (historical, artistic, scientific, literary, etc.) singly or in collections', whereas the Hague Convention mentions 'manuscripts, books and other objects of artistic, historical or archaeological interest; as well … important collections of books or archives or of reproductions of the property defined above'. The UNESCO Memory of the World Programme focuses on the preservation and accessibility of documentary heritage, a broad concept that includes the books, manuscripts and archival collections listed in the Memory of the World Register provided that they are of international interest and universal value. Manuscripts are also covered by the legislation on intellectual property.

We can see that a manuscript is a complex object, a hybrid material valued for its content, for its precious character, singly or in a collection. This multiform reality must be expressed in the law. Firstly, a significant distinction is to be drawn. The physical medium of the manuscript is protected by a number of rules. These rules serve private as well as public interests. They are mostly related to the issue of ownership. Manuscripts are subject to ownership; they can belong to individuals or public entities, institutions,

libraries, archives, and so forth. Other rules govern the conditions of use and access to the intellectual content. While in principle there may be a conflict between the legal protection of the physical object and the legal protection of the object's intellectual content, this rarely applies to manuscript studies, as in most cases intellectual rights expire within one or two generations after the death of the author (see below) and thus do not apply to manuscript content. We will discuss the legal status of manuscripts with respect to the great legal challenges they pose: material conservation, circulation, access, dissemination and valorization.

4.2.1. Conservation of manuscripts

This conservation objective is ensured by cultural heritage law, a set of rules at national and international level aiming at preserving the integrity of a number of sites and objects of historical, artistic, or scientific interest.

Protection of manuscripts at international level

There are very few international texts specifically targeting manuscripts or books. Binding legal instruments (that impose obligations on the states signing and ratifying the conventions) concern more widely all the goods that are part of cultural heritage. Nevertheless, some soft law texts are worth mentioning, alongside the programs developed by UNESCO, in particular the Memory of the World Programme.

Within the general framework of cultural heritage preservation, few laws are likely to apply to manuscripts. In 1954, the first international convention to tackle the issue of protecting cultural objects (here, only in cases of armed conflicts) was passed; while providing a more inclusive understanding of cultural property, it expressly mentioned manuscripts. Under Article 4, the *Convention for the Protection of Cultural Property in the Event of Armed Conflict* of 14 May 1954 (Second Protocol, 26 March 1999) states that the parties must respect cultural property situated within their own territory as well as within the territory of other parties by 'refraining from any use of the property and its immediate surroundings or of the appliances in use for its protection for purposes which are likely to expose it to destruction or damage in the event of armed conflict; and by refraining from any act of hostility, directed against such property'. No derogation to this principle of respect for property is possible, unless military necessity imperatively requires it. In addition, the parties 'undertake to prohibit, prevent and, if necessary, put a stop to any form of theft, pillage or misappropriation of, and any acts of vandalism directed against, cultural property…'. In case of occupation, the occupant must 'as far as possible support the competent national authorities of the occupied country in safeguarding and preserving its cultural property'. The convention also provides for refuges to shelter movable cultural property; these refuges are placed under special protection and must be identifiable. Special protection is granted to cultural property by its entry in the 'Inter-national Register of Cultural Property under Special Protection'. The idea of the Convention is to ensure that each belligerent respects cultural property. To this aim, a distinctive and internationally recognizable emblem must be placed on the cultural goods protected by the convention. Apart from this convention, there is no other binding instrument safeguarding movable cultural property as a whole.

There are soft law texts, however, that must be considered. In 2006, the Quebec archival community passed a Declaration on archives. It has been taken up at international level in 2011 when the International Council on Archives adopted the Universal Declaration on Archives which was very influenced by the Quebec declaration. Nevertheless, these declarations carry no legal weight. While recognizing the significance of archives for memory, it is advocated that: 'the management of archives is valued and is carried out fully in civil society, public bodies and businesses; archives are conserved in conditions that ensure their authenticity, integrity and intelligibility; archives are made accessible to everyone, while respecting the rights of individuals, creators, owners and users.'

The Memory of the World programme is based on the principle 'that the world's documentary heritage belongs to all, should be fully preserved and protected for all and, with due recognition of cultural mores and practicalities, should be permanently accessible to all without hindrance' (<http://www.unesco.org/new/en/communication-and-information/flagship-project-activities/memory-of-the-world/about-the-programme/objectives/>, last accessed June 2014). In this view, the two prevailing objectives are preservation and access. As regards the first objective, the program aims at ensuring and facilitating the preservation of the world's documentary heritage by providing subsidies and disseminating advice and information. As regards the second objective, the legal requirements that protect private or public interests

(property rights, intellectual property rights, archive rights, and so forth) can sometimes get in the way of access. The programme prescribes that these potential limitations must be recognized. It also recommends that 'indigenous communities' custodianship of their materials, and their guardianship of access' must be honoured.

Protection at national level

Protective measures for documents, manuscripts and archives take multiple forms: some of them focus on the material preservation of the medium, and others set out the conditions governing access to these documents or manuscripts. Generally speaking, there is no specific protection for manuscripts. Just like at international level, it is necessary to invoke either the general rules governing the preservation of tangible heritage, or public property rules.

The heritage protection schemes set up by states often target cultural property as a whole. This allows ensuring the protection of documents and manuscripts. Laws on historical monuments (that generally include immovable as well as movable property), cultural property laws or cultural heritage laws have instituted protective measures that can be very restrictive. They oblige the owner to request an authorization for any activity that may alter the property: restoration work, modification, or any transformation that could impact the character of the property under protection. These measures are intended to protect property of artistic or historic interest, the creations belonging to cultural and intellectual heritage. Manuscripts can be protected on this basis. A certain number of these protective measures apply to isolated items; for example when it is a matter of preserving a given building, manuscript or artwork. But there are different ways of considering a set; for instance, it could arise from the exceptional consistency of a fund or collection from a literary, artistic or historical standpoint. The consequences of such recognition vary according to the country, and it is not always possible to safeguard the whole set.

In a number of states, publicly owned cultural property is relatively well protected. In some countries, cultural property becomes public property because it is thought to serve the public interest, which is why it is considered as inalienable, imprescriptible (it can be claimed without any limit in time) and cannot be seized. The character of inalienability means that the public owner cannot sell or even donate the property for as long as it remains under that special regime, that is to say as long as it serves the public interest. Such property can be found in museum collections, archival funds or libraries. This public nature is frequently used as an argument against restitution claims from other states. However, public property rules are not equally efficient among states.

Customary property laws may also be relevant. Conservation of manuscripts is sometimes ensured by private law instruments such as trusts, foundations, or *waqf* in Muslim law (forms of collective properties), which entail some obligations. For the oriental manuscripts, a very significant amount is privately owned by families; many documents are held in religious institutions such as monasteries, churches, mosques, or synagogues.

4.2.2. Circulation of manuscripts and books

The circulation of manuscripts is another significant theme in cultural heritage law. Such protection has two functions: a preventive one and a repressive one.

Prevention: controls on the movements of artworks

Before studying the domestic principles governing the circulation of cultural property, it is important to consider these rules in a more global context, at international, European and national level. Again, as was the case in terms of protection, international rules come from general instruments concerning movable cultural property as a whole and not specifically manuscripts, books or archives.

On an international level, from the beginning, the General Agreement on Tariffs and Trade (GATT, established in 1947, last updated in 1994) recognized that, to achieve the protection of national treasures, the circulation of cultural property could be subject to restrictions (for exportation or importation) in domestic legislations. Article XX: General Exceptions prescribes that 'Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures … (*f*) imposed for the protection of national treasures of artistic, historic

or archaeological value' (see GATT text at <http://www.wto.org/english/docs_e/legal_e/06-gatt.pdf>, pp. 37–38, last access June 2014). In this view, states are not allowed to act totally freely. A measure not justified or a disguised restriction on international trade can be disputed. As of now, no case has been heard by the World Trade Organization (WTO).

The rules governing the circulation of cultural property at European level are more complex. Insofar as the European Union (EU), like the WTO, promotes trade liberalization, it also needs to reach a compromise between the free movement of goods and heritage protection. Article 36 of the TFEU also allows setting up prohibitions or restrictions on imports, exports or goods in transit justified on grounds of the protection of national treasures possessing artistic, historic or archaeological value. With the creation of the internal market on 1 January 1993, the EU member states' legislations regulating the circulation of cultural property and the prohibition of the most valuable cultural goods have been seriously undermined. To prevent or fight the unlawful removal of cultural property from a member state to another member state or outside the EU, two pieces of legislation have been passed. The first one creates a common control procedure to export towards third countries, whereas the second one regulates the return of the unlawfully removed national treasures that circulate within the Union. Manuscripts are mentioned among the categories listed in the annex to these texts.

Finally, provided that they comply with WTO and EU rules, states establish their own legislations controlling the circulation of cultural property and, in that respect, the cultural objects under protection are not the same ones everywhere, and the techniques and methods for controlling their circulation vary as well.

Some states have developed broad definitions of cultural property, and they control significant cultural objects which are called in different ways (cultural heritage, cultural object, object of cultural significance, national treasure, and the like). Other states choose to list all the objects falling into a given category. Both methods are sometimes combined.

Prevention: the fight against illicit trafficking of cultural property

Several instruments can be used at international, European and national level. Internationally, the two main instruments are the 1970 UNESCO Convention and the 1995 UNIDROIT Convention. Both concern cultural property in general and not specifically manuscripts.

The States Parties to the *Convention of 14 November 1970 on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property* undertake:

> 'to take the necessary measures, consistent with national legislation, to prevent museums and similar institutions within their territories from acquiring cultural property originating in another State Party which has been illegally exported after entry into force of this Convention, in the States concerned' (Article 7.a);
>
> 'to prohibit the import of cultural property stolen from a museum or a religious or secular public monument or similar institution in another State Party to this Convention after the entry into force of this Convention for the States concerned' (Article 7.b.i);
>
> 'at the request of the State Party of origin, to take appropriate steps to recover and return any such cultural property imported' (7.b.ii); and
>
> 'to admit actions for recovery of lost or stolen items of cultural property brought by or on behalf of the rightful owners' (Article 13.c).

Article 1 defines the term 'cultural property' for the purposes of the Convention, and manuscripts are expressly mentioned in this definition.

Although this Convention is a significant step in the strengthening of the means to fight against illicit trafficking, it is unevenly efficient as only states are concerned. Furthermore, its implementation is limited by the existence of domestic rules which protect the rights of good faith purchasers.

In order to address the aforementioned difficulties, the *UNIDROIT Convention on Stolen or Illegally Exported Cultural Objects of 24 June 1995* was designed to establish 'common, minimal legal rules for the restitution and return of cultural objects between Contracting States, with the objective of improving the preservation and protection of the cultural heritage in the interest of all'.

Stolen cultural objects are subject to restitution, i.e. they must be returned to their rightful owner, whereas illegally exported cultural objects, or more specifically objects 'removed from the territory of a Contracting State contrary to its law regulating the export of cultural objects for the purpose of protect-

ing its cultural heritage' must be returned. The scope of this Convention is the same as the one defined in Article 1 of the 1970 UNESCO Convention, and the list provided for in the annex to the 1970 Convention is repeated in its entirety in the annex to the UNIDROIT Convention. A very similar approach had been adopted with the Council Directive 93/7/EEC on the return of cultural objects, and it can be noted that this instrument shares many common elements with the UNIDROIT Convention. The obligation to return stolen goods is one of the significant innovations in this text, and this constitutes an important exception to the principle of good faith acquisition that prevails in several legal systems. Furthermore, in the UNIDROIT Convention good faith is not presumed; the possessor must establish it. The good faith possessor is entitled to 'payment of fair and reasonable compensation', unless 'the possessor neither knew nor ought reasonably to have known that the object was stolen and can prove that it exercised due diligence when acquiring the object' (article 4.1). As regards illegally exported property, only the objects of significant cultural importance are subject to protection.

4.2.3. Access to public documents and manuscripts

In cultural heritage law, which mainly focuses on conservation, no general principle of access to cultural heritage is really laid down, based on the general interest. Domestic legislations govern this issue, and in most cases they do so by establishing specific rules of access to public archives, which are a set of documents produced or received in the course of a public activity. Some manuscripts, if they are defined as public archives, may be subject to these rules. There is a growing tendency, especially in countries outside Europe and America, to block access to original documents as a rule, and refer researchers to electronic images. Only in exceptional cases limited access to the originals is still granted. This can be understood as a measure to safeguard the originals, but it ignores all research necessities where the originals need to be consulted (if only for reasons of codicological research).

4.2.4. Dissemination and exploitation of manuscripts

The intellectual content of a book may be subject to a number of rights, for example intellectual property rights or rights on the publication, and sometimes those rights are linked to the property rights over the physical object. The aspects of copyright are largely irrelevant for mediaeval and pre-modern manuscripts (see below), as the only legal right a library or archive has is its right of ownership. The general regulations of intellectual property may be valid, however, for manuscripts containing texts composed or translated in the twentieth century, a case not so seldom in the oriental manuscript context.

Intellectual property

Protection of intellectual property rights is ensured at international, European and national level. The *Berne Convention for the Protection of Literary and Artistic Works* of 9 September 1886 was the first major international text in this field, and it was completed by the World Intellectual Property Organization (WIPO) treaties. UNESCO also passed some texts on this issue. One should also mention the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (or TRIPS Agreement, see <http://www.wto.org/english/tratop_e/trips_e/t_agm0_e.htm>) in relation to the WTO as well as the provisions concerning European Union member states. States also develop their own laws.

Whether in application of international law (Berne Convention) or domestic laws (at least most of them), manuscripts can be subject to copyright if they contain intellectual works, i.e. original works which can also be works deriving from another work. A translation is an intellectual work (for obvious reasons, this does not apply to automatic translations). One may wonder whether restorations of cultural objects can be considered as intellectual works. This might be the case if the restorer's work is creative, but this is likely to be contrary to the ethics of the profession.

According to the Berne Convention, authors possess economic and moral rights for forms of exploitation and dissemination of a work (reproduction, performance, translation, adaptation, and so forth, see Article 6 *bis*). The duration of rights is limited to 50 years (extended to 70 years by European law) after the author's death; at the expiry of this term the work falls into the public domain and anyone can use it freely (even prior to that term, as there are exceptions in the European Union law for citations; for reproduction and performance granted to cultural heritage organizations; and for orphan works): this is the case with the overwhelming majority of manuscripts.

The right of reproduction of institutional depositories varies from nation to nation. In some states, the owner of the physical medium of the work may still be entitled to certain rights, even when the work has fallen into the public domain. Consequently, some museums or libraries may require the payment of royalties for using the work, or they may control all reproductions or uses of the work.

Similarly, in some legal systems, publishers are granted neighbouring rights on published works. When for example ancient manuscripts are published, they are not protected by copyright but they can be protected under this publishing right.

Some legislations have a system of legal deposit, following which each published document, each document made publicly available must be deposited with an institution or other public body. The aim of this is to conserve a memory of intellectual heritage. It can also be a means to control publications.

As we have seen, the rules are really dispersed, and very often domestic law, international law and European law must be combined. In addition, in a number of cases it is necessary to take into account the rules provided for either in the regulations of institutional depositaries or in contractual practice.

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4.3. Some recommendations on good practice (IL)

In the context of European policies on digitization and access to cultural heritage, we can speak today of a legal recognition of the right of libraries and archives to digitize manuscripts when it serves the purpose of conservation and accessibility of the manuscripts.

However, when approaching manuscripts from the legal point of view one should always regard them from two perspectives: (1) as containers of works that are sources of metadata and scholarly work and are subject to intellectual property rights (see also § 4.2 above) (2) as material objects that are subject to material property rights, and are sources of images that can be produced from manuscripts.

4.3.1. Library cataloguing metadata

Cataloguing of manuscripts (prior to exhibition or digitization) falls within the responsibilities and tasks of the library or archive where they are preserved. The resulting metadata is part of the digital library catalogues. It is recommended—as is already the case in many European countries—that the metadata should be integrated into national or international databases (hypercatalogues) that could be filtered by various parameters, including places of origin and historical periods.

The cataloguing entries themselves may also be subject to intellectual property rights (see also Ch. 4 § 6), especially if they meet the originality criteria and involve scholarly analysis. When, as often happens in basic library catalogues, there is no real originality, the metadata should not be considered independently from the document the description identifies.

Libraries should be advised to specify on their Internet pages the conditions of use regarding these descriptive metadata, indicating that use is free provided the source is fully credited alongside the date of retrieval under an open license.

4.3.2. Manuscript studies

When manuscripts have been the subject of a study that identifies the date and shows their characteristics, such a study (a copyright protected object) may be very useful for those who consult the manuscript and should at least be referenced in the descriptive metadata. While it may be helpful if such studies are available with the manuscripts, they cannot, in principle, be reproduced or distributed without the permission of the authors. However, there are two relevant exceptions in intellectual property rights.

The first is citation, when certain elements of a study have been incorporated into another work. The citation must be appropriately short and justified by the scientific content of the work in which it is incorporated; the name of the author and source must be clearly indicated.

The second is the reproduction and distribution 'for educational purposes or for the purpose of illustration in the context of teaching and research', provided that such use does not give rise to any commercial exploitation.

In addition to studies that have gone out of copyright for time reasons (see § 4.2), so-called orphan works (when we have lost track of the authors) may be reproduced by libraries or archives without permission under European law, provided the institutions can demonstrate that they have tried to locate copyright holders and that the search has been unsuccessful. Orphan works may be made accessible alongside the manuscript metadata provided full bibliographic reference is given.

4.3.3. Reproduction rights

In most European countries, if a manuscript is in a public collection, the institution that keeps it has no rights to the photographic images of this manuscript. However, in some member states of the European Union (e.g. Greece) the reproduction copyright belongs to the state, and therefore prior to any digitization action one should apply for, and receive, authorization. The local legal framework must thus always be clarified before any digitization campaign. If the owner is a private person, an authorization request is always required.

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Chapter 1. Codicology

edited by Marilena Maniaci

1. Introduction (MMa)

Among the 'physical' features of the handwritten book, its materials and structure offer, with respect to writing and decoration, greater and more direct opportunities for comparison, thus allowing one to speak of a 'universal grammar' of the manuscript book (and in particular of the codex), aimed at 'identifying the structural elements common to the majority of craft traditions and the profound reasons for their organization in a coherent system' (Maniaci 2002a, 25). Codices written in Latin, Greek, Arabic, Hebrew, Syriac, Coptic, Ethiopic, Armenian, Georgian, Glagolitic, or Cyrillic scripts shared the same materials, similar sizes and proportions, a common structure of quiring normally achieved by folding a certain number of sheets, and the employment of means for ensuring the right sequence of the quires and of the bifolia and leaves within the quires; written and unwritten spaces were most often previously defined and distinguished by means of ruling, and some codices were decorated and illustrated in the margins or within the written area. This common structural setting, which often displays—whether dependently or independently—equivalent technical solutions (for example, concerning quire structure, ruling technique, and layout of the text), was indeed universal and remained remarkably stable, despite its multiple representations over time and space, not only until the beginning of mechanical printing (in many aspects it was inherited and further implemented by the printers), but to a large degree until our own time (Beit-Arié 1993).

The contributions collected in this chapter confirm, in fact—on a more systematic basis than has ever before been established—the existence of a patrimony of knowledge and craft practices shared by a plurality of book traditions, showing significant preferences for certain materials and procedures. These similarities are, however, flanked by just as many more or less relevant and eye-catching differences and peculiarities.

This intricate web of similarities and divergencies involves a multitude of manuscript cultures, divided by religion, political borders, language, social structure, and mentality, distributed over a very wide geographical area, centred on the Middle East and North Africa, but extending—through the Greek and especially the Jewish manuscript tradition—to Italy and transalpine Europe. Three great religious traditions, being also three 'religions of the Book', dominate this spacious setting: some specific technical solutions cluster (although not always in a clear and coherent way) around the two poles represented by Christianity and Islam; the Jewish tradition of book production, embracing as it does all areas of the Jewish Diaspora, occupies a distinct position, resulting in an extraordinary richness and variety of codicological habits.

A multifarious interplay of relations and interactions, still waiting to be fully disclosed, unfolds against this background. In some cases, the direction and weight of the influences appear evident, although they have not yet been adequately detailed (such as the influence of the Byzantine book tradition on the Coptic, Caucasian or Slavonic ones, or the role played by the Arab-Islamic world in the transmission of paper-making technology or in the diffusion of certain ruling methods); in many other regards, the tension between different poles produces less clear outcomes and hybridizations which are far from being sufficiently investigated.

Comparison is further complicated by the existence of significant chronological shifts in the origin and evolution of the various manuscript traditions, some of which basically completed their life cycle by the sixteenth century or earlier, while others remain fully active and vital to this day. In some traditions, the persistence of the handwritten codex (and for specific purposes also the roll) as an object of use and not as a precious relic of the past finds its counterpoint in the late introduction of the printing press, hampered for a variety of historical, technical and economic reasons which would deserve specific analysis.

In this complex scenario, the comparative approach obviously should not and cannot be reduced to an abstract and mechanical juxtaposition of practices, techniques and craft devices: it requires instead an overall reflection on the reasons for the genesis and the development of different book forms—roll and codex above all—as well as for the transition from one to another; on the timing and extent of their diffusion in the different cultural environments; on the influence exerted by cultural, economic, and functional factors upon the definition of their overall aspect as well as their specific features. Comparison points up a

need to distinguish between solutions that were inherited from a common substrate or developed independently in response to universal needs; to delineate identities and similarities which may be explained on the basis of clearly documented or indirectly discernible contacts, exchanges and influences; differences with cultural or ideological connotations (as in the case of the opposition between the quiring of Islamic parchment manuscripts, consisting of quinions indifferent as to the alternation of hair and flesh sides, and that of the Christian-Arabic ones, made of quaternions systematically applying Gregory's Rule, that is with matching skin sides facing each other at each opening, see Ch. 1 § 1.3.1); choices with no apparent motivation, whose explanation might be due to correlations that have not yet been identified (such as, for example, the average number of bifolia composing a quire; whether parchment quires begin with a hair or a flesh side; ruling techniques; the position of quire signatures).

The task of drawing a clear and complete picture of differences and similarities and explaining their reasons is still beyond the reach of current research as reflected by COMSt. To date, the understanding of most phenomena is seriously hampered by the significantly disparate quantity of previous scholarship in the various cultural and research traditions. A wide gap remains between our codicological understanding of Byzantine manuscripts and the research on Georgian, Slavonic, Ethiopic, Syriac and Coptic material. Hebrew codicology has benefited greatly from the systematic analysis of a large corpus of dated manuscripts. Important work has been done for the wide and diverse Arabic tradition, although the task still to be accomplished is as vast as the huge number of extant manuscripts.

For most of the oriental traditions which have been taken into consideration in the work of the COMSt project, the state of available knowledge is both quantitatively and qualitatively very heterogeneous, and it is mostly not founded on first-hand research conducted on adequately large and appropriately selected samples of manuscripts (with those that contain explicit indications of their date and provenance representing the core), nor even on the systematic collection of second-hand information offered by catalogues. For most domains, thorough inventories, bibliographies and modern descriptions of collections are still a major desideratum and should be set as a priority for future research (see Ch. 4).

This situation does not allow systematic comparisons or the sketching of a complete overview, which would be premature and is not among the objectives of this introduction. Rather than forcing a variety of disparate pieces of information into a single chapter, with the ambition of outlining a comparative history of the oriental manuscript book, the choice has been made to present separately in the following subchapters the state of knowledge for each individual tradition, without hiding the existence and extent of gaps, problems, and open issues. The adoption of a common arrangement of the topics in each subchapter allows the results presented to stand as a rich puzzle of widely comparable materials, if not as a strictly comparative depiction resulting from their final composition.

The arrangement followed, more or less, by all the subchapters corresponds substantially to the presentation traditionally adopted by modern handbooks, mostly concerning—with the notable exceptions of Arabic and Hebrew (Déroche – Sagaria Rossi 2012; Beit-Arié 2014)—the Graeco-Latin world (Maniaci 2002a, Géhin 2005, Agati 2009, the latter two encompassing also other traditions, Maniaci 2011, on Greek codicology). The presentation proceeds in a logical order from a description of the materials and tools used in the manufacture, writing and decoration of handwritten books, to their formats and techniques of construction—with particular reference to the codex—, the preparation of the page, the strategies adopted by scribes and painters for the exploitation of the available space, and ends with a description of bookbinding.

This logical, analytical arrangement is justified by the requirements of pedagogical clarity, but it must not be forgotten that an overall synthetic project always lies behind the production of any manuscript book and is more or less clearly revealed by the elements that compose its finished state; and that a manuscript's present state is the result of a sequence of events involving readers and owners who have often, and only more or less evidently, influenced the initial state of the book, possibly modifying—or even fully transforming—its original structure and function. Codicology, intended as the application of 'archaeological' methods for historical purposes, allows one to 'read' in manuscript books—beyond the contents transmitted by letters and images—a range of less obvious, but no less significant, information concerning the circumstances according to which they were commissioned, displayed, purchased, traded, variously used, possibly transformed, or more generally perceived and understood as artefacts. For most of the oriental book traditions, a transition from viewing codicology as little more than an auxiliary tool for dating and localizing manuscripts to envisioning it as an 'integral history of the manuscript book'—meant as an intel-

lectual, technological, artistic, and also socio-economic history—still appears not only as a distant goal, but also as a strange and quite unfamiliar one, even to the most experienced scholars. A purely utilitarian interest in codicological data still prevails with regard to their autonomous evaluation, as well as with regard to the capacity to correlate them with the subject matter of the books, their contexts and levels of circulation and use, the categories of users and their needs and expectations, and the constraints exerted by material, cultural, functional, and economic factors. Here, then, is another reason to promote the comparative study of the main oriental book cultures, taking advantage of the methods and data of the scholarly traditions that have progressed the farthest to date.

Not only is the road to the writing of a 'universal grammar' of the oriental manuscript book still long and difficult, but the lack of a 'universal terminology', that is a proper and shared set of technical terms, complicates the task of telling it with the required accuracy. This is true both for individual languages and for English, which is increasingly becoming the common idiom in humanities research. The still unfinished work by J. Peter Gumbert (2010b) has been used, where possible, as a reference tool, but in many cases the wish to use precise and unambiguous terms came into conflict with the still largely undefined state of codicological knowledge or the force of particular traditions. The terminology adopted in the following pages reflects the effort to adopt a homogeneous language, but seeks to avoid a premature standardization.

Despite their shortcomings, we hope that the materials presented in the following pages may constitute a starting point towards the acquisition or consolidation of a common vision of the problems, the development of a clearer awareness of the work to be carried out, and the sharing of methods and research tools. Among these, absolute priority has to be given to the establishment of historical typologies, based on the direct examination of as many manuscripts as possible, focusing on dated ones, and preferably those for which a clear provenance can also be established.

In order to highlight the common ground in which the different manuscript traditions are rooted, and to reduce redundancies in the individual sub-chapters, some main facts concerning oriental book materials and manufacturing techniques are briefly summarized in the following pages. The reader should refer to recent handbooks for further general information and specific bibliography (references in the following pages are limited to an essential minimum) and to the individual sections for an informed and detailed presentation of specific cultural peculiarities. Given the uneven state of research in the different traditions of the oriental manuscript world, most of the technical information in this introductory section derives from work done in Greek, Hebrew and Arabic codicology; generalizations not based on specific investigations can only be proposed, in some cases, as working hypotheses.

1.1. Materials and tools (MMa–SE–IR–OH–RN)

Writing was done on a wide range of materials: rock, metal, wood, bone, clay and plaster, and above all papyrus, parchment and paper.

1.1.1. Papyrus (SE)

The papyrus plant (*Cyperus papyrus*, a long plant stalk composed of cellulose fibres and containing a natural adhesive) grew plentifully along the Nile River throughout Antiquity and was used by the Egyptians for a variety of purposes, among them to manufacture a writing material similar to paper (which word derives ultimately from the ancient Greek word *papyros*).

The writing material made from the papyrus plant was Egypt's most characteristic product and was exported all around the Mediterranean world for many centuries. The vast majority of the surviving papyrus manuscripts has been discovered in the arid parts of Egypt (not in the Delta) and in Nubia, while much smaller quantities have been found in other desert environments such as the Sinai peninsula, around the Dead Sea, and in Palestine and Syria; or else they have survived as a result of special circumstances such as having been carbonized by intense heat (such as the papyrus rolls preserved in Herculaneum by the eruption of Mount Vesuvius), by having been recycled as mummy pasteboard or by having been waterlogged (Ireland's *Faddan More Psalter* cartonnage). A number of papyrus manuscripts also survived into modern times by being preserved in mediaeval European archives.

A sheet of papyrus was manufactured as two layers of thin strips sliced from the stalk of a papyrus plant, with the two layers lying at right angles to one another. After being pressed together and dried

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(and perhaps also then polished by some means), the cross-hatching layer of fibres and intervening pith provided a quite usable and durable writing surface. The traditional practice was for the manufacturer to paste a number of sheets of papyrus together to create a long strip, being careful always to overlap one sheet and the next in the same way, thus producing a papyrus roll. Normally, the surface intended to support the writing, the inside of the roll, was made to have the fibres running horizontally along it (papyrus fibre direction →). The single manufactured sheet is called a *kollēma* (plural *kollēmata*), and the pasted overlap of two adjacent *kollēmata* is called a *kollēsis* (plural *kollēseis*). In a roll to be used for copying a Greek work (for instance), that is to be written in columns from left to right, the *kollēseis* 'step down' from left to right. The first *kollēma* is called the *prōtokollon* and was typically attached with reversed fibre directions, i.e. with the vertical fibres on the inside of the roll (papyrus fibre direction ↓); the last one is called *eschatokollon*.

Although systematic research is still missing, the dimensions of the *kollēmata* have been witnessed to be not very large. The papyrologist Eric G. Turner (1977, 48–51) observed that *c*.170 mm is a usual width in the Hellenistic and Roman period, the widest *kollēma* that he had ever noted in a roll being approximately 330 mm wide (a number of Coptic codices involve the use of rolls with much longer *kollēmata*). Heights of rolls in Turner's experience ranged between 220 and 410 mm. Much broader *kollēmata* are in fact attested, and the existence of *kollēmata* approaching even as much as 2 m in length suggests that the only natural limit to the size of papyrus sheet that could be made was the length of the usable part of a papyrus plant's stalk (Emmel 1998, 39–42). Some practical limitation might have been imposed by the technology by which the sheet was manufactured, about which we are not well informed; presumably it was easier to make smaller sheets rather than larger ones.

1.1.2. Parchment (MMa)

The history of the use and diffusion of writing supports of animal origin in the manufacture of oriental books differs from one culture to another and is interrelated with the history of the westward spread of paper manufacturing techniques, which were first introduced into the Arab-Islamic world from China and gradually penetrated from the east to the west, except in Ethiopia, where the habit of writing on processed animal skins has remained dominant until modern times. Written information on the manufacture of parchment—a writing material made from animal skin, freed from hair and dried under tension—is scarce in the east, apart from a series of late Armenian recipes (known to most scholars only in Russian and German translations) which have not yet been the object of a detailed study (see Ch. 1 § 3.1.2). This lack of documentation, along with the vagueness of the terminology employed by the sources to designate the use of animal skins as a writing material, makes the distinction between 'parchment' and other kinds of animal-skin support other than leather (such as the lightly tanned skins that were used for most of the Hebrew scrolls found in the Judaean Desert at Qumran and Masada) very difficult to make, as is any exact reconstruction of the procedures by which they were manufactured. The occasional statements derived from sources of various origins and natures converge in documenting the prevalent use of sheep, goat or (less frequently) calf hides, with rarer—and not always trustworthy—mentions of various other domestic animals or wild beasts. Even in the almost total absence of specific visual and instrumental analyses—apart from sporadic surveys based on the microscopic observation of hair implantation on samples of (Latin and) Greek manuscripts—differences based on local availability may reasonably be expected, although in the absence of material evidence (for example DNA analyses, only occasionally applied until now) the possible use of horses, donkeys and camels, antelopes and gazelles, panthers and hyenas, hares or deer cannot be assessed. Different factors (animal species, age and state of an animal's health, more or less careful workmanship) surely influenced the quality of the resulting product; technical differences in the manufacturing process must be also admitted according to places and times, although they are difficult to assess, in the absence of written sources. The essential operation, consisting in stretching a hide on a frame to dry and skiving and smoothing it on both surfaces with an instrument with a curved blade in order to remove residual hair or flesh and fat, could be preceded by chemical and/or enzymatic purification and depilation, by means of one or more lime baths (a method of unknown origin, reported by Latin sources from only as late as the eighth–ninth centuries CE), or through the application of various substances, such as dates, bran, barley flour or pigeon droppings; hair removal could also be done, as in Ethiopia, without the use of any specific agent. The skin was subsequently stretched on a frame—for a time dictated by the

speed of drying, the required thickness of the end product, and, of course, the precursor skin—thus forcing the reticular collagen fibres into an arrangement in parallel layers. After being scraped with a blade, the skin might be smoothed with a rough substance (natural pumice or some artificial compound). It would then be subjected to finishing processes (using chalk or a mixture of egg yolk and linseed oil, for example), which were meant to improve the presentation of the surface by making it glossy and smooth, and to enhance the adhesion of ink. A difficult Coptic source (Crum 1905a; see Ch. 1 § 5) seems to transmit recipes for preparing (or improving) the surfaces of parchment pages. Other treatments of uncertain nature could be applied to equalize the two (hair and flesh) sides of the skin, such as scraping in Hebrew Ashkenazi codices produced in the German area from the end of the thirteenth century (see Ch. 1 § 9). Cow hide processed on only one side was used for writing Hebrew Tora scrolls; in the Orient, skins used for Hebrew scrolls could also be superficially tanned, as is attested by halakhic (legal) sources and confirmed by chemical analyses. The assumption that surface tanning, perhaps associated with other treatments, might have made possible, in certain cases, the splitting of the skins into two layers (corresponding to its hair and flesh sides; see Haran 1991) does not appear convincing.

Research on the dimensions, thickness and defects of the skins used, such as has been undertaken recently in Greek and Latin codicology, is unparalleled for the oriental traditions, apart from the data on parchment thickness and dimensions that are available (but not yet fully exploited) for dated Hebrew manuscripts.

In some oriental traditions, the use of purple or indigo-coloured parchment is documented (obtained either by dying or by surface painting, see Ch. 1 § 8.1.2), whereas it is apparently unattested or extremely rare in Armenian, Coptic, Ethiopic, Georgian, and Syriac book manufacture (although documented for Armenian by textual references from the early seventh century; see Ch. 1 § 3). Without the help of scientific analyses, it is impossible to distinguish the expensive murex purple (whose use in western mediaeval manuscripts is often mentioned, but has never been confirmed empirically) from its animal surrogates—the chermes or other insects of the same Coccidae family—or from its vegetable ones—the Mediterranean plant *Chrozofora tinctoria*, or turnsole, and the lichens *Roccella tinctoria* or *Ochrolechia* (the first one having been recently detected, although not with certainty, in a famous Greek purple Psalter; see Crisci et al. 2007). Information from other cultures is a desideratum.

The reuse of already written parchment—due not only to the high cost of writing materials, but apparently also to a widespread 'recycling attitude'—is widely attested in oriental manuscript traditions: such palimpsest manuscripts seem to be rare in the Islamic world, as well as in Ethiopia and in the Coptic and Slavonic regions, but they abound in the Greek, Armenian, Georgian and Syriac traditions, and they are the only surviving witnesses to the Caucasian Albanian written culture prior to the ninth century (see General introduction § 3.4). Palimpsests also document the movement of books between neighbouring cultures: manuscripts with a first, underlying text in one language, written over with a text in a different language, are not infrequent. Given the lack of oriental sources (only a single Latin description of the making of a palimpsest survives, in fact), techniques of erasure and strategies of reuse have to be deduced from a direct analysis of the extant examples.

1.1.3. Paper (MMa)

The use of paper in oriental books (and still earlier in documents) spread from east to west from China via the Arab-Islamic culture to the eastern Mediterranean and from there across North Africa and to Europe. The earliest evidence for paper in the Arab world dates from at least as early as the middle of the second AH/eighth CE century, and the oldest known dated specimen is an Arabic book from 848 (Beit-Arié 1996, 9); an isolated Greek example originating from the Jerusalem area has been assigned to around 800 (see Ch. 1 § 8.1.3). The phase of most rapid diffusion was, for the other cultural traditions, in the tenth and eleventh centuries, with the exceptions of the Slavonic region, where paper (of exclusively western manufacture) arrived much later, and Ethiopia, where it was not employed until the nineteenth century (and to some extent only in the second half of the twentieth century). In the absence of specific studies, the exact timing and routes of acceptance of the new material, as well as the relationship between imported and locally manufactured paper, remain uncertain.

The extraordinary abundance of material available for analysing oriental paper is far from being fully exploited and properly compared to the (not entirely perspicuous) information offered by Arabic sources.

The descriptive classification of the surviving types of paper that has been elaborated by scholars is not supported by detailed data concerning the tools, techniques and manufactured formats, nor by a clear view of the diffusion of each type.

While in East Asia (and perhaps also farther west at the beginning of the Arab manufacture) paper was obtained from plants in their raw state, the major innovation consisting in the use of recycled rags is probably to be attributed to the Arabs (although an eleventh-century Arabic treatise seems still to refer to the use of raw plants). Common to the different kinds of Arab paper is the use of unrefined rag 'pulp', with residues of long fibres whose botanical identification (hemp, linen, or other vegetable fibres) is still uncertain. The close observation of sheets of oriental paper allows one to distinguish various types, based primarily on the different characteristics of the sheet when observed against backlight, which characteristics can be used to formulate conclusions about the configuration of the paper 'mould' (that is the tool used to produce the paper sheet). Although 'one should bear in mind the frequent difficulty in identifying the visible structure of the oriental-Arabic paper even in well-preserved manuscripts, the many cases of ambiguous documentation and the inconsistent or contradicting impressions which blur clear and distinctive description' (Ch. 1 § 9), the main types can be summarized as follows, according to the sheet texture, on which all or part of a grid of perpendicular lines, parallel to the long and the short sides of the sheet—respectively known as 'laid' (or 'wire') lines and 'chain' lines—may be recognized: (1) paper with no visible laid or chain lines (showing, in Yemen, a 'chaotic' pattern); (2) paper with laid lines only; and (3) paper with both laid and chain lines, whether (a) single, or variously clustered in groups of (b) two, (c) three, (d) two/three alternating, or (e) four.

Type 1 can be related to the use of a rudimentary mould, composed of a simple rectangle of cloth stretched over a light wooden frame: such a 'cloth mould', when placed so as to float on water, required the pulp to be spread manually over the cloth in order to obtain a sheet, which consequently would show no grid. Type 3, showing a visible grid of laid and chain lines, was produced with a mould composed of two elements: (1) a wooden frame with a series of wooden or vegetal rods fixed at regular intervals, parallel to the short side of the frame (the pressure of these rods appears impressed on paper as chain lines); and (2) a kind of mat laid on the frame, made of thin flax or hemp threads sewn together, individually or in groups (visible on the paper sheet as laid lines). This 'flexible' form of mould was—as was also later the 'rigid' western one—normally submerged in a suspension of fibres diluted in water. The exact structure of the mould associated with paper with laid lines only (type 2) is still undefined.

In papers showing both laid lines and chain lines, correlations between the size of a sheet and the pattern of its grid led to the (uncertain) distinction of four large groups: (1) eastern Arabic paper (the only type showing unevenly grouped chain lines); (2) western Arabic; (3) Spanish; and (4) primitive Italian (showing single chain lines, regularly—and at the beginning of its manufacture also widely—spaced). The distinction between the types also depends on their typical size, characterized by a variety of equivocally defined standards. Research on Arabic manuscripts has recently questioned the 'traditional' classification into three groups developed by Jean Irigoin, by juxtaposing a different set of criteria (see Ch. 1 § 2.1.4 for a comparative table). More generally, the size of the sheets in use for the various kinds of oriental paper requires further research; with only a few exceptions, the spacing between chain lines and the density of laid lines, as well as the materials employed in the construction of the mould, have not been fully and systematically investigated.

Oriental manuscripts were also manufactured using western watermarked paper, produced first in Italy and later also in other European countries. Watermarking implies the use of a 'rigid' mould, a wooden frame with a great number of thin metal wires fixed parallel to the long side, supported at regular distance by wooden slats parallel to the short side and sewn to each other and to the slats themselves. Even apart from the presence of an image ('watermark') incorporated into the texture of the sheet, western paper is recognizable both by its standardized sizes—four, of which two main ones ('reale' = *c*.615 × 445 mm, and 'reçute' = *c*.450 × 315 mm, as they are called in the text of the Bologna city statute of 1389 and on the so-called 'Bologna stone')—and by the occurrence of a protein-based glue for sizing (obtained by boiling bones, skin or parchment scraps), spread by means of immersion, instead of starch sizing (made from rice, maize or wheat), applied with a brush (both types of sizing material were described by late Byzantine sources: see Schreiner – Oltrogge 2011, 76–79). Western watermarked paper appears in the Byzantine world by the end of the thirteenth century and in other oriental cultures during the fourteenth and fifteenth centuries. Cheap Italian paper produced specially for the Islamic world (with appropriate symbols

as watermarks, such as crescents) annihilated most Arab paper making, but the extent of its export, the routes of its diffusion, the ratio of its use in comparison with oriental paper, and the diffusion of specific watermarks remain aspects that require much clarification.

A feature whose origin, manufacture and function are still matters of dispute among scholars is the occasional presence of a 'zigzag' mark, variable in design (a broken line, a series of comb teeth, etc.), visible either under raking light or against backlight. The zigzag mark, first documented in a mid-twelfth-century Andalusian codex, might not be an exclusive feature of Iberian paper production, as has long been believed, and is occasionally found also on watermarked paper.

During the nineteenth and early twentieth centuries, machine-made paper also came to be used in those traditions where manuscript books were still being produced.

1.1.4. Inks (IR)

According to its generic recipe, one of the oldest writing and drawing pigments was produced by mixing soot with a binder dissolved in a small amount of water. Thus, along with soot, binders such as gum arabic (ancient Egypt) or animal glue (China) belong to the main components of soot inks. From Pliny the Elder's detailed account (*Naturalis historia*, XXXV.25), we learn that, despite its seeming simplicity, the production of pure soot of high quality was not an easy task in Antiquity.

Purely organic or tannin inks are solutions of tannins extracted from various plants. The best known among them is the thorn ink, or Theophilus's ink, whose elaborate recipe is recorded in Theophilus's twelfth-century work *De diversis artibus* 49–51.

Iron-gall inks were certainly among the most commonly used writing materials and dominate the black-to-brown palette of many manuscripts. Though the origin of the use of a mixture of iron salts and tannins to produce a blackening fluid can be traced back to Antiquity (Pliny, *Naturalis historia*, XXXIV.43, 48), the earliest evidence of recipes that unambiguously mention a reaction between iron sulphate and tannins does not appear before the twelfth century (Zerdoun Bat-Yehouda 1983, 218–224). Iron-gall inks are produced by mixing natural iron vitriol with gall extracts. Iron(II) sulphate (also known as 'green vitriol' because of its colour and its glassy appearance) is the most frequently named ingredient in ink formulas. In mediaeval writings, however, other names like *atramentum* and *chalcanthum*, derived from ancient sources, are often used. Galls are diseased formations on the leaf buds, leaves, and fruits of various species of oak, caused when parasitic wasps deposit their eggs in them; they contain gallic acid and a number of other tannins, in varying quantities. When iron(II) sulphate and gallic acid are mixed, initially a colourless, soluble complex results; its oxidation through contact with air results in a black, water-insoluble pigment. Historical inks usually contain organic materials such as tannins, as well as a water-soluble binding agent, for example gum arabic. Solvents like water, wine, or vinegar were used to take extracts from the galls. Since the ingredients are mostly naturally occurring raw materials, the inks display a very heterogeneous composition.

In addition to inks of pure types, mixed inks containing components of different types are well known. The study of manuscript inks requires the use of instrumental analyses (on which see also General introduction § 2.2).

1.1.5. Pigments and dyes (OH–RN)

Iron oxide minerals such as red ochre ($Fe_2O_3 \times H_2O$ + clay + silica), haematite (Fe_2O_3) or goethite (FeOOH) belong to the oldest pigments; in Europe they were used since prehistoric times. Due to the variety of colours of iron oxides, there exist many recipes for the preparation of book illumination, whose use has been confirmed in manuscripts from Late Antiquity (Oltrogge – Hahn 1999); their early use has also been proved for Egypt, Mesopotamia and Asia. The pigments were prepared by cleaning, grinding and wet-sifting the minerals; red ochre can also be manufactured synthetically by heating yellow earth at 800°C (Theophrastus, *De lapidibus*).

Cinnabar or vermilion, using either natural (Liu 2005) or synthetic mercury sulphide, was also very commonly used in ancient times. The pigment was prepared artificially by sublimation, heating the pulverized mineral in the air. In the dry-process method, grinding liquid mercury with sulphur results in black mercury sulphide, the compound known in Antiquity as black *Aethiops mineralis*. Heating this compound up to 580°C for one hour in a large-mouthed earthen pot covered with an iron pan leads to formation of red cinnabar on the rim of the pot and on the iron pan cover. In the wet-process method, red mercury

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sulphide is precipitated from a solution of a salt of mercury by gaseous H_2S under slow heating. Another important red pigment is 'red lead' (Pb_3O_4), a synthetic pigment usually prepared by heating 'white lead' in an oxidizing environment (Pliny the Elder, *Naturalis historia* XXXV).

A yellow pigment known as 'massicot' is obtained by gently roasting white lead, with or without the addition of tin. In addition to yellow ochre (hydrated iron oxide) and massicot, arsenic sulphide-based pigments, natural and artificially produced orpiment (As_4S_6) and realgar (AsS) were also used. Orpiment was manufactured in a dry process by means of sublimation, or by a wet process using arsenic compounds in reaction with hydrogen sulphide. Adulteration of orpiment was usually made by mixing gall of fish, chalk and vinegar. Realgar exhibits a reddish to orange colour.

Copper-based pigments were widely used for green and blue colours since ancient times. The blue mineral azurite ($CuCO_3 \times Cu(OH)_2$) and green malachite ($2CuCO_3 \times Cu(OH)_2$) belong to the copper carbonates. Paratacamite ($(Cu,Zn)_2(OH)_3Cl$) has been detected in wall paintings from the fifth to eighth centuries in East Turkestan (Kühn 1988). One prominent artificial green pigment is verdigris ($Cu(CH_3COO)_2$), a reaction product from copper salts with acetic acid or vinegar. In addition, copper silicate (*chrysocolla*, $CuSiO_3 \times nH_2O$) was used as a painting material in East Turkestan and Egypt (Kühn 1988). Since these pigments are complex weathering products, their main preparation technique consists in cleaning or separating the pigments from other minerals. Green was also produced by mixing blue indigo with yellow pigments. Synthetic blue pigments are 'Egyptian blue' ($CaCuSi_4O_{10}$) and 'China Han blue', a barium copper sulphate ($BaCuSi_2O_6$). Egyptian blue was prepared by heating together a calcium compound with a copper alloy, silica (sand), and soda or potash as a flux at 850–1000°C. The glassy product was then ground and refined for purification (Vitruvius, *De architectura*, VII.11). The mineral lazurite, a sodium alumosilicate ($(Na,Ca)_8[Si,AlO_4]_6(S,SO_4)_2$), can be extracted from the stone lapis lazuli. It contains additionally calcite, pyrite and other minerals. Deposits in the Hindu Kush mountains in Afghanistan (Oxus River, Amu Darya, near Sar-e Sang/Kokcha Valley in Badakhshan) are the main source. It is mined in open pits by heating rocks and then cooling them with water (Marco Polo, *Il Milione*, 46). It is prepared in order to intensify the colour by heating it several times, cooling it with vinegar, pulverizing it, and sieving it and repeatedly washing it out with water or vinegar as sedimentation. The powder is then kneaded together with resin or gum and linseed oil under cold water. With warm water, pigment particles come out of the wax pellets, which are finally washed and dried again. The early use of lapis lazuli as a pigment is attested in Central Asia (Riederer 1977). French ultramarine is a synthetic pigment that can be produced by heating clay (Ca, Si, Al), sulphur and soda together. In Europe during the Middle Ages, Egyptian blue was replaced by lapis lazuli (Gaetani et al. 2004).

White lead ($2PbCO_3 \times Pb(OH)_2$) is the best known artificial white pigment since Antiquity. The basic lead carbonate was produced by the influence of vinegar present in the atmosphere on metallic lead. White lead, as well as the mineral cerrusite ($PbCO_3$), were also used for the production of 'red lead' by heating. White chalk ($CaCO_3$) and gypsum ($CaSO_4$) were used as pigments not only for painting but also for priming.

The colouring component of 'plant black' or 'bone black' is carbon (see Ch. 1 § 1.1.4).

Not only minerals, but also metals were used for book illumination. Gold is applied as a kind of ink often on a base coat made out of a mineral pigment, for example white cerrusite, or in the form of a gold leaf. Gold powder is prepared with a binder as gold drops for trade. When used as paint, it is ground together with mercury to clean it by amalgamation before mixing it with glue.

However, the historical formulas do not only describe the extraction and production of pigments. Since Antiquity, dyes which were produced from plants and animals were used not only for manufacturing textiles, but also as lakes for the decoration of manuscripts. Historical dyes are less resistant to ageing than pigments are; this is surely the main reason that less is known about their use in Antiquity or in the Middle Ages.

Indigo is surely the most important organic deep blue pigment. The colourless pre-product is present in different plants, particularly in the East Indian *Indigofera tinctoria L*. The extraction of the blue pigment is done by fermentation.

A red dye is obtained from brazilwood and similar types of wood. During the manufacturing process, the deep red colour is extracted from the wood and the bark by using lye, vinegar, alcohol or urine. By extraction with alum, one gets a red violet lake. Depending on the extraction time and medium, one obtains colours between pink, crimson and reddish brown. Brazilwood was imported mainly from Ceylon

and India in the Middle Ages. Several red or violet dyes can be produced by fermentation from different lichens (for example, *Rocella*). For the production, crushed lichens were treated with a thinned ammonia or urine and then fermented for some days or months. Other dyes were produced from scaled insects, for example, *Kermes vermilio* Planchon, *Porphyrophora hameli* Brandt or *Kerria lacca* by extraction (Hofenk de Graaff et al. 2004).

1.1.6. Writing instruments (MMa)

Information about writing instruments comes from various kinds of sources: surviving examples (quite rare and mostly antique); texts, both literary and technical; pictures, mainly those appearing in manuscripts themselves; and also—particularly from Ethiopia and sub-Saharan Africa—ethnographic observations (including interviews with local craftsmen). But the available information is very uneven. Written sources (for example, Arabic treatises on penmanship) may contain very detailed instructions, but they do not resolve all doubts concerning the relationship between the use of specific instruments and scripts of different thickness and contrast. As for pictures, miniatures of the evangelists sitting in front of a lectern full of instruments (such as pens, ink pots, knives, scissors) and occasionally copying from a roll to a codex (or vice versa) occur frequently in manuscripts belonging to different Christian book cultures (Greek, Syriac, Georgian, Armenian, Ethiopic, Slavonic), but these conventional portraits, perpetuating ancient traditions and therefore abounding in inconsistencies and anachronisms, seem to be of only limited value; common models and relationships across cultures await specific study. Late Islamic miniatures are more realistic in the depiction of scribes and calligraphers.

Waxed tablets (where attested) were written with a pointed metal or ivory stylus (known from archaeological and literary sources), with one end in the shape of a spatula used to erase previously engraved letters, by smoothing them out of the wax. Flexible supports (mainly papyrus, parchment and paper) required different tools: most often mentioned (and most often described, particularly by Islamic authors) is the 'reed' pen or 'calamus' (Greek *kalamos*, Arabic *qalam*), a hollow plant stem (or also—less frequently—a hollow metal tube?), through which the ink could flow to a tapered point. The cut of the point had a strong influence on the execution and aspect of the written script. 'Quill' pens, made from the moulted flight feather of some large bird, were employed in Ashkenaz according to western practice, but their use is also known in the Orient (an earlier Syriac instance, from 509 ce, is particularly noteworthy (see Ch. 1 § 11.1.7), although its diffusion could perhaps be verified by the analysis of the oriental scripts).

Mentions and representations of other tools connected with writing, or with the preparation of the page (ink pots, knives, scissors, rulers, compasses, burnishers, pieces of furniture, as well as painters' and illuminators' tools) also occur in various sources from the different manuscript traditions.

1.2. Book forms (MMa)

1.2.1. Miscellaneous forms

Writing on a variety of surfaces quite unlike any book of the usual sort—clay tablets and *ostraca* (pottery sherds, limestone chips), bones, seashells, sticks, cloth—was a common practice in most (if not all) oriental book cultures. For books, the 'roll', or 'scroll' (terminology is inconsistent in the different scholarly traditions), both in the horizontal 'multi-column' and in the vertical 'single-column' ('rotulus') arrangement, and especially the 'codex' are the norm in all book cultures, although with salient differences from one to another.

1.2.2. The roll and the rotulus

As already described above (Ch. 1 § 1.1.1), Greek and Coptic rolls were made of a series of papyrus sheets (*kollēmata*) which were glued together (at joins called *kollēseis*) and rolled/unrolled, usually with the help of a wooden or bone stick attached to one or both ends of the roll. Rolls were sometimes made of parchment—or leather—in which case the sheets could be sewn together. The text was arranged, normally only on the inner side (in papyrus rolls, usually along the horizontal fibres), in a series of columns, usually rather narrow, but sometimes broad, whose lines run parallel to the long side of the roll. Height and length of rolls, as well as the number of sheets and the width of the columns, varied according to local conventions (which have been partially investigated only with regard to Greek rolls), with the limits to our knowledge being determined by the fragmentary state of the evidence and its uneven geographical distribution. Although more rarely preserved, parchment rolls might have been more widely used than is

usually thought, especially outside Egypt. Talmudic instructions require writing the liturgical Tora scroll on *gevil*, cow hide processed on only one side, and literary halakhic (legal) sources, confirmed by chemical analyses, attest to regional differences in the substances used for the processing of the skins (Beit-Arié 2014). The diffusion of horizontal leather rolls in other traditions is subject to speculation.

Vertical rolls (*rotuli*, also called 'scrolls')—of parchment or paper, exceptionally of papyrus—are attested even in those cultures to which the use of horizontal rolls is unknown (Syriac, Armenian, Georgian, Ethiopic, beside Greek, Coptic and Hebrew; Slavonic liturgical examples seem to be rare imitations of Greek models, while in the Arab-Islamic world the *rotulus* occupies only a very marginal place). Unlike an ancient roll, a *rotulus* was not written horizontally in a sequence of more or less narrow columns, but vertically, in a single long column of lines running parallel to the short side of the roll; Ethiopians scrolls of larger size may be written on two columns. The use of this form for exorcisms, charms, amulets, obituaries, liturgical or magical texts and documents of various sorts is common to the cultures in which it is diffused. Early Greek examples go back to the eighth to ninth centuries, but their wider diffusion starts only with the eleventh century and continues into modern times in oriental monasteries. A comparative typology of the oriental vertical roll (still lacking) could offer interesting insights into their manufacture and use (length and width of the constituent sheets and methods of joining them, writing on one or both sides, decoration, contexts of use, and so on).

1.2.3. The codex

With regard to the use of the codex form of book, two main groups can be easily distinguished among the oriental manuscript cultures, according to the chronology of the earliest witnesses. On the one side are the Greek and Hebrew contexts, the horizontal roll having been the sole carrier of literary texts in the Greek area until Late Antiquity, and the codex having been introduced into the Hebrew book culture only very late, apparently not before the ninth century or a little earlier. On the other side are the cultural areas in which horizontal rolls are completely unknown: the Coptic book culture emerged around the end of the third century CE, at a time when the codex was already the dominant book form in the eastern Mediterranean world, and only very few Coptic horizontal rolls are known; the codex is known as the exclusive form in the Armenian and Georgian book cultures, whose languages were not given written form until the early fifth century; the same is true for the Syriac book culture, whose book production began in the first centuries of the Christian era; the earliest surviving Ethiopic handwritten books (two codices) were probably produced around the fifth and sixth centuries (although the date has been long debated); and also in the Arab-Islamic world the codex is known to the exclusion of the horizontal roll, since the emergence of Islam occurred at a time when the codex (possibly known through the intermediation of Ethiopia) was already dominant.

In Ethiopia, the 'leporello', 'concertina' or 'accordion book', apparently unknown elsewhere in the Near East, has been employed, for devotional purposes, at least since the late fifteenth century (see fig. 1.6.1). A leporello consists of one folded strip of parchment (or several strips folded together), with or without wooden or leather boards to which ties could be attached; the contents could be limited to pictures (one on each fold) or also include text.

Conversely, wooden tablets were widely diffused in oriental cultures. The plain wood could be directly used as a writing surface, or it could be carved out and covered by a thin layer of wax (often darkened with lampblack): this ductile material could easily be engraved with a pointed stylus (which could penetrate the wood beneath the wax, leaving traces of one or more scripts). Tablets were mainly adopted for documentary purposes or for writing ephemeral notes, exercises, drafts of texts to be transferred onto more durable surfaces, and so on. They could be used individually or assembled in groups (as 'diptychs' or 'polyptychs'): these latter have been considered as a direct ancestor of the codex, whose exact genesis—certainly due to a confluence of ideological and practical reasons—is likely to remain unknown. The presence of the wooden 'notebooks' in literary sources (mainly Greek and Latin) and the morphology of the surviving examples have been the object of specific interest.

1.3. The making of the codex (MMa)

1.3.1. The making of the quires

The basic constitutive unit of the codex is the 'quire', or 'gathering', which may be defined as 'a series of bifolia and/or folia [leaves] inserted one into the other' (Andrist et al. 2013, 50; various alternative defini-

tions are offered in the codicological literature). A codex may be made of a single quire of any number of leaves or of a series of individually folded rectangular sheets of some pliable material, but intermediate structures consisting of a limited number of sheets folded together are the norm.

Quires are mostly (but not only) formed by superposed bifolia folded in half, usually along the shorter side; coupling of separate leaves ('coupled leaves' or 'stubbed singletons') which might be glued together to create an 'artificial bifolium' is documented—for instance in parchment Qurʾāns, and also in other traditions—but data are wanting on the frequency and diffusion of this practice. 'Tackets', a kind of provisional basting made with threads or thin strips of leather, occasionally found in Latin, Ethiopic, Coptic, Slavonic, and also Greek manuscripts, including the famous Archimedes Palimpsest (Gumbert 2011, n. 16), were particularly useful for ruling or writing on quires containing loose sheets or coupled leaves.

In codices made from papyrus, it is observable that, as a rule, it was the roll that remained the basic material unit. For in the majority of papyrus codices, one almost always finds at least some leaves (and often many leaves) where a *kollēsis* occurs, as one would find at intervals also in a papyrus roll. Such occurrences of *kollēseis* on the leaves of papyrus codices provide clear evidence that the bifolia from which the quires of these codices were made were cut from rolls that had been manufactured in the traditional way by pasting together a series of *kollēmata*. Eric Turner stated as his summary view 'that normally a codex was made by cutting up a roll into lengths of the right size to form the constituent sheets of that codex; that sometimes care was take to cut out the *kollēseis* found in the original roll; and that special reasons … must be invoked to account for the few exceptions to this norm' (Turner 1977, 50). But specifically in the case of a significant number of Coptic papyrus codices, something unusual has been observed with regard to the characteristics of the rolls from which the bifolia for the quires were cut. In these cases, there is no doubt that the original papyrus rolls had been made of extremely long *kollēmata*, exceeding 1 m and sometimes even approaching 2 m in length, i.e. being on the order of five times as long as what Turner had observed to be the maximum attested length of a *kollēma*. Given that up to now, such very long single sheets of papyrus have been discovered only as constituent parts of papyrus codices, it seems a reasonable hypothesis that the manufacture of such sheets was a technological innovation that was motivated by an increasing preference for the codex form of book over the roll. In the absence of similar evidence for very long *kollēmata* from non-Coptic codices, it is possible that this innovation came about in connexion specifically with Coptic book production, which seems to have begun to increase significantly during the fourth century CE.

In parchment codices, bifolia were obtained by dividing the rectangular surfaces derived from parchment. The recourse to multiple folding that would be used to produce quires in *quarto* and smaller formats (which was often practised in the west from the eleventh century onwards) has recently been questioned for Greek manuscripts on an archaeological basis: surely it cannot be considered as a general rule, and the procedures applied by the craftsmen still await specific analysis, relying on the observation of the skins' natural features (mainly the position of the flanks, still often visible on the surface of the page because of their particular grain). It is interesting to observe that the practice of cutting the skins, sometimes with the aid of templates, is documented in modern Ethiopia (see Ch. 1 § 6).

Skins were assembled either according to Gregory's Rule (see Ch. 1 § 1) or with alternating flesh and hair sides at each opening (except at the centre of a quire): whatever the choice, the arrangement was not usually left to chance. The choice of the parchment side to be shown at the beginning of a quire even varies according to different traditions, but occasionally also in time and place within the same book culture. Consistent information is lacking for most of the oriental traditions: a clear preference for putting the flesh side at the beginning is observed in Greek and Coptic codices (which might be the earlier practice, also documented in ancient Glagolitic codices), while in most of the Hebrew geo-cultural zones, quires usually start with the hair side; both practices are attested in the Arab-Islamic world.

1.3.2. The composition of the quires

'Quire composition' was also subject to a variety of practices. In papyrus codices, 'extreme' structures are documented, i.e. rare codices composed of a series of single bifolia, or more often of a single thick quire. Quaternions and quinions are everywhere the most widely diffused and predominant structures in parchment codices. In those traditions where the codex has an antique history, the two structures appear to have been concurrent initially; at a later stage, a divergence in the quiring of parchment manuscripts occurred, the causes of which have not been adequately explained. Quaternions dominate Greek and

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part of the European geo-cultural zones of the Hebrew book craft, and this structure prevails with some exceptions also in Armenian, Georgian and Slavonic manufacture; the eastern Islamic world—including Syriac and Hebrew manuscripts—displays a clear preference for quinions, although with the exceptions of Persia and Yemen; the Maghreb shows an unusual propensity for ternions. Greater variety is found in paper codices, where quaternions are also the predominant structure, but they are often replaced by quires of thicker composition, which may have been thought to be more resistant to stress and wear, or possibly they were simply more economical to bind. 'Mixed quires', made of paper bifolia 'protected' by parchment ones, usually placed at the outside, or at both the outside and the inside of a quire, also tend to show thicker structures (septenions or octonions, that is quires of seven or eight bifolia). Much more rarely, mixed quires made of parchment and papyrus are also attested (like the tenth-century Georgian hymnary of Tbilisi, see Ch. 1 § 7.1.1), some of which may have disappeared.

1.3.3. Pricking and ruling

Unlike in papyrus rolls, where writing might be guided by the horizontal fibres, placing content on the empty surface of a codex page requires a preliminary allocation of 'black space' and 'white space', mostly achieved by means of 'ruling' a grid of perpendicular lines drawn on the surface of a page in order to organize the written area (the 'black space') and to facilitate the alignment of text and images. Not all codices show traces of ruling, and in those which are ruled the grid was not always respected by the scribe, with the consequence that the actual written area does not always coincide exactly with the ruled area. When ruling was drawn, it might be preceded by 'pricking' (often removed by subsequent trimming of the margins and therefore not always still fully or even partially visible). Pricking and (even more so) ruling are complex phenomena, still in need of further research for oriental book cultures, with the exception of Greek manuscripts, which have been quite thoroughly investigated.

Pricks for guiding the drawing of the horizontal and vertical bounding lines were most often made with a sharp instrument; although unproven, the use of templates may have been quite common. Specific studies of the shapes and positions of the pricks, and the ways in which they were made are desiderata for all oriental book cultures; exceptionally, the contemporary Ethiopian practice of using two awls and a piece of pierced parchment as a template has been documented (see Ch. 1 § 6). Ink dots or strokes were sometimes used instead of, or occasionally in addition to, pricks, as we find in some Greek papyri, the Judaean Desert Scrolls, and some Coptic parchment codices.

Observations on ruling can be decomposed into several distinct aspects. The main ones are usually called 'technique', generally corresponding to the materials and instruments employed for tracing the lines (using more than one 'method', each implying the recourse to specific tools and gestures); and 'type', that is the grid (or 'grille') of perpendicular lines which is rendered on the page. The notion of 'system' is also required for the description of ruling done with a dry hard point, referring to the orientation and intensity of impressed furrows and ridges within a quire. Current terminology, reflecting the unsatisfactory state of our knowledge, should also be revised.

The two main techniques (or 'classes') of ruling are distinguished by a substantial difference in their visual appearance, depending on whether the grid is (directly or indirectly) impressed on the page (blind ruling) or traced page by page on both sides of each unfolded bifolium with a colouring material (coloured ruling). In both cases, various devices and/or substances may be involved in the operation, still awaiting further research for most oriental book cultures. The simplest tool for impressing lines on parchment (but occasionally also on paper) was a dry hard point, probably used in connexion with a straight edge, widely diffused in the east, allowing the simultaneous ruling of multiple superposed surfaces. A plethora of 'systems' is attested by Greek manuscripts—on single folded or unfolded (mostly parchment) bifolia or on successive leaves or bifolia in one go, on the hair or flesh side, resulting in a variety of sequences of 'direct' and 'indirect' rulings which can be observed on the leaves or bifolia of a single quire. So far, no parallel has been systematically identified in other oriental book cultures, with the exception of Hebrew and of Slavonic manuscripts; nevertheless, 'indirect ruling' is certainly witnessed in Armenian manuscripts and may have been applied also in other traditions.

With the diffusion of paper in the Islamic world, the use of a ruling board (*misṭara* or *masṭara* in Arabic, *kanna* in mediaeval Hebrew sources, *tołašar* in Armenian)—known through Jewish, Arabic and Armenian literary sources as well as being attested by extant mediaeval and modern examples—gradu-

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ally became a common feature of oriental manuscripts (from whose example it also spread in the west): it is documented from 1131 for Hebrew manuscripts, in late Byzantine and post-Byzantine codices, and in mediaeval Coptic codices (see fig. 1.9.3). The *misṭara* is a frame made of cardboard or occasionally of wood, on which cords of various thicknesses were threaded into grooves and stretched, forming ridges corresponding to the bounding and writing lines, in accordance with the desired layout. The scribe would place each leaf (or bifolium) of the manuscript on the board and rub it with the thumb along the cords, which consequently left their impressions on the surface. Identification of this ruling technique is easy: there is no guiding pricking; the ruled lines are not as deep and narrow as those ruled by hard point, but wide and rather flat, and they are not perfectly straight, but usually slightly curved; in some manuscripts, it is possible to see the impression of the twists in the string; in addition, a uniform layout is observable, and the horizontal lines never exceed the boundary lines. The use of the *misṭara* allowed the creation of complex patterns of ruling in a fast and uniform way.

Some codices were not ruled at all, or were ruled in a crude way, limited to 'bounding lines' ('frame ruling'), and the bifolium could be folded parallel to the four edges in order to have the four lines framing the written area ('justification') indicated. The use of a fingernail for scoring is also mentioned, in Arabic sources.

Blind ruling, however executed, is the only technique used in Georgian, Slavonic and Ethiopic manuscripts as well as (apart from isolated exceptions) in Byzantium and the Arab world. Ruling by 'ink', introduced in the west at least by the end of the eleventh century (and then very common), did not meet great success in the east, despite some very precocious occurrences. Ruling by 'plummet', leaving grey traces, is known from some early Syriac examples already in the sixth and seventh centuries; traces of colour are also sporadically witnessed in a few Greek codices from the ninth and eleventh centuries. Not surprisingly, coloured ruling, overcoming initial religious resistance, spread by the end of the thirteenth century in the Hebrew tradition (see Ch. 1 § 9); Armenians used both metallic hard point ruling and red coloured ruling at least since the late thirteenth and fourteenth centuries and regularly from the seventeenth century (see Ch. 1 § 3). There has been much speculation—without fully convincing results—on the reason(s) for the shift from blind to coloured ruling, which had visual and functional advantages (a greater regularity in presentation and the possibility of adapting the grid to the need of texts with variable layout) and ergonomic disadvantages (given the need for ruling each page).

Whatever the details of execution, ruling produces a more or less elaborate grid of perpendicular lines, traditionally called a 'ruling pattern' or 'ruling type' (although the two expressions are not fully synonymous; Sautel 2012). The abundance of studies, repertoires and encoding proposals concerning Latin and Greek is contrasted by the general lack of such work concerning all the other eastern traditions, the only existing repertoire being one devoted to Hebrew manuscripts (Dukan 1988). No comparable data are available on the richness and variability of the patterns in use in the different traditions, according to dates and places of production and to content types: a higher variety may be admitted for parchment manuscripts, while the introduction of the *misṭara* resulted in a considerable simplification of the types in use.

1.3.4. Ordering systems

Unlike printed books, codices were not always equipped with devices meant to ensure, on the one hand, the correct sequence of quires, bifolia and leaves and, on the other hand, the immediate retrieval of specific passages of the text.

As for the first objective, oriental craftsmen (like western ones) show a remarkable inventiveness both in the development of effective systems and in their customization. The oldest and most widespread device is represented by quire numbering, i.e. the use of 'quire signatures', although with differences in chronology and diffusion in the different traditions; religious prescriptions could function as a deterrent to usage, such as in early Hebrew Bibles or Qurʾāns. Quire signatures may be indicated through an alphabetical or a numerical system (in the latter case, either spelled out or expressed by letters) and may appear on the first recto of each quire, on the last verso, or on both; the practice of 'signing' quires at both beginning and end seems to become more frequent in the course of time, appearing as a possible evolution of the system. The position on the page (upper or lower margin) and within the margin (inner, centred, outer) may also vary. A typology of quire signatures (as well as of other kinds of signatures)—as has been partially attempted for Greek and Arabic manuscripts and extensively for Hebrew ones—should take into account all the elements mentioned, in an effort to evaluate their variations in space and time (or also according

to other factors, such as text types). Changes in the style and placement of signatures within the same codex may provide important clues for understanding the historical evolution of a codex and the different phases of its circulation; the co-occurrence of signatures in different languages may also offer clues for the detection of cross-cultural exchanges.

Quire signatures ensure the correct sequence of the quires within the codex, but do not prevent inversions in the sequence of bifolia and leaves within a single quire. As a means to protect the order of the quire (at the time of binding or while copying on loose bifolia and leaves), bifolium signatures could be used in association with quire signatures, specifying the number of the bifolium within its quire. As an additional measure, the opening of the central bifolium of each quire could be marked by special signs of various shapes (as in Hebrew manuscripts from the end of the tenth century, and in Arabic ones). Later in time, and not in all cultures, 'catchwords' appear as an alternative system for ensuring the correct connexion between two quires, with the advantage of making the link immediately visible at each transition. In the most widely diffused form, catchwords consist in writing the first words (or letters) of the following quire on the last page of the preceding one, usually outside the written area (immediately below the text or in the margin): in this last case, the catchwords could be written horizontally, vertically or diagonally (as in Arabic or Hebrew oriental manuscripts) at the lower inner corner, but could also appear at the centre of the bottom margin. It also sometimes happens that the last word of the preceding verso is simply repeated at the beginning of the text on the following recto (a system sometimes called 'counter catchwords', or 'repeated words'). In parallel with bifolium signatures, bifolium and leaf catchwords also sometimes appear. Widely diffused in Arabic, Hebrew and (later on) Greek codices, catchwords seem to appear only very late in other manuscript traditions. Any type of signature or catchword could be enriched by decorative elements. Additional signs such as crosses or asterisks may also appear (usually in the top margin) in order to emphasize the beginning and/or end of each quire.

In contrast to the devices meant to facilitate the work of the scribe and the binder, numbering was rarely employed to enhance the ease and comfort of browsing in the text: after appearing in some early Greek codices, first-hand leaf and/or page numbers are the norm only in Coptic codices, or else only in recent times, for instance in Ethiopia (probably in imitation of printed books).

1.3.5. The codex as a complex object

Unlike contemporary printed books, manuscripts do not always contain a single text, written on a structurally uniform series of quires and bound to remain stable over time. Volumes of miscellaneous contents are frequently found: the texts they contain may be transcribed one after the other without physical 'caesurae' or on independent units, either contemporary or more or less distant in time ('composite manuscripts'). Moreover, the initial appearance of a codex may be preserved until today, or (as often happens) it may have been altered by a series of more or less radical transformations: comments and notes may be inserted in the margins; new quires containing new texts may be added to the original sequence or it may be accidentally or deliberately altered; leaves, bifolia or entire quires may be removed or simply get lost.

Greek and Latin codicologists (Crisci – Pecere 2004; Ronconi 2007; Andrist et al. 2013; Ch. 1 § 8; Ch. 4 § 4) have become increasingly attentive to the 'complexity' of the mediaeval codex and have developed new approaches to analysing the relationship between the structure of the codex and its contents, and to investigating the form a manuscript takes not only in its original state at the time of its manufacture, but also during the various phases of its later life. For other oriental cultures, research is still at the beginning, apart from some pioneering surveys (Maniaci, forthcoming; Ch. 1 § 5).

1.4. The layout of the page (MMa)

The page layout of a codex is conditioned by both the contents and its intended purpose (or destination) and also the natural features of the material used, as well as by the dominant aesthetic canons and the personal preferences of artisans and commissioners. Quantitative codicology, which has focused almost exclusively on Latin and Greek manuscripts, has codified the main parameters to be considered in the analysis of the page layout: absolute and relative dimensions, number of columns and width of the four margins, extent of the written area and 'density' of the writing it contains (Ornato 1997). The absolute dimensions have been often expressed as the sum of height and width, or half the perimeter ('size'), conventionally defining how large a page is; various other indicators and calculation methods are also possible. The ratio of width divided by height is used to characterize a page's more or less slender or stout

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'proportion': a page with ratio = 1 is perfectly square, one with ratio = 0.5, or ½, is very slender, one with ratio 0.8, or 4/5, very stout, the central value in the series of possibilities is the so-called 'invariant' ratio of 0.707, which does not change when a rectangle having this proportion is folded parallel to its shorter side (the modern standard paper format 'ISO 216' or 'DIN 476' has a ratio of 0.707). The 'filling rate' is given by the percentage between the written surface and the total surface of the page (of course possibly changing with every rebinding, but in any case always useful as an approximation for statistical purposes), while the 'exploitation rate' approximates the quantity of text contained on a single page, roughly determined by the distance between the ruled writing lines ('ruling unit').

None of these parameters (or others) has been systematically calculated in the study of the layout of oriental codices, even in the case of dated Hebrew manuscripts, for which an impressive quantity of numerical data has been collected, including ratios and proportions which can be classified in relation to other features, such as the number of columns or the text genre. Our knowledge is therefore limited almost entirely to occasional observations and casual statements. Moreover, research has focused (especially in Arabic codicology) on the effort to highlight the aesthetic values of the page (which surely played an important—although not exclusive—role in deciding on a given page's layout, as is shown by the complex organization of many Arabic manuscript pages, often equipped with not just one frame, but multiple frames) or to detect presumed numerical canons believed to be charged with particular elegance and harmony, although the theoretical limits of this approach have been clearly shown by Latin codicologists.

The size of the codices was surely connected, to a certain extent, to genres of text and their functional and social contexts: however, the available data do not allow us to establish chronological and regional typologies, nor to hazard comparisons between one culture and another. For Armenian manuscripts, for instance, it has been observed that Gospels, Bibles, and other liturgical texts were always larger, and parchment manuscripts were usually a bit bigger than paper ones, so that with the increase both of the variety of texts and the use of paper, overall size was reduced (see Ch. 1 § 3): analogous tendencies could also apply to other traditions, but they have not been documented on a tangible basis, except for Byzantine parchment codices.

Oriental (as well as western) books normally show a vertically oriented 'tall format', or occasionally a 'square format': 'oblong' or 'landscape' formats (wider than high) are practically unknown in most oriental book cultures, except for some isolated exceptions, such as ninth- and tenth-century oblong Qurʾāns from North Africa or later Persian poetry manuscripts (see Ch. 1 § 2.2). The lack of systematic surveys does not allow us to compare the distribution of the range of sizes and proportions in different traditions, and the correlation with other features of the codex, starting with its contents. Occasional observations hint at some culturally related peculiarities: very big codices—as represented, for instance, by Syriac Gospel books from the sixth to eighth centuries (*c*.360 × 280 mm) or by Armenian Gospels from the ninth and tenth centuries (*c*.330 × 250 mm)—or extreme sizes, such as that of a group of *plano* Qurʾāns of the second to third century AH (eighth to ninth centuries CE; *c*.680 × 530 mm) or of an Armenian Homiliary of 1202 (705 × 550 mm), are unknown to Greek and Georgian parchment book production, probably because of the adoption of more economic strategies of skin subdivision. Special shapes, such as that of certain small-format octagonal Qurʾāns, are extremely rare.

The same want of data affects our understanding of the proportion of oriental manuscripts, except for the Byzantine production, which shows since Late Antiquity a clear preference for a more or less squarish format (tending to disappear with the introduction of paper). A square or approximately square proportion seem to have been largely, but not exclusively, favoured for eastern parchment books, but this general impression needs to be verified by specific research (for a first attempt concerning Armenian manuscripts, see Ch. 1 § 3).

In fact, with the diffusion of paper, book size and proportion underwent changes associated with the gradual standardization of paper sheet sizes, which for oriental paper still await a more precise definition. The adoption of a more slender proportion, mechanically derived from the in-*folio* folding of paper sheets, seems to be accompanied by a general tendency to size shrinkage.

Research on Greek and Latin codices has shown that the layout of the text in one or two (rarely more) columns, far from being a purely aesthetic choice, is strictly connected to text readability: since the reader's eyes are at ease in anticipating only a limited maximum number of letters, when the lines of text are too long (as might be the case especially in large manuscripts) or too close to each other (as may happen even in smaller manuscripts), it becomes necessary to split them into columns, in order to increase

the ease and comfort of reading. In Latin codices—and to a lesser extent also in Greek ones—text layout is therefore more or less strictly correlated to their size (thus explaining the existence of different layouts for the same text, when copied in volumes of different size), and to the density of the text contained in the written area. The choice may also be influenced by other factors, such as the conditions of reading (publicly and aloud, as in the case of liturgical texts, or privately and more or less silently), the weight of local traditions, the influence of specific models, or the practical function of certain types of works (such as glossaries or bilingual texts).

To date, no quantitative study has been attempted—apart from Byzantine codices—to illustrate the relationship between size, content and single- or multi-column layout in oriental books and to define if and how the relationship between layout and readability exerts its effect also in other book cultures, and to what extent the artisan was aware of its implications.

Single-, double- and triple-column layouts appear to be variously represented in oriental book production, with preferences for the one or the other disposition having sometimes been hypothesized. Some correlations are empirically evident, such as the predilection (with some early exceptions) for a double-column layout in Armenian Gospel codices, New Testaments and whole Bibles (rare), while single-column manuscripts were usually reserved for poetry and philosophical or religious treatises; similar remarks have been made only unsystematically for other traditions. Writing lines are usually traced horizontally, but diagonal writing is attested in Arabic manuscripts. Special (sometimes inventive) arrangements were adopted for specific needs, for instance the layout of commentaries associated with a main text, or of images and drawings, whether placed in the margins or within the written area. The available information on these aspects remains mostly at the stage of obvious correlations or impressionistic notations; the same is also true for the general questions regarding exploitation of the page and of the written area.

Both in the design and in the practical implementation of the layout, specific models could be followed (as stressed by contemporary Ethiopian craftsmen), but the existence of layout 'prescriptions' is only sporadically documented, since very few of them have been preserved: these are in fact limited to a late Byzantine set of prescriptions and an Arabic text (apparently corrupt) from the second half of the seventh century AH (thirteenth century CE); a Latin Carolingian text, probably reflecting a Late Antique Graeco-Latin tradition, also deserves mention in this context (Maniaci 2013). Other isolated instructions, such as those concerning the decoration of the Eusebian Canon Tables in Armenian Gospels (see Ch. 1 § 3.5) or some late specifications for the copying of the Qurʾān might also be mentioned here. Given the rarity of explicit prescriptions, the reconstruction of layout rules should rely on the careful examination not of isolated cases, but of adequately large samples of written pages, an undertaking which has not yet been attempted.

1.5. Text structure and readability (MMa)

1.5.1. Writing and decoration

The role of the scribes was not confined to the physical embodiment of the verbal text; it also involved shaping its visual disposition, which in turn affected its verbal perception and reception, and allowed the reader to navigate within it easily. The visual presentation of texts in manuscript books was not an autonomous interpretative or purely artistic act on the part of the scribe and the painter; there were other factors and conventions—material, social, economic, aesthetic, and scholarly—dictating text configuration or at least affecting it.

Headpieces, initial letters or entire words (in the Semitic scripts or in all Armenian texts), titles (and running titles) in display scripts, and the use of colours (among which, various shades of red) may help to organize the text and to guide the reader by establishing dimensional and chromatic hierarchies. At the same time, the insertion of decorative elements adds visibility. Some of them, for example text dividers, break the flow of the text, forcing the scribe to plan his writing carefully and to adopt various graphic resources (abbreviations, changes in the form of the letters or in the width of their spacing, horizontal expansion or compression, and so on), in order to adapt the writing to the available space.

Also by means of spacing, compound punctuation, paragraphing and subdividing, underlining words or passages, pointing out terms, marking citations and lemmata, providing tables of contents and other locating devices and search tools, scribes enhanced the legibility and understanding of the contents.

In making a 'codicological use' of decoration and illustration as a means for structuring the text and shaping the reader's perception, every writing culture develops its own vocabulary and strategies: com-

parison is therefore limited to some general trends. An eye-catching example is represented by the insertion of an author's or an evangelist's portraits at the opening of a text or its sections, or by the use of single or double opening pages or (rarely) closing pages for religious (mostly liturgical) texts.

1.6. The scribe, the painter and the illuminator at work (MMa)

1.6.1. Colophons

'Subscription' and 'colophon' are generally (and vaguely) employed as synonyms to designate the often formulaic statements with which the scribe ended his work copying a book, usually by stating his or her name and/or dating it, and possibly also contextualizing it by specifying a place, an institution or other details concerning his or (more rarely) her enterprise or person. The genesis of the phenomenon and the reasons why a copyist decided to subscribe his or her work are not entirely clear, and obviously they varied according to time and place, as well as specific circumstances under which a manuscript was copied (from the desire to earn the forgiveness of the copyist's sins, to wanting to declare and advertise his or her own writing skills, to the intention of marking a specific act).

The frequency of the use of colophons varied significantly according to the different writing cultures (available estimates fluctuate from *c.*60% of Armenian manuscripts to less than 10% for Greek or about 7% for Hebrew and Slavonic manuscripts). Also the length and structure of colophon texts, as well as their literary quality, differ considerably from one oriental book culture to another (apparently with a tendency of Hebrew and Armenian scribes to be much more loquacious than all their colleagues) and within each of them.

In general, colophons are composed of variable combinations of the following elements, none of them appearing entirely consistently: the scribe's name, the name of the person on behalf of whom the scribe wrote, and the date of completion of the copy. Other information, such as the place of copying (always declared in Armenian colophons) and other details (reasons for copying, mention of secular or religious authorities; memories of historical facts; painter's or binder's name, exemplar, duration of copying, payments, names of the scribe's parents and so on) may also be found; their frequency changes according to the different traditions. In some cases, the final note may incorporate information relating to the collation and the editorial activity of the copyist (as in Arabic colophons), or a variety of detailed facts (as is often the case in Hebrew or Armenian ones). More or less verbose formulaic sections may be annexed to the colophon and possibly set off visually by some means: any such section should be formally and terminologically distinguished from the colophon itself. Statistics on the frequency of the various elements and their combination, and particularly on the mention of date, place and name of the scribe are missing for all oriental traditions, even when plenty of data are available (as for Greek, Hebrew or Armenian).

Colophons are not always located at the end of the book, but can appear at the end of a text section or of a production unit. Multiple colophons may give information on the 'evolution' of the book, helping us to distinguish its constituent layers. Attention must be paid to the possibility that colophons were copied from a model (particularly, but not only, when they are of particular historical interest) or even deliberately counterfeited or tampered with.

Although colophons are often transcribed in manuscript catalogues, the study of their formal aspects and of their evolution over time is hampered by the general absence of repertoires of formulations subdivided by place and date and accompanied by a detailed description or by an image of their layout. Existence of standard formats, evolution across time, correlations with other aspects (above all the contents of the book) remain to be studied. The same is true for external aspects: the lines containing information on the transcription may be put in a relation of continuity with the text itself or clearly distinguished from it, through the use of dividers of various kinds—lines or frames,— different writing styles or dimensions, colours, and other embellishments particularly related to layout, such as the arrangement of the text in original shapes.

1.6.2. Dating systems

The date of the copy is expressed according to a variety of local systems, whether limited to the year or specifying the month and day, the day of the week, or even the time of day; other elements (such as the solar and/or lunar cycle, cycle of the evangelists, epact, indiction, year of reign of a sovereign) may also appear in addition, or as alternatives to the explicit expression of a date. Details on the methods in use, with reference to bibliography, may be found in relation to the single book cultures.

When more than one dating system is used simultaneously, the consistency of the information they give should always be checked carefully. More generally, it is necessary to verify that the date of a subscription corresponds in fact to the date of the entire manuscript, or of the unit to which it is appended, and has not been copied from its model.

1.6.3. Duration of copying

Colophons as well as various notes in manuscripts and statements by third parties (for instance, contracts stipulated for the transcription of one or more books) provide only sporadic and occasional indications about the duration of the copying and the speed of the scribes. A hypothetical estimate of 2–3 leaves per day has been proposed for Latin mediaeval scribes (Gumbert 1995b; Gullick 1995), while no reliable data are available for any oriental tradition: given the variety of the circumstances and the subjectivity of the scribal experience, any generalization should be carefully avoided, at least until the available evidence has been systematically collected and analysed, which is far from being the case at present.

1.7. Bookbinding (NS–KS)

Although the basic composition and functionality of manuscripts in each cultural tradition appear to be founded on the same model, it is noteworthy that distinctive binding structures were developed. The basic structure consists of folded leaves, assembled in such a way as to form gatherings that were sewn and subsequently covered with a protective binding. The material of which those leaves were made, their number and their format, may differ over regions, historical periods and cultures, but the principle of nesting bifolia in the spine-folds to form gatherings is found in each tradition. However, the manner in which these gatherings were then sewn together differs from culture to culture. As a consequence, recognizing and understanding the differences in structure may be an important step in the process of establishing a manuscript's provenance.

The first difference consists in the use or absence of 'sewing supports'. Sewing systems without supports are link-stitch or kettle-stitch systems, in which the sewing thread links the gatherings directly together. When sewing supports are used, they are found on the spine of the text block where the sewing thread passes around each one, thus forming a structure in which the gatherings are connected to the supports, and also to each other close to head and tail. Sewing supports in general consist of strips of tanned or alum-tawed leather, or parchment, or pieces of cord.

A second characteristic to consider is the method of board attachment, and two main systems can be distinguished. Boards can be attached to the text block after it is sewn, using the binding slips (that is the outer ends) of the sewing supports, or, in the case of unsupported sewing, the extending parts of a spine-lining which is applied after sewing. With the other method, the sewing process starts only after one of the boards is prepared, either with the thread that is also to be used to sew the gatherings, or with the sewing support strips. In the latter case, a difference in the attachment of the two boards will be noticeable. With regard to the material of the boards, in some traditions wood was the predominant material, and in others boards were made of pieces of scrap paper pasted together. When wood was used, specific preferences are noticeable in individual traditions as regards to its grain direction. A final point of attention is the size of the boards relative to the text block. In some cultures, the boards are always flush with the edges of the text block.

Thirdly, small variations in the pattern of the sewing thread can be the clue for distinguishing between certain traditions. The passing of the thread within the fold-line and the positions of exit on the spine-side, linking either with the support or the previous gathering, plus the possible passing of the thread on the spine-side—often underneath the covering material and therefore not always visible—should be noted carefully. Further remarks can be made about thread thickness, the use of a single or a double thread, whether the thread consists of linen or cotton, and the number of sewing stations.

The next step in assessing the structure of a binding is to see whether the text block spine was lined after sewing, and if so, what kind of material was used and what shape and function it has. Generally, binders used parchment, leather or cloth to line the spines of the gatherings. When sewn on supports, the spine-lining often consists of strips made to adhere onto the spine in between the raised supports; with unsupported sewing, the spine-lining material is often full length, covering the text block spine from head to tail. Regardless of the presence or absence of sewing supports, the sides of the spine-lining material in

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most cases extend beyond the first and last gathering. The protruding sides are then usually pasted onto the inside or outside of the boards in order to strengthen the board attachments. One other aspect of the spine-lining is its function as a supportive material for the 'endband' sewing; often, the endbands will be sewn only after the spine-lining material has been applied.

The endband itself consists of several elements or features, most of which can be indicative for specific traditions. As such, it is important to register whether the endband is sewn on a core, and if so, of what material that core is made. Typically, parchment, tanned or tawed leather, or cord made of hemp or flax was used, but some traditions did not incorporate endband cores in the sewing, and others used double cords or even triple cords. Moreover, the endband core can have the additional function of making up an extra board attachment position, at head and tail of the book. If that is the case, the extending slips of the core are fastened in some way to the boards, otherwise, the endband core is cut at the position of the joint. With regard to the endband sewing, it should be established whether a primary sewing was applied, or if a secondary—usually decorative—endband was added. Furthermore, the gatherings need to be checked for anchoring stations.

Other binding elements of importance for distinguishing the traditions are often not directly related to structure, but concern features that affect the functionality and aesthetics of bindings. Closing systems, for example, diverge widely among the traditions. Sometimes straps, often combined with metal elements, but sometimes with wooden pegs, were used. In other cases, an extension to the backboard in the form of a protective flap was added, instead of an actual closing mechanism, and a combination of these elements is also possible. All measures intended to keep the manuscript closed have primarily the function of protecting the front edge from deformation, but were often included in the decorative scheme as well. The same dual functionality of protection and aesthetics is found with other metal elements fitted on book covers, usually described as 'furniture'. Another characteristic to remark on is the use and appearance of possible reading aids, whether they are flexible tassels or fixed page-markers.

All book traditions display a certain development in techniques and materials used, as is the case for the structure and the functionality of the artefact as a whole. Therefore, to typify any book tradition by its predominant form and construction by definition ignores the interesting, remarkable or even characteristic variant specimen. As a consequence, an introduction into the multiplicity of book structures that can be found in the oriental cultures can only outline the basic characteristics.

It seems that the Coptic codex, with its link-stitch sewing structure, is the basic book form on which the other traditions where modelled. While bulky, one-gathering structures were made in the early centuries of the Coptic tradition, it was the multiple-gathering structure and its unsupported sewing—the boards were attached with the sewing thread—that took root (Szirmai 1999, 7–31). Byzantine manuscripts resemble the Coptic structure but can also be distinguished when the sewing structure is examined carefully: in certain instances, yet not always, instead of sewing the text block from back to front or vice versa, the Byzantine manuscript is sewn in two parts, starting from each board so that the board attachment is similar at front and back; the two halves of the text block are connected by linking their sewing at the middle of the spine. Furthermore, the endbands on Byzantine manuscripts deviate from the Coptic ones. The latter were sewn without an endband core while the Byzantine endband is sewn on cords that extend beyond the joint and are sewn to the boards. The text block is cut flush with the boards at the head, tail and front edge, the spine is rounded in a characteristic manner, and often the bindings are furnished with a fastening system using leather thongs and metal clasps (Szirmai 1999, 62–83).

The Islamic book structure can best be divided into the type that developed in the first centuries of Islam, of which unfortunately little is known due to the scarce material that is left from the period, and the structure that evolved from this initial codex type and became the predominant book structure from the eleventh century onwards. It is generally assumed that the oldest book structure had wooden boards that may or may not have been attached to the text block. Remnants of bindings indicate that the leather covering had protective flaps, or even 'walls' attached to the back cover that covered the edges of the text block. With the later book type, only the flap extending from the front edge of the back board lasted, but developed further with an additional envelope flap. This fore-edge and envelope-flap structure is typical for the Islamic tradition. The Islamic manuscript book is further characterized by a flat spine. Usually the books were sewn with a link-stitch, and the boards are flush with the edges (Di Bella 2011; Scheper 2014, forthcoming).

Syriac and Ethiopic book structures also adopted link-stitch sewing from their predecessor, the Coptic codex. However, seemingly small variations in sewing schemes make it possible to distinguish between the traditions, and both Syriac and Ethiopic bindings display a particular method of board attachment. Furthermore, Ethiopic bookbindings display most often a unique way of sewing the text blocks, using a four-needle sewing in two pairs of sewing holes (Di Bella – Sarris 2012). Syriac bookbindings are further distinguished by a spine-lining of coarse cloth, which outer ends are usually pasted onto the outside of the boards, a feature not often found in other traditions (Checkley-Scott 2008; Szirmai 1999, 45–50).

Armenian bindings developed differently from their direct neighbouring cultures: instead of using link-stitch sewing, the gatherings were sewn on binding supports and the support slips were used for board attachment. The insides of the boards are usually lined with coloured textiles. A further unique binding element is a protective flap precisely the shape and format of the fore-edge, made of leather and attached to the back board. A further closing system is found in the form of leather strips, attached underneath the covering leather on the back board, crossing the fore-edge flap and long enough to be secured on the front board, where usually two wooden pegs are affixed for this purpose (Merian 1993, 2008).

Information on more specific features, concerning binding structures, but also types, materials and decoration of covers, will be found in the sections on the individual traditions.

References

Agati 2009; Andrist et al. 2013; Beit-Arié 1993, 1996, 2014; Checkley-Scott 2008; Crisci et al. 2007; Crisci – Pecere 2004; Crum 1905a; Déroche – Sagaria Rossi 2012; Di Bella 2011; Di Bella – Sarris 2012; Dukan 1988; Emmel 1998; Gaetani et al. 2004; Géhin 2005; Gullick 1995; Gumbert 1995b, 2010b, 2011; Haran 1991; Hofenk de Graaff et al. 2004; Kühn 1988; Liu 2005; Maniaci 2002a, 2013, forthcoming; Merian 1993, 2008; Oltrogge – Hahn 1999; Ornato 1997; Riederer 1977; Ronconi 2007; Schreiner – Oltrogge 2011; Sautel 2012; Scheper 2014, forthcoming; Szirmai 1999; Turner 1977; Zerdoun Bat-Yehouda 1983.

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2. Arabic codicology (FD–VSR–AVN)

2.1. Materials and tools (FD–VSR)

2.1.1. Papyrus (FD)

Too few papyrus manuscripts survive to allow any major trends to be extrapolated. Makers continued to prepare papyrus as they had done in ancient times. Papyrus codices were employed very early. For instance, some documentary codices in Egypt have been dated prior to the ʿAbbasid period (Gascou 1989, 100–101; see also fig. 2.2.2). The majority of literary papyri subsist in a fragmentary state and provide only an incomplete picture of the use of the material. Nevertheless, a certain number of bifolia in reasonably good condition seem to confirm the conclusion that the codex was indeed the dominant book form.

Papyrus continued in use until around the mid-fourth century AH/tenth century CE, by which time competition from paper became overwhelming, papyrus manufacture practically dying out by the fifth century AH/eleventh century CE (Grohmann 1967, 73).

2.1.2. Parchment (VSR)

Although in the Orient parchment seems to have been well known and used from the beginning of the first millennium BCE (Ryder 1991), collections of Arabic manuscripts include only very few examples written on this support. Though we do not have any manuscripts which we can date with certainty to the period before the third century AH/ninth century CE, there is no doubt that parchment was used in the Islamic world right from the beginning.

The spread of the paper-making technique brought about a progressive disappearance of the production of parchment. Two Qurʾāns from the end of the third century AH/ninth century CE, in all probability copied in Persia, show that at this date parchment was still being used in this region in which paper had been widely available for more than a century. In the central area of the Islamic world, where the documentary evidence is more abundant, the use of parchment was still very common in the fourth century AH/tenth century CE (in the following, unless specified otherwise, only CE dates are given).

In the western part of the Muslim world, copyists continued—less and less frequently—to use parchment until the fourteenth century CE, and perhaps even into the fifteenth century CE. A manuscript copied in Syria in 980 AH/1572–1573 CE represents the most recent use of parchment (see also fig. 2.2.6). In India a particular type of very transparent parchment, which could be written only on a single side, was used to copy exemplars or excerpts of the Qurʾān.

Islamic authors refer to sheep (mainly), goat and calf parchment. A treatise by the Sevillian Ibn ʿAbdūn (d.1135 CE) strongly suggests that the skin of lean sheep should not be used for the preparation of parchment. Ibn al-Nadīm, the tenth-century author of the famous bio-bibliography *al-Fihrist*, mentions the technique that we know from the Latin west (eighth to ninth centuries CE) of dissolving the fat and facilitating the removal of the hair from the follicles through one or more baths of calcium hydroxide after applying a depilatory paste, *nūra*, composed of quicklime and arsenic, which is inconvenient as it makes the skin dry. The Arabic text spells out the composition of the paste, variously indicated by Arabic, Turkish and Persian dictionaries. Another procedure, in use in Kufa, made it possible to obtain a soft skin thanks to a preparation based on dates, also used in mediaeval eastern Jewish communities. Some authors think that the treatment of the hides in a bath of lime was, if not invented by the Arabs, at least transmitted by them to the Europeans; others hold that this technique spread the other way around. Comparison between manuscript traditions of other Middle Eastern regions may help in integrating the overall picture, which is still rather patchy (Haran 1985, 47–50; Déroche – Sagaria Rossi 2012, 45–50).

Some cities maintained that locally produced parchment was of a superior quality: Kufa or Edessa (al-Ruhāʾ) had a high reputation, yet the reasons for this excellence—technique, geographical location, climate—are not clear. The practice of dying the parchment was well known throughout the Mediterranean area, as is attested by the celebrated tenth-century ʻBlue Qurʾānʼ; other colours, such as saffron, yellow and orange, were also available. Coloured inks were also used on dyed parchment: in a widely read eleventh-century treatise on the production of books by the Zirid sovereign of Ifrīqīya Muʿizz ibn Bādīs, the author provided prescriptions for how to prepare golden and blue inks (Bloom 1989).

The depilation of the hair side of a skin was not always carefully done, as appears in numerous manuscripts from the Maghreb. The parchment might be scratched with a sharp instrument or covered with chalk, as microscopic analysis has shown for the sheets of the *ḥiǧāzī*-style Qurʾāns—dated in the end of

the seventh and the beginning of the eighth centuries—and others copied in the Maghreb in the thirteenth and fourteenth centuries (Dreibholz 1991).

Regardless of the dimensions of the hides and of the size of the manuscripts, parchment codices are rectangular in shape or, more rarely, square.

2.1.3. Palimpsests (FD)

There survive a few Arabic palimpsests, but only one is clearly from an Islamic context. The Qurʾānic *scriptio inferior* of Sanaa, DAM, inv. 01-27.1, with a leaf in Copenhagen (Davids Samling, inv. 86/2003) was probably transcribed during the last third of the seventh century CE, then erased and covered by another copy of the Qurʾān (Déroche, forthcoming). Other palimpsests exist, however, in which Arabic script masks texts written in other languages (Grohmann 1967, 109 and n. 6). In other cases, the upper text has been added in a Christian context (Lewis – Mingana 1914; George 2011).

2.1.4. Paper (FD–VSR)

Oriental-Arabic paper. History and diffusion (VSR)

Arabic paper can be distinguished within the macrocosm of 'oriental papers', although with some difficulty. Among different types of Middle Eastern paper, the 'Arabic' one is the type produced at the end of the eighth century in the capital of the Abbasid Caliphate, Baghdad, as well as that produced in other regions of the Arab-Islamic world, including the territories of the Iberian Peninsula controlled and governed by Muslims (al-Andalus). The differences between Arabic and Persian paper, with a wide distribution in the Arab countries Yemen and Iraq, are not yet clearly defined (Humbert 2002).

Paper was imported from China well before 751 and spread throughout Central Asia and Persia. Though paper is called *qirṭās* or *waraq*, Persian *kāġaḏ*, Arabic *kāġiḏ* or *kāġaḏ*, Turkish *kāğıt*, is a loanword from the Sogdian language, belonging to the Eastern group of ancient Iranian languages, which passed through Persian into Uyghur and then into Turkish as *kāğıt*. The Sogdians, in contact with Chinese Central Asia, contributed to the spread of paper making techniques, to the point that the first Christian texts on paper might have been written in this ancient Iranian language. Imported paper, already employed by the governors of Khorasan for administrative acts in the seventh century CE and used to copy books in Arabic, was certainly already employed for the Sogdian language. We do not know how long imported Chinese paper was used in those regions after paper manufacture had started in Samarkand, where paper was first produced from rags, and not only from pulped vegetal material (Karabacek 2001; Bloom 2001).

As for the adoption of paper by the Arabs, Karabacek establishes 794/795 CE as the date it arrived in the Abbasid capital Baghdad; in fact a paper mill is attested there in 794 CE, under the government of Hārūn al-Rašīd. Unfortunately, however, no dated book or document written in Arabic on paper from this period and coming from this area has come down to us. Egypt used paper beginning in the ninth century CE, and later a paper mill was set up at Fusṭāṭ. Damascus had a paper industry in the twelfth century CE, but its quality, reputedly better than that of Egypt, quickly declined. The use of paper was imposed by Caliph Hārūn al-Rašid starting in 808 CE.

The expansion of so-called 'Arabic paper' throughout the Mediterranean area occurred relatively rapidly. In the twelfth century CE, Spain had numerous paper mills in the Muslim provinces. In the Maghreb it arrived in the ninth century CE, though it was used along with parchment until the fourteenth to fifteenth century CE. In eleventh-century Sicily, paper was both imported from other Islamic centres and locally produced, using the same techniques. As regards Anatolia and Constantinople, one must note the slowness of the Byzantines in adopting paper, assumed to be imported from Syria. There was a paper mill at Kāğithane, near the estuary of the Golden Horn in 1453, the date Sultan Mehmet II conquered Constantinople, and another at Bursa which was functioning in 1486. Other paper mills only seem to have entered into production starting in the first half of the eighteenth century CE.

Paper trade started rapidly and on a large scale. The presence of mills near some large cities led to styling the different types of paper with adjectives corresponding to the place where it was produced: thus *baġdādī*, *samarqandī* and others. Also the quality of the water used in manufacturing paper was relevant. The paper of Baghdad—hence also the adjective *baġdādī*, referring to a sheet of large dimensions—was appreciated for its quality until the fifteenth century CE. Syrian paper, called *šāmī*, enjoyed particular prestige and set a format in use at the Mamluk chancellery.

If the spread of paper around the Islamic area was fast, the decline was equally rapid, due to a series of factors that occurred starting from the middle of the fourteenth century CE. The inefficient administrations of the Ilkhanate governments (thirteenth to fifteenth century CE) in Persia and Iraq, and of the Mamluks (thirteenth to sixteenth century CE) in Egypt and Syria, together with waves of plague that afflicted Egypt until the early 1500s, resulted in the collapse of local industry. In Egypt, linen production also entered a crisis, and cheaper European wool textiles were preferred over local products, causing a drop in the quantity of rags available for the local production of paper, with a consequent increase in cost (Bloom 2001, 211–212). Conversely, European paper, Italian paper in particular, was much cheaper and therefore competitive. It was the plundering by Tamerlane, in particular of Damascus in 1401 CE, that dealt the death blow to the oriental-Arabic paper industry, above all that of Syria, actually the producer of the best quality paper at the time. Mongol domination introduced Chinese techniques of paper production, above all of paper decoration. The latter consisted in dying, spraying, and painting the paper in gold, and marbling it to the extent that it became an integral part of the cultural baggage of local artisans. These techniques reached their highest level under the Safavid dynasty (1501–1736) and the Mughals and remained in use in the subsequent period also, under the Qajar dynasty (1781–1825) and British colonial rule.

Sources and manufacture (VSR)

Sources on paper manufacture are scarce: they usually report places of production, formats, and quality, but only rarely do they concern the actual fabrication techniques. For example, what we know about the paper made in Samarkand comes from Ibn al-Nadīm, according to whom the Khorasan paper was produced by Chinese artisans following the model used for Chinese paper; Ibn al-Nadīm also provides us with the Arabic denomination for six types of paper, all referring to high-profile functionaries in that territory (Déroche – Sagaria Rossi 2012, 52–53). Thus, one can assume that at least two types of such kinds of paper, which survived their governors, were recognizable by their production techniques, as shown by the recipe for the preparation of *talḥī* paper which has come down to us, known as the ‘recipe of Ibn Bādīs’, the first real witness to paper manufacturing and moulds in Islamic lands (Humbert 2002, 59–61).

The only authors who provide information on paper production are the geographer al-Muqaddasī (d. after 988 CE), who mentions the production of *kāġiḏ* in Damascus and in Tiberias, and the Syrian biographer and geographer Yāqūt al-Ḥamawī (d.1199) who mentions paper production in a suburb of Baghdad. It has been proved that paper mills existed in various localities of Syria between the ninth and tenth centuries CE, namely in Hama, Tripoli, Manbij and Sanaa in Yemen (Karabacek 2001, 28–33).

The famous Ibn Bādīs recipe is open to a variety of interpretations, as concerns the descriptions and identification of the raw materials, and also their manufacture. Humbert thinks that Ibn Bādīs referred to linen in its natural state. The fibres underwent repeated cycles of submersion into a lime bath and of manual defibration, after which they were left to dry in the sun and then cut and immersed in fresh water for seven days. The pulp, pounded in a mortar, was diluted with water and forcefully beaten with the hand until it turned ‘soft as silk’, then was poured and evenly spread into moulds of the desired size, like ‘baskets opened on the sides’ made of reeds, canes or grass, fixed on a vat. After filtering and draining the water, the sheet was removed and laid on a wooden table and pressed against a wall to let it dry (Irigoin 1993, 278–280). The surface was then glazed with flour and starch in equal proportions; this mixture, laced with water, was boiled and then smeared on both sides of the sheet to make the paper able to receive writing. According to Karabacek, the raw materials consisted of hemp rags and ropes, treated with water and milk of lime, then beaten with sticks moved by water mills or, less frequently, by animal labour. Indeed, it seems that rags and old rope were used in Samarkand and in the westernmost regions of China since the first half of the eight century CE (Karabacek 1888, 13–14; Bloom 2001, 44–45).

Irigoin stresses that linen was the prerogative of Egypt, and that by the mid-twelfth century CE the cultivation of cotton had spread from India to eastern Persian, Maghreb and Muslim Spain (Irigoin 1993, 281–282). Although the existence of paper made from cotton fibres has often been denied, the presence of cotton fibres in some papers has been detected by recent diagnostic analysis (Colini 2008, 89–91, 105). The crux of the matter is the meaning of the adjective ‘bombycine’ from Latin *bombycinus*, itself derived from Greek *bombykinos* ‘silken’ and *bombyx* ‘silk’, specifically the ‘silk-worm’. The derived Latin words could be applied to any fine fibre, including cotton. It has been suggested that the expression ‘bombycine paper’ referred not to the material from which the paper was made, but rather to the sheet’s texture as being similar to that of silk or cotton (Karabacek 2001, 36–40). It is also possible that the Greek adjective

bombykinos referred originally to the city of Hierapolis Bambyke—now Manbij in northern Syria—renowned for its silks, but which could have, by analogy, given its name to the paper it produced. On this theory, an adjective 'bambykinos' referring to the city and designating both the basic origin of some product as 'made in Bambyke', and also the quality of any such product, came to designate a soft-textured paper made in Bambyke by means of a change in the first vowel, from *bambykinos* to *bombykinos*, thus alluding (whether by design or confusion) to the word *bombyx*. If so, then 'bombycine paper' would be just a kind of paper produced in Manbij (Hierapolis Bambyke), about the morphological nature of which nothing can be said. In any case, the analysis of ancient paper pulps (containing both vegetal and rag fibres) is still too limited to offer more precise information on the recycled materials that were used.

Returning to the paper moulds that were in use, the type described by Ibn Bādīs consists basically of a wooden frame on which a flexible linen cloth was stretched. The paper pulp, dissolved in water, was poured onto the cloth and then levelled smooth. This operation was performed while the mould was floating, soaking wet, on the surface of a vat.

The second half of the eighth century CE saw the rise of the dipping mould, similar to the Chinese one, made of an external wooden frame supporting a flexible and removable mesh on which another wooden structure was laid to keep it in the right position and ensure that the sheet would have the right thickness (Déroche – Sagaria Rossi 2012, 56–58, with figures). Also known as *forme souple*, this mould was composed of a mesh made of flexible grass straws or cloth fibres, or of stiffer bamboo canes, laid at regular intervals parallel to the longer side and at broader intervals perpendicularly, bound together by threads or animal hairs. In the majority of cases, such a tool replaced the previous model, allowing the production of multiple sheets from a single mould.

Another Yemeni prescription, dating back to the thirteenth century, is attributed to the Rasulid ruler al-Malik al-Muẓaffar al-Ġassānī (d.1294 CE). It attests a local manufacture developed in a much later phase than the first examples of paper production in Yemen. The suggested raw materials are 'the white internal fibres from the bark of fig trees', a plant in the same family as the mulberry, called *kozo*, whose fibres taken from the inner part of its bark were used to make Chinese paper (Gacek 2002). In his treatise, the practice of piling reams of hundreds of sheets is also described, or of packing them in groups of five, which introduces quiring in quinions, very frequently used in Arabic manuscripts.

Al-Ġassānī may likely refer to the wireless type of paper, with a chaotic pattern in which neither chain lines nor laid lines can be distinguished. Reputed to be the most ancient kind of Arabic paper, it was widely employed in the Middle East from the mid-eleventh century CE until the end of the fourteenth century CE, particularly in the regions of present-day Iraq and Iran, where it is attested even later. A peculiar kind of wireless paper, belonging to the more comprehensive non-watermarked category, was produced exclusively in Yemen, in the fourteenth to the sixteenth centuries: it is thick and opaque, densely filled with fibres in a markedly chaotic pattern (Déroche–Sagaria Rossi 2012, 60–62, and fig. 15; D'Ottone 2006, 16–17).

Sizing was carried out using humid white sorghum; after drying, the sheets were polished with a piece of marble or a burnisher, usually along the long side; a mixture of wheat flour and rice starch is referred to in the Ibn Bādīs prescription.

Typologies and formats (FD)

The identification of the fibres used in the preparation of paper in the Islamic world remains underdeveloped. The relevant information gathered from the very few analyses of the composition (fibre or rag) of paper pulp undertaken to date is not particularly helpful to our investigation. The question arises of the part played, if any, by hemp, linen (sometimes recycled), cotton, or other vegetable fibres (Gacek 2002, 79–93). Finally, a certain amount of paper is said to have been produced from a pulp of silk fabric (*ḥarīrī* paper), but analysis has not substantiated this hypothesis (Déroche 2005, 52).

On the basis of a visual examination of papers, G. Humbert provided a rough typology based on the kind of mould used by the papermakers, focusing mainly on the distribution of the chain lines (Humbert 1998). A first category covers papers with simple, isolated chain lines, with spaces between them ranging mostly from 12 to 25 mm, but sometimes as much as from 30 to 55 mm in some Indian manuscripts of the sixteenth to eighteenth centuries CE (Humbert 1998, 17–18). In papers produced in the western Islamic lands (also in southern Italy), the spacing is in general somewhere between 40 and 50 mm.

In the second category, the chain lines are grouped in twos, threes or fours, lying in uniform arrays over the whole sheet. Groups of double chain lines are attested from at least the twelfth to the fifteenth

centuries CE, particularly in Egypt, while chain lines arranged in threes are amply attested from the eleventh to the fifteenth centuries CE in Persia, Syria, Egypt, Asia Minor and even at Mecca. The place of manufacture of this type of paper remains mysterious, but it is known that its use expanded noticeably in the course of the fourteenth and more particularly in the fifteenth century CE (Humbert 1998, 20–22).

Other, less frequent, dispositions of the chain lines are known: in fives (between 1374 and 1420, Baghdad and southern Iran); in regularly alternating groups of two and three (some of them in the thirteenth century in Syria and also in Egypt). Papers where such groups alternate irregularly have been documented from the beginning of the thirteenth to the fifteenth centuries CE in the Middle East, Egypt and Syria, eventually also in Persia. A series of Persian papers of the twelfth and thirteenth centuries CE present simple, double or triple chain lines that alternate more or less regularly (Humbert 1998, 22–25).

In the western part of the Islamic world, papers produced locally sometimes exhibit a specific feature: the 'zigzag'. Often found in the fold or close to it, sometimes also in the upper or lower margin, this mark looks like a succession of tightly joined segments crossing rectilinearly the width or length of the sheet. The occurrence of the zigzag corresponds to a thinner area of paper and can be observed by transparency. The purpose of this device and the way in which it was produced remain unclear (see for instance Estève 2001).

Sheets of paper were seldom used in their original uncut state save in the case of volumes of exceptional size (for example Paris, BnF, Arabe 2324, 760 mm high × 530 mm wide, early fourteenth century CE). As a rule, dimensions rarely exceed 650 × 450 mm. In most fifteenth-century Persian *folio* volumes, the whole sheet measures at least 550 × 350 mm. On this basis, the dimensions of the sheets have been calculated, first by Jean Irigoin on a sample of Byzantine manuscripts (Irigoin 1950), and more recently by Nourane Ben Azzouna, who compiled a corpus of manuscripts produced under the Mongol dynasties (1258–1411; Ben Azzouna, forthcoming).

	According to J. Irigoin	*According to N. Ben Azzouna*
Largest format	660 to 720 × 490 to 560 mm	680 to 820 × 488 to 608 mm
Middle format	490 to 560 × 320 to 380 mm	596 to 668 × 415 to 500 mm
Small format	320 to 380 × 235 to 280 mm	440 to 524 × 305 to 374 mm

Since bifolia were prepared in advance, occasional leaves with lines running in an apparently anomalous direction do appear. In the case of unusual volumes such as the so-called Baysunqur Qurʾān the precise technique that was employed remains unknown; perhaps a fixed mould was used (James 1992b, 104–105; Soudavar 1992, 59–62). Again there exist, especially in the Iranian world, oblong or 'landscape' format volumes (in Persian *safīna*, lit. 'boat'), whose utilization recalls that of the roll. The sheet could be deployed indifferently in either direction the gatherings corresponding to the same formats. Sheets were often trimmed drastically and so off-cuts could be put to use.

After sizing with wheat, rice or maize starch, the sheet of paper was laid on a board to be scraped and smoothed with a tool made of glass, agate or other material designed to reduce roughness. Craftsmen in Iran and the Ottoman Empire seem to have accorded more importance to the preparation and outward appearance of paper than their western Islamic colleagues. A sheet, once scrupulously smoothed, was often brushed down with a primer (glair, or gum tragacanth, also known as dragon gum) or coating, although in many cases the paper was simply painstakingly smoothed. The delamination of leaves is a phenomenon encountered occasionally in manuscripts, due in all probability to the presence of several layers of pulp.

Western and watermarked paper (VSR)

Since the mid-fourteenth century, watermarked papers from Europe were employed in manuscripts produced in the Maghreb and gradually in Middle Eastern countries. From the Ottoman Empire, watermarked paper of the fifteenth century is frequently encountered, coexisting with the other oriental non-watermarked papers, which remained largely predominant; their success is demonstrated by the fact that some watermarks were copied as forgeries. European paper and non-watermarked paper still coexisted in roughly equal proportions during the sixteenth century. After 1550, until the mid-seventeenth century, non-watermarked oriental papers with chain lines grouped in twos or threes are no longer attested, being replaced most frequently by Venetian anchor-watermarked papers. By the seventeenth century in Turkey, Syria and Egypt, as in the Maghreb, the great majority of manuscripts were being transcribed on watermarked papers; by the second half of the eighteenth century three crescents (*tre lune*) watermarked paper

competed with French (or Imperial) paper marks (Regourd 2006). In 1744, in Yalova (Sea of Marmara), the production of Ottoman watermarked paper began, following the European models.

From Persia and India, very few manuscripts on European paper are attested before the end of the eighteenth century; starting from 1815, Persia imported Russian, English and Austro-Hungarian paper. The fine-quality paper produced in the Deccan dominated Mughal Indian manufacturing; English papers were occasionally employed in India, but not before the end of the nineteenth century.

Although the Muslim west adopted European paper in the early fourteenth century, non-watermarked paper continued to be produced in the Muslim East down to the beginning of the twentieth century (Déroche – Sagaria Rossi 2012, 67–69).

Industrial papers (FD)

During the nineteenth and early twentieth centuries, papers produced industrially were used in the production of Arabic manuscripts. Very often, in contradistinction to the traditional papers discussed above, they do not show clear traces of the fabrication process. In some cases, however, they have watermarks. As yet, there is little information about these papers.

Decorated papers (FD)

Tinted parchment was a forerunner of a strong tradition of tinted paper used in Islamic manuscripts. Actually, the custom of mixing 'white' and tinted papers within a quire is a proof of the specific way in which quires were prepared in the Islamic tradition. The fifteenth century marked a golden age for coloured and decorated papers in Iran, and it was then that a number of special techniques reached their zenith. Throughout this century, in Timurid and Turkmen states, manuscripts with differently coloured pages were actively sought after, most being collections or anthologies of poetry. Paper was at that time generally dyed on both sides and thus probably made by being plunged into a vat before a finish was applied; it was then often necessary to fix the colours with an acid treatment before rinsing and drying. There even survive sheets of tinted papers that have been deliberately flecked with a different colour. Sheets tinted on one side only are also to be found, though these are rarer; they received their finish prior to being floated on a mixture on the surface of a tank (Déroche 2005, 60–61).

Other paper-decorating techniques were also developed. 'Silhouette' (or 'shadowed') paper was produced by way of two different processes, one practised in fifteenth-century Persia and the other in the Ottoman world at the end of the fifteenth century and in the seventeenth century. 'Gold-speckling' or 'gold-sanding' appeared in Persia around 1460. 'Marbling' was one facet of the sustained effort observed in the Persian and Ottoman worlds to produce paper of varied appearance designed to fulfil specific purposes (Déroche 2005, 61–63).

2.1.5. Inks (VSR)

Recipes for making ink are preserved in a few Arabic sources, dating back to the eleventh to thirteenth centuries CE (Šabbūḥ 1995). As concerns their ingredients, their compositions differed widely (Schopen 2006). Carbon inks, iron-gall inks, and a combination of the two (mixed inks) are the types found in the Middle East, the two former called *midād*, the latter *ḥibr*. Muslim copyists continued to resort to already tested ink-making processes (maceration, drying, pulverization, etc.), though, as might be expected, wine never appears as an ingredient of their ink recipes.

In the carbon inks, the substances and the methods used for carbonization largely varied. Mostly vegetable products were adopted; among them the sources specify wheat flour, gourds, walnuts, and oils from various plants. Several lists of instructions call for raw materials of animal origin: in addition to grease, both horn and wool were used. The transformation of organic or mineral substances into carbon was achieved by burning them, then collecting the residue and reducing it to powder by mechanical action; in order to refine the raw material, often it was sifted; for a better result, lampblack may be collected by vapourizing a substance rich in carbon. Gum arabic is the usual additive for binding the ink, but Ibn Bādīs also records the use of egg white (Levey 1962, 1–17).

Iron-gall ink has been known in the Islamic world since its early period. Iron has been detected in two Arabic manuscripts of the end of the seventh and the mid-eighth centuries CE. The tannin element recommended by the sources derived from the gall of the terebinth or tamarisk tree, though also other plants rich in tannin are mentioned: myrobalans, pomegranate rind, and decoctions of fresh myrtle. The metallic salt

was vitriol containing sulphates of iron, copper and other metals (Levey 1962, 16, 20, 21). Iron-gall ink, unstable and alterable over time, has corroded a few Qurʾānic parchment fragments of the eighth century CE. For the early period, the prevalent presence of an iron-gall component has been confirmed by diagnostic analysis of Qurʾānic fragments of the eighth to tenth centuries (Khan – Lewincamp 2008).

The sources—Ibn Bādīs being the major one—enumerate numerous dye components and coloured ink preparations. While modern diagnostic techniques have so far been applied to only a few samples of decorated pages and concentrated on paintings, comparisons between the recent data and the sources suggest good prospects for further research.

From the early period (seventh century CE), red inks or gilding were employed to stress significant features of the text: a word or a group of words, diacritical punctuation or additional signs; the colour blue was also employed. The red Qurʾānic Sūra headings, attested in seventh-century fragments, could be added by copyists as further operations of page layout. The colour red rapidly came to be employed for specific requirements: abbreviations, overlining, single letters. Ninth-century Qurʾāns attest the practice of adding the vocalization in red, made more precise by the use also of green and yellow dots in order to distinguish the three Arabic short vowels. In the Maghreb, this refinement became a long-term practice. In the sixteenth century, Persian Qurʾāns employed more colours in the body of the text; their functions are far from clear, but in any case they create fancy effects of colour alternation and lining contrast. Coloured symmetrical words were arranged on mirror-image double pages of late Ottoman Qurʾāns (eighteenth and nineteenth centuries).

Gold and silver were also used in the Arabic world since ancient times. Apart from highlighted titles or verse counts, certain manuscripts were written entirely in gold or, more rarely, silver inks: the oldest known attestation is a Qurʾānic fragment dating from the early eight century, but the most famous example is the so-called Blue Qurʾān, written in gilded script on blue-tinted parchment (late ninth century). Book artisans employed either gold ink or dusted gold powder. Once the gold was applied, the surface was carefully burnished and then often outlined in black ink (Déroche – Sagaria Rossi 2012, 19–25, 85–95).

2.1.6. Writing instruments (FD–VSR)

The *qalam* was cut from a reed whose selection is the subject of very precise recommendations on the part of many authors. It was recommended first to soak the reed in water until the required appearance was obtained. At this stage, the reed could be trimmed. In the Maghreb, penmen used a *qalam* of a very different form, cut from a reed (*Arundo donax*), the stem being sliced downwards into strips (Houdas 1886, 98; Déroche 2005, 104–106).

The question of how copyists executed the early Qurʾānic scripts (eight–tenth centuries) is a thorny issue. Some scripts are so thick that the use of some special implement may be postulated.

The penknife (*sikkīn, sikkīna*) used to sharpen the reeds, the small board which supported the reed (*miqaṭṭ, miqaṭṭa*), the inkwell (*miḥbara*), the ruler (*siṭār*), and the compass (*birkār*) are the equipment of the copyists. The burnisher—glass, metal or hard stone—is the most widespread type of polishing tool for paper and gilded areas. A special relevance was assigned to the X-shaped book rests (*kursī, mirfaʿa*; Gacek 2001, 2008).

2.2. Book forms (FD–LEP)

2.2.1. The roll and the rotulus (FD)

The horizontal roll was not used in the Islamic manuscript tradition, and the vertical roll (or rotulus) occupies only a very marginal place, mainly related to talismanic use, although calligraphic variations on this form are not unknown. In most cases, the surviving rolls are copies of the Qurʾān. A form peculiar to Indonesia is long, narrow strips of palm, along which runs a single line of text (e.g. Jakarta, Perpustakaan Nasional, Vt. 43).

2.2.2. The codex (FD)

The emergence of Islam occurred at a time when the codex was already the dominant form of the book in the eastern Mediterranean basin. It was taken over as such by those who were at the origin of the Islamic book tradition and had to write down the text of the Qurʾān in the form of a book (Déroche, forthcoming). By the end of the seventh century CE, the vertical format was challenged by an oblong format which

became dominant during the ninth century CE for the Qurʾāns (see fig. 2.2.6). In the end, the Qurʾān itself was again transcribed in vertical codices (see fig. 2.2.7), perhaps in association with the diffusion of paper. From the end of the thirteenth century CE onwards, another kind of oblong codex (*bayāḍ* format or *safīna*) was used, especially in the Persianate world: in this case, the lines are written parallel to the spine (Ben Azzouna, forthcoming).

Codex-like manuscripts are also found. A few *plano* manuscripts were briefly produced at the beginning of the second half of the eighth century CE (Déroche, forthcoming).

2.2.3. Albums (LEP)

Albums are a peculiar kind of Islamic manuscript, made from cut-outs and individual works (paintings, drawings, sketches, calligraphy exercises), usually executed on paper, but occasionally on silk or cotton, mounted on paper sheets, assembled and bound (Parodi 2010). Commonly in codex form, albums may also occur in accordion or 'concertina' form, or in an elongated codex form (*safīna*). A master compiler supervised the selection and preparation of materials—including repairing, resizing, reformatting and decorating with illumination, ruling, the addition of coloured grounds— and their arrangement on the page. Often he would write a preface, providing a historical context and listing the names of practitioners with brief biographical notes strung together according to master-student affiliations (Roxburgh 2001). Prefaces typically survive not inside albums, but as specimens of good prose reproduced in collections of belles-lettres (*inšāʾ*).

Not unlike Islamic manuscript illustration itself, albums seem to have stemmed from within the Persian-speaking Turko-Mongol milieu that dominated the eastern Islamic world between the eleventh and the eighteenth centuries. They enjoyed popularity in Iran, Central Asia, India and the Ottoman Empire.

The earliest albums to survive almost intact date from the first half of the fifteenth century and originate in the Timurid milieu of Iran and Central Asia (Roxburgh 2005). But the fashion for albums was possibly introduced a century earlier, when the Mongols were ruling over parts of the eastern Islamic world.

While the rationale behind albums has been plausibly traced to collections of *ḥadīṯ*, anthologies and other traditional Islamic compendia (Roxburgh 2005), direct foreign inspiration is likely to have triggered their introduction. The Mongols entertained direct contacts with China, where a fashion for picture albums, prompted by block-printing, was already well established by the twelfth century (Silbergeld 1982). Chinese albums were made up of individual paper sheets folded along the middle, sometimes assembled in concertina form. Further parallels are evident (Parodi 2010), with albums in both traditions seemingly responding to a changing attitude towards the arts, with an appreciation of single, non-narrative painted scenes or even concise sketches, paralleled in poetry by a taste for brief and personal poetic expressions. Both implied an acknowledgment of authorship and encouraged connoisseurship. Calligraphy specimens and, subsequently, graphic or painted works collected in albums increasingly featured (accurate or spurious) attributions to great masters, if not actual signatures. Later albums, whose popularity survived into the modern era and extended outside Islam (as in the Rajput albums of India), assembled works made expressly for them by contemporary masters rather than, or in addition to, masterpieces from the past.

Albums defied book conventions by denying the traditional progression expected of a codex even while adopting its format, presenting a novel theme with each opening. While the role of albums is to some extent comparable to that of picture galleries in Europe, the form was strictly regulated by the conventions of book production, with gathered leaves stitched into a text block and onto a standard Islamic binding with upper and lower covers, elaborate doublures, and an envelope flap to protect the outer edges of the leaves. Albums in codex form, however, were usually larger than illustrated manuscripts: specimens of about 500×300 mm and with more than 150 leaves are not uncommon (Roxburgh 2001). Concertina albums are usually smaller, and *safīna* albums are eminently portable.

Some early albums also mimicked the inner conventions of the codex—frontispiece, illumination, rulings, and markers of progression. But they typically displayed an emphasis on 'facture' (Roxburgh 2005), on the complexity of assembling heterogeneous materials and giving them visual and thematic coherence: juxtaposing works derived from a single prototype, assembling calligraphy from a group of closely connected masters, or focusing on a single subject, such as portraits of courtiers (Wright – Stronge 2008). Thus individual openings became especially important, and were often conceived as visual units. Margins, the single most important element providing coherence, were increasingly ornamented: in seventeenth-century Iran and India, they often featured elaborate figural ornamentation that included calligraphy and almost obscured painted works (Parodi 2011, Wright – Stronge 2008, Welch et al. 1987).

Albums were often refashioned or pillaged for content by successive owners. Many were taken apart by art dealers who sold individual works without caring for the original leaf sequence or subject matter. Unlike Muslim patrons, who understood and valued the form, logic and facture of albums even as they disassembled and reassembled them to suit new purposes, western collectors until recently were often more interested in certain subjects than others and generally valued paintings above calligraphy. The figural pages of some seventeenth-century Mughal albums, whose openings alternated between paintings and calligraphy, were sometimes pasted onto cardboard mounts in the early twentieth century, with irreversible damage to, or loss of, the other side.

Albums pose a great codicological challenge to cataloguers: reconstructing the leaf sequence of a dispersed album is an extremely complex task, although it has emerged as a distinct field of study in the three decades spanning the year 2000 (Welch et al. 1987; Beach 2004; Wright – Stronge 2008, Parodi et al. 2010, Parodi – Wannell 2011).

Digitization has facilitated the virtual reconstruction of albums, as exemplified by the work undertaken by the Staatsbibliothek zu Berlin on the Diez Albums (Berlin, Staatsbibliothek, Diez A fols. 70–74). The albums were assembled from imperial Ottoman specimens when Heinrich Friedrich von Diez (1751–1817) was Prussian ambassador to the Ottoman court and contain materials spanning several centuries from as early as the Mongol period. The individual sketches and paintings were taken apart in Berlin in the twentieth century, but microfilms document the original appearance of the leaves, and lacunae in imperial Ottoman albums in the Topkapı collections (Istanbul, Topkapı, H. 2152, 2153, 2160, 2154) can be matched with individual Diez leaves (Roxburgh 1995). The corpus, made available on the website of the Berlin library in 2013, is leading research in a new direction.

2.3. The making of the codex (FD–VSR)

2.3.1. The making of the quires (FD)

The composition of the quires reveals how sheets of parchment and later paper were used: bifolia were cut to the desired dimensions in advance, then gathered, usually in groups of four or five, and folded in half.

From as early as the thirteenth century, certain *de luxe* manuscripts began to feature tinted papers, so that one pink-tinted bifolium, for example, might be found in a quinion. In the fifteenth and sixteenth century centuries, leaves of white, tinted, marbled, or decorated paper sometimes alternate. This naturally implies the preliminary cutting of sheets and the *ad hoc* assembly of these bifolia by the copyist. These observations can sometimes be confirmed by examining the direction of the laid-lines.

2.3.2. The composition of the quires (FD)

Parchment manuscripts

The oldest surviving Arabic manuscripts are Qurʾāns, and date from the second half of the seventh century; most of them are fragments written in *ḥiǧāzī*-style script, which provides the basis for the dating, in association with other features like the orthography. Few of these copies contain continuous sequences of leaves, which are essential to understanding how parchment was used to make up quires in those early days. It seems, however, that various kinds of quires were used: quaternions, quinions, even quires with ten bifolia have been mentioned. Hair and flesh sides are not always arranged according to the same sequence. This situation seems to have prevailed until the eighth century CE. The size of the manuscripts also seems to have been evolving. The early material is mainly constituted of small- and medium-sized copies, but big Qurʾānic manuscripts appeared at the beginning of the eighth century, perhaps as a result of official patronage by the Umayyads.

Many more manuscripts from the ninth century have survived. Although they are often fragmentary, several contain continuous text sequences over a sufficient number of folia to provide useful information. A good example can be seen in the composition of manuscript Paris, BnF, Smith-Lesouëf 193 (Déroche 2005, 74–75): despite the loss of several leaves here and there, examination shows that the quires contain ten folia arranged in the following manner: HHHHH^FFFFF.

This observation is confirmed by a survey of three large collections of Qurʾān manuscripts copied on parchment between the late first and the middle of the fourth century AH (seventh to tenth century CE), namely those at the Bibliothèque nationale de France, the Museum of Turkish and Islamic Art in Istanbul and the Musée des arts islamiques in Raqqada, close to Kairouan (Tunisia). The overwhelming majority of

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manuscripts in those collections are composed of quinions; the immediate implication of this observation is that such quires cannot be obtained by simple folding, as subsequent analysis confirms. In addition, the very specific format of those copies makes the folding technique quite impractical. The way in which the parchment was used to form each quire shows a consistent approach on the part of those who made the book: the recto of f. 1 (outermost side) is almost always the hair side of the parchment (Déroche 2005, 75). It also appears on the rectos of the following leaves of the quire, that is to say ff. 2, 3, 4, and 5. When the manuscript is opened, a contrast is evident between the two halves of every double page, except at the junction of two quires (where two hair sides face one another) and in the middle of each quire (where, naturally, two flesh sides appear). It sometimes happens that this pattern is accidentally broken within a quire of a manuscript that otherwise strictly follows the normal arrangement. This is due to the fact that the parchment was cut down to the dimensions selected for the manuscript. A single skin could, if necessary, be used for different quires, indeed for different manuscripts. Subsequently, sheets of the same size, usually five in number, were stacked in the same position and folded down the middle to compose a quire.

The way the skins were used is also highly specific: an examination of the quires reveals the fairly regular presence of stubs, beginning at a very early date. The presence of stubs does not always indicate gaps in the text, but sometimes reflects an extremely common practice that involved a 'substitute' for a bifolium in the form of a pair of 'coupled leaves'—two stubbed singletons—inserted symmetrically in relation to the central stitching. Within a quinion, the number of singletons varies from two to eight or even ten. Only a quarter of the quinions were composed of five bifolia proper. In the remaining cases, singletons inserted in symmetrical fashion in the quire replaced the bifolium or bifolia that would normally have been found there (Déroche 2005, 77–78). It would seem that as far as possible the craftsman making the book was careful not to undermine the sturdiness of the quire, and therefore of the manuscript.

Other ways of composing quires of parchment leaves occasionally occur. Quaternions were sometimes used in oblong manuscripts in the third century AH (ninth century CE), which, strangely, had no impact on the arrangement of hair and flesh sides, the first leaf displaying the flesh side outermost in conformity with the description above.

In the western reaches of the Islamic world—the Maghreb—parchment long remained in use, especially for copying the Qurʾān. It was employed alongside paper until the fourteenth century, even as late as the fifteenth. This conservatism did not mean, however, that parchment was used in the ways described above; on the contrary, it is clear that the arrangement of hair and flesh sides generally follows Gregory's Rule, and that there was no marked preference, strictly speaking, for one type of quire or another. Quinions were not unknown—two manuscripts in Paris, BnF, Arabe 6090 (*FiMMOD* 68) and 6499 (*FiMMOD* 65), are composed of quinions—but they were not the only type found. On occasion, gatherings of parchment might be large, for those in Paris, BnF, Arabe 6905 (*FiMMOD* 16) contain as many as fourteen leaves. Copyists also used quaternions. Ternions seem to have been a Maghrebi speciality when it came to parchment manuscripts (Orsatti 1993, 298). In all these manuscripts, from both the Bibliothèque nationale de France and the Biblioteca Apostolica Vaticana, Gregory's Rule is respected. This does not mean, however, that the quires were made by the folding method used in the west, as mentioned above. 'Irregularities' and the heterogeneous nature of the bifolia composing a single quire point into this direction.

Mixed quires combining papyrus and parchment (sometimes only a parchment 'guard') are known, and the introduction of paper resulted in similar associations, combining the sturdiness of parchment where it was most useful with the less expensive paper where the text was least vulnerable. The use of mixed quires is known in Kairouan from the early eleventh century CE (Raqqada, Musée des arts islamiques, Rutbi 247, dated 404 AH/1013 CE; Déroche 2005, 81–83).

Paper manuscripts

The steady growth in the use of paper for manuscripts did not radically change copyists' working methods. As regards manuscripts written in Arabic script, some of the special features already discussed in terms of parchment quires recur in paper gatherings, and the descriptive method explained above can easily be applied to the latter.

The type of quire most commonly encountered in manuscripts made of paper is the quinion: some 70% of manuscripts published up to 2001 in *FiMMOD* are primarily made up of gatherings of ten leaves. However, a variety of other forms were also used. Sometimes different types of quires alternate within the same manuscript. This relatively rare approach has been noted in manuscript Tashkent, IOB, 3106 (*FiMMOD* 253), where quaternions and quinions alternate, and in part of manuscript Liège, BU, 5086 (*FiMMOD* 69),

from 696 AH/1297 CE, composed of binions and ternions. Although copyists generally tended to stick with a single type of quire—apart from minor variations dictated by circumstance—there exist manuscripts whose quires seem to eschew all coherence.

Various other types of quire have been noted, although unequal in frequency. Senions are relatively numerous, being characteristic of many manuscripts dating from the twelfth and thirteenth centuries CE (e.g. Paris, BnF, Arabe 1499 (*FiMMOD* 12), Vatican City, BAV, Vat. ar. 1023 (*FiMMOD* 87), Tashkent, IOB, 3102 (*FiMMOD* 247), Tashkent, IOB, 3107 (*FiMMOD* 249)). On occasion, gatherings of a greater number of leaves were used: fourteen (e.g. Genève, Bodmer, MS 527 (*FiMMOD* 174)) as well as sixteen leaves.

Quaternions are relatively common, or at any rate sufficiently numerous to reveal various tendencies. Manuscripts from Iran and the Persian-speaking world, for example, show a preference for this formula. An overview of manuscripts written in Persian (Déroche – Richard 1998)—some of which were copied in Asia Minor, India, or Central Asia—reveals a number of noteworthy trends for the period from the thirteenth to the sixteenth century centuries. In the previous era, quires of eight leaves had been used, as demonstrated by several manuscripts from the eleventh and twelfth centuries (Déroche 2005, 85–88), some of which may have been produced in Iran. They were still dominant in fourteenth-century Persian manuscripts, although by no means exclusively. By comparison, they are comparatively rare among Arabic manuscripts of the same period.

Quaternions still predominated among Persian manuscripts of the fifteenth century (Déroche 2005, 87–88), with some cases of alternation with quinions within a single codex. As for Arabic manuscripts, the sample represented by *FiMMOD* gives the same impression of the rarity of quaternions: only two manuscripts can be cited, one produced in Ṣufi-abad (Paris, BnF, Arabe 6962 (*FiMMOD* 167)), the other perhaps in Mecca (Istanbul, Süleymanie Kütüphanesi, Şehid Ali Paşa 1876, *c*.1406 (*FiMMOD* 138)). In Iran itself, the type of quire generally used during the sixteenth century was the quaternion, or sometimes, in a small number of manuscripts with paintings, the ternion (Déroche 2005, 88). By contrast, in the Ottoman Empire quaternions and quinions co-existed, the former apparently being preferred for manuscripts based on Iranian models. These trends intensified in the following century, with quaternions dominating almost exclusively in the Iranian world and India, where only very rare exceptions can be found, while in the Ottoman Empire quinions won out—only a few eastern outposts of the empire ignored this rule.

Manuscripts from Sub-Saharan Africa

Manuscripts originating from West Africa—where they continued to be produced into the early twentieth century—often take the form of separate single leaves. When quires or bifolia do appear, they bear no trace of stitching. When quires were used, there was a wide variety of formats, ranging from two to twelve leaves per quire, with a relatively high incidence of four and eight leaves. Some manuscripts are composed of bifolia produced by folding a single sheet in four.

2.3.3. Ruling (VSR)

Dry point ruling shows up rather early in a number of Qurʾāns written in *ḥiǧāzī* script, dated to the second half of the seventh century or the first half of the eight. Even in cases where we cannot find any rulings on the page, we cannot exclude the use of some other device which in some way regulated the framing and the direction of the writing. The use of a systematic practice was, however, probably not very wide spread.

On paper, the most widely used ruling instrument was the *misṭara*, a panel of cardboard or wood of the same dimensions as the sheet of paper to be written, on which threads of variable thickness were stretched and sewn. Their weft corresponds to the lines of justification and to the rulings. There are rare written and orally reported descriptions of how a *misṭara* was used. According to a practice which had been proven over time, the copyist placed the sheet of paper over the panel and rubbed it, impressing signs visible to the naked eye and perceptible to touch. Sometimes the *misṭara* was placed under a single leaf, in other cases one or more bifolia were ruled at the same time. The differences can be deduced by observing the position of the ridges and furrows on the leaves (Déroche – Sagaria Rossi 2012, 122–126 and fig. 34). The *misṭara* was extremely flexible and allowed one to create very complex ruling schemes, marking dozens of sheets of paper easily and rapidly. There are also examples of mixed rulings accompanied by schemes of simpler *misṭara*. Two, four or six columns can be set up by a *misṭara*, then be filled by verses and bordered in the margins by obliquely placed lines. In the cases in which prose and verse are mixed, the ruling scheme, two columns and a double margin, is respected by the copyist only for the transcription of the verses.

A Qurʾān fragment datable to the end of the seventh century CE is ruled in ink, on both the recto and verso of the sheet of parchment, all through horizontal and vertical ruling. The same technique is observed in a ninth-century Sudanese Qurʾān. Some (rare) mention of the methods and proportions of ruling are made in Persian texts of the fifteenth century dedicated to calligraphy.

2.3.4. Ordering systems (FD–VSR)

Quire signatures (FD)

In Arabic Islamic manuscripts, the quire number is always found on the recto of the first leaf of the quire, in the upper margin, with a few exceptions. At an earlier date, the top, inner corner, near the stitching, seems to have been used, as witnessed in manuscripts dating from between 324 AH/936 CE and 582 AH/1186 CE. In other manuscripts, dated between 528 AH/1134 CE and 695 AH/1295 CE, the quire number occupies various positions in the upper margin. Starting in the eleventh century CE, quires were numbered in the outer corner of the upper margin, a position that became the norm by the second half of the twelfth century CE and was subsequently almost the only one used, despite a few exceptions, from the thirteenth century onwards. Early quire numbers used the *abǧad* system (Arabic letters with numerical values), which was employed until the late twelfth century CE. By the second half of the eleventh century CE, however, numbers were beginning to be spelled out in ordinal form—*al-awwal, al-ṯānī,* etc.—and that soon became the most common method; they are sometimes accompanied by the noun they implicitly qualify *al-kurrās* ('quire'), eventually abbreviated (but *ǧuzʾ* 'part' in Paris, BnF, Arabe 3841 (*FiMMOD* 147)). Numerals seem to have been used in a purely occasional manner in the eleventh and twelfth centuries CE; they then appear regularly, if not very frequently, in the thirteenth century. It should be noted that the *abǧad* system and the use of numerals appear more frequently in scientific texts than in religious ones. On the other hand, Qurʾān manuscripts apparently never include quire numbers. The numbering of quires seems to have been less common in the Maghreb than elsewhere: only one instance has been published, an undated manuscript produced in the fifteenth century; the numbers are given in *abǧad* form (Orsatti 1993, 310).

The number of the quire usually appears alone, but in several manuscripts produced between 544 AH/1149 CE and 691 AH/1292 CE, it is accompanied by the number of the bifolium within the quire, also placed in the top outer corner of the recto. Sometimes the number of the volume, or the name of the title or author of the work, might also be added (Vatican City, BAV, Vat. ar. 372 (*FiMMOD* 43), Paris, BnF, Arabe 3291 (*FiMMOD* 54), 4088 (*FiMMOD* 226) and 6883 (*FiMMOD* 260)). When quire numbers were spelled out, they might be written horizontally, diagonally downward or, more rarely, diagonally upward, sometimes following a virtual line from the corner of the written text to the corner of the leaf. Numbering thus became an artistic feature of the page. In at least one case (Paris, BnF, Arabe 820, 617 AH/1221 CE (*FiMMOD* 97)), the quire number is written vertically.

Whereas Karaite manuscripts in Arabic seem to follow the same rules as their Islamic counterparts (see for instance London, BL, Or. 2554, transcribed in Ramla in 345 AH/956–57 CE), the manuscripts produced by Coptic copyists sometimes—though not always—display special features from the standpoint of numbering. Some manuscripts have the quire numbers spelled out in Arabic letters, accompanied by foliation in Coptic numerals, both being placed at the top outer corner of the first verso of the quire (Déroche 2005, 93). Occasionally, though much more rarely, a manuscript will have only leaf numbers in Coptic numerals, or only quire numbers in Coptic numerals, or both leaf and quire numbers in Coptic numerals. The practice observed seems often related to the customary uses of the various communities where these manuscripts were produced.

Catchwords (FD)

Catchwords have turned up in two Islamic manuscripts copied in the latter half of the twelfth century (Paris, BnF, Arabe 6042 (*FiMMOD* 57) and Paris, BnF, Arabe 6440 (*FiMMOD* 171)), to which may be added—if it is the case that the catchwords are indeed in the hand of the copyist—a manuscript produced in 536 AH/1142 CE (Berlin, Staatsbibliothek, Sprenger 432 (*FiMMOD* 190)) and another, even older, dating from 404 AH/1014 CE (Leiden, UB, Or. 704 (*FiMMOD* 213)). By the second half of the thirteenth century CE, catchwords were relatively frequent, and in the first quarter of the fourteenth century CE over half the manuscripts employ them. In Maghrebi manuscripts, they appear in the second half of the fourteenth century CE. In the fifteenth century, a catchword on every leaf became the most common system, whereas those affecting only one part of the quire became increasingly rare.

The catchword is usually placed below the bottom line of the text (see fig. 1.2.1 for a Persian example), often written at a diagonal that almost always angles downward. In a few manuscripts from the

late fourteenth century CE, the catchwords run diagonally upward. A catchword might also be written horizontally, quite close to the last line of text, itself slightly raised to leave a space for the catchword within the frame of the written area. Horizontal catchwords close to the line of text seem to have been favoured by Maghrebi copyists, at least until the late fifteenth century CE. Catchwords were not usually subjected to special decorative treatment or ornamentation in Arabic manuscripts, except in rare cases in which they were overlined or accompanied by an inverted comma in red ink. In some manuscripts that do not have catchwords, the last word of the preceding verso is repeated on the following recto (a system sometimes called 'repeated words'), as notably found in Maghrebi codices of the fourteenth century CE. A variety of systems was used: catchwords on every verso, on the versos of the first four (in the case of a quinion) and last leaves of a quire, on the last verso.

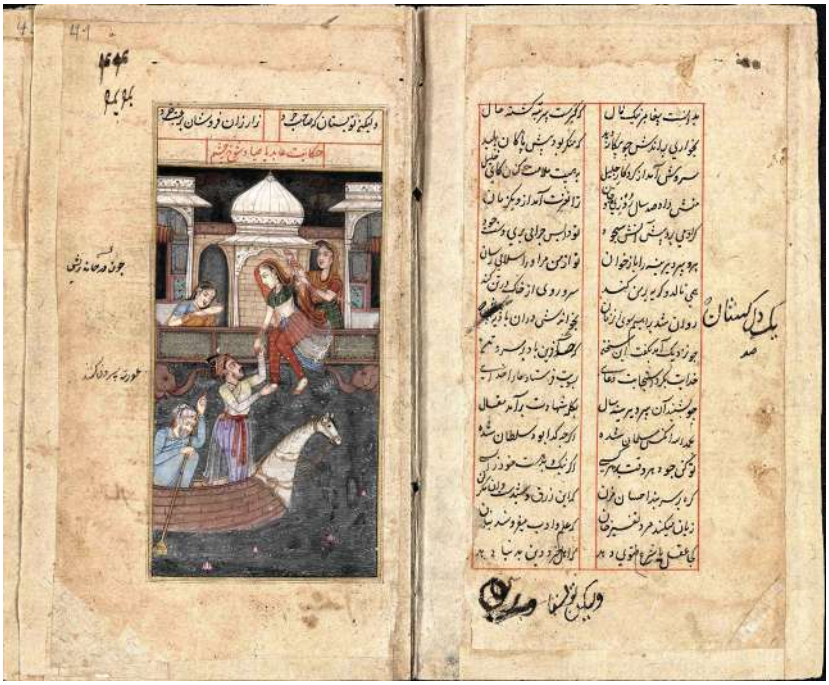

Fig. 1.2.1 Persian poetry by Abū ʿAbdallāh Mušarraf al-Dīn b. Muṣliḥ al-Dīn, known as Saʿdī (d.1292), paper, seventeenth century, Leipzig, UB, Cod. or. 325, ff. 40v–41r.

Foliation (VSR)

Original foliation in the hand of the copyist rarely appears in the earliest manuscripts; it is attested in *abǧad* in an exemplar of the tenth century CE. The foliation marks are found in the same place as the quire numbers, in the upper left corner of the rectos. That practice did not become widespread until the sixteenth century, although the lack of any systematic study on this matter precludes making such statements with confidence. In Arab-Christian manuscripts, foliation is attested from the fourteenth century CE, throughout by means of the Byzantine *rūmī* or the Western Arabic *ġubār* numerals.

Mid-quire notation (FD)

On opening the central bifolium of certain manuscripts, sometimes one finds notations placed in the top outer corner of the right-hand page, as well as in the bottom outer corner of the left-hand page, but also in the opposite direction: bottom outer corner on the right, top outer corner on the left. Sometimes only one of these notations is found, for instance in Karaite manuscripts in Arabic (for instance London, BL, Or. 2579). They were probably meant to indicate the central fold to the binder.

The *rūmī* numeral 5 appears in the earliest examples of the practice. This form of numeral in fact features regularly in Maghrebi manuscripts. In the Near East, on the other hand, from the fourteenth century onward the notation disappeared from manuscripts. Dashes are also found. Similarly, long bars were also used much later, for example in manuscripts copied or re-bound in India from the late seventeenth to the eighteenth centuries. Other marks have been used, although less frequently (dots, an oriental numeral 2 extended downward, *rūmī* numeral 4 in a Karaite manuscript, the letter *mîm*, groups of three dots, or small circles).

2.4. The layout of the page (VSR)

In Arab-Islamic manuscripts, the ruling pattern is the first and fundamental clue in revealing how the layout was structured. Though ruling is linked to the notion of justification, in Arabic manuscripts the writing does not always correspond exactly to the frame destined to contain the written text. While runover into the left margin is limited (pages are usually perfectly justified except in the case of poetic texts and some

Arab-Christian manuscripts), runover is frequent in the top and bottom margins. At the top of the page, scribes tended to write above or across the top line, so that the written area is generally taller than the ruled area. Text at the bottom of the page also tended to be written below the bottom line, although this phenomenon is less evident than is extension above top line.

Ruling patterns on parchment are rather varied; the progressive introduction of the *misṭara* led to a relative standardization of ruling types. Some copyists used the line as a central guide, that is, the letters were written so that they extend both above and below the line, while others placed the letters entirely above them. Ruled lines do not always occur, for example in the Maghreb, where only the two vertical bounding lines were ruled—and sometimes only one of them.

The absence of methodical studies of the layout of the text area in Arabic manuscripts explains the prevalence of aesthetic and numerological arguments. Empirical remarks related to texts with standardized layout such as Qurʾāns, Qurʾān commentaries, collections of religious traditions (*ḥadīṯ*) and bio-bibliographical works of different origins and dates may be the basis for discussing layout variables. The graphic performances of texts in Arabic characters, involving both canonical writing styles and common handwriting, constitute themselves the most essential framework within which any further layout purpose should be investigated.

If the analysis of the ruling allows us to understand the project of the copyist or painter of an Arab-Islamic manuscript, both the frame of a single page and that of an opening may provide an articulated space for complex layouts. Despite the abundance of literature on calligraphy and, to a lesser degree, on the miniaturist's art, only one Arabic text is known that supplies us with some information concerning the architecture of the page. The treatise on inks and colours by the Andalusian vizier and man of letters Abū Bakr Muḥammad ibn Muḥammad al-Qalalūsī (d.1308) is dedicated to the use of the *misṭara* and refers to justification and to the figure of the *šīḥa*, which divides the written area in two equal parts (the same term is used for one of the resulting halves; Déroche – Sagaria Rossi 2012, 125–127).

Since systematic research on the exploitation of the page is missing, local sources are again resources to turn to, as in the case of the calligrapher Sirāǧ Šīrāzī, who mentions among the artisan's tools the calamus for drawing the *ǧadwal*, which is the frame for the text area, and a *siṭār*, a ruler and a pair of compasses used to trace the *ǧadwal*; the principle was that the top margin should be wider than the bottom margin, so that the two margins would appear equal once the text had been written on the ruled lines (Porter [Y.] 2003).

As regards the analysis of the proportions of the written area, a certain number of volumes of different sizes offer similar height-to-width ratios depending on the regions where they were made, the period when they were made, and their support. Discussion of the proportions of the written area in Arabic-Islamic manuscripts has been mostly based on an aesthetic approach, relying on intuition and simplified description. Even the matter of the dimensions of the written area is yet to be investigated, in relation to geographical and chronological distribution, including the relationship of proportions and ratios with reference to specific kinds of texts (Déroche – Sagaria Rossi 2012, 128–136).

There is an evident correlation between the format (*qaṭʾ*) of the leaf and the ruling pattern. This quest for harmony can be found above all in *de luxe* volumes, where relatively simple geometric formulae were used for dividing the page. The decorative units and miniatures may also fill spaces defined by further formulae, whereby the role of the copyist in relation to the planning of the layout remains to be clarified.

At first, both the ruled area and the written area showed horizontal lines and nearly square format of page and text layout, such as the most ancient Qurʾāns and North African manuscripts. In the Maghreb, in particular, the written surface or the frame for a picture corresponds to a specific rectangle in which the height of the written area represents the side of an equilateral triangle and the width of the written area the triangle's height, so that the height-to-width proportion is between 1.13 and 1.17. This ratio is present in manuscripts copied between the twelfth and fourteenth centuries CE and above all in manuscripts with a square or almost square format. Later it became rarer, but still found in the fifteenth century, during which it was much favoured for the layout of small square prayer books.

Regarding the distribution of the text on the page, the earliest evidence—Qurʾāns with *ḥiǧāzī* script dated to the second half of the seventh century or the beginning of the eighth century CE—shows that copyists were inclined toward long lines and oblong horizontal justification, while they later switched from an oblong horizontal format to a vertical one (Déroche 2009). The preference for long lines was

maintained for non-Qurʾānic manuscripts, as is shown by the first dated copies from the ninth century. During the following period copyists usually remained faithful to this tradition. Attempts to analyse the density of the writing of prose texts have confirmed that the number of lines per page remains relatively constant, although variations and differences must be taken into account.

The lines of writing in prose manuscripts are horizontal. Poetry introduces an exception to the preference for long lines: because of its structure, and in particular because of the presence of rhyme, poetry lends itself to being marked in such a way as to highlight the recurring elements. The verses are often placed in two or more columns (figs. 1.2.2, 1.2.2), and they are readable all along the horizontal lines, that is to say, across the intercolumn(s). The use of a frame (*ǧadwal*) was introduced in Persian manuscripts to delimit the text area and to separate elements of the text (see figs. 1.2.1, 1.2.2); intercolumns and inner margins might be further separated by means of triangles or lozenges, above all in correspondence with the end of the poem (Orsatti 1989, 1997). Sometimes, even in Arab-Christian manuscripts, the text is divided into columns meant to be read vertically.

Fig. 1.2.2 Rome, Museo Nazionale di Arte Orientale, inv. 21368/31705r, Firdawsī, *Šāhnāma*, Persia, fifteenth century, four-columns poetical text with a central title panel.

When a second or third text occurs in the margin, it is interesting to see if the layout represents a forced adaptation using the small remaining space or if it is rather the result of a structured and well calibrated plan; the orientation of text written in the margins is generally oblique, regardless of whether or not the *miṣṭara* was used to create the ruling pattern. The effect created by the doubling of a text is also exploited in frames for Qurʾāns (Persia, seventeenth century CE), with text in Arabic in the centre and marginal comments in Persian, assuming the double function of separating texts and languages. During the ninth and the early tenth centuries CE, copyists sought to lighten the justification of small Qurʾāns: numerous examples have on a single line, often the one in the middle, only a few letters, with extremely extended connecting strokes. A similar process seems to be the one used at the beginning of the eleventh century CE by copyists of juridical manuscripts that have a part of the line left empty, without any element of text.

Copyists also resorted to graphic solutions for determining the layout for the writing on the line, exploiting the possibility of varying the writing mode and calligraphic style from line to line. This formula does not imply a hierarchy of the components, except in a few cases, where, however, the articulation of the text—titles, divisions—remains easily distinguishable. Another graphic expedient is the technique of *mašq*, the lengthening, more or less accentuated, of the base line that links the letters within a word; one or more lines on a page—the one in the middle, the first, and the last, or a combination of both—can contain a small number of letters, but with numerous and significant lengthenings (see figs. 1.2.2, 2.2.7).

The number of written lines is extremely variable, even when the copyist worked according to a ruling pattern. In one of the earliest ruled examples (Paris, BnF, Arabe 328a), the number of lines varies from 20 to 26 per page. In the course of time, odd numbers were usually preferred. The middle line can

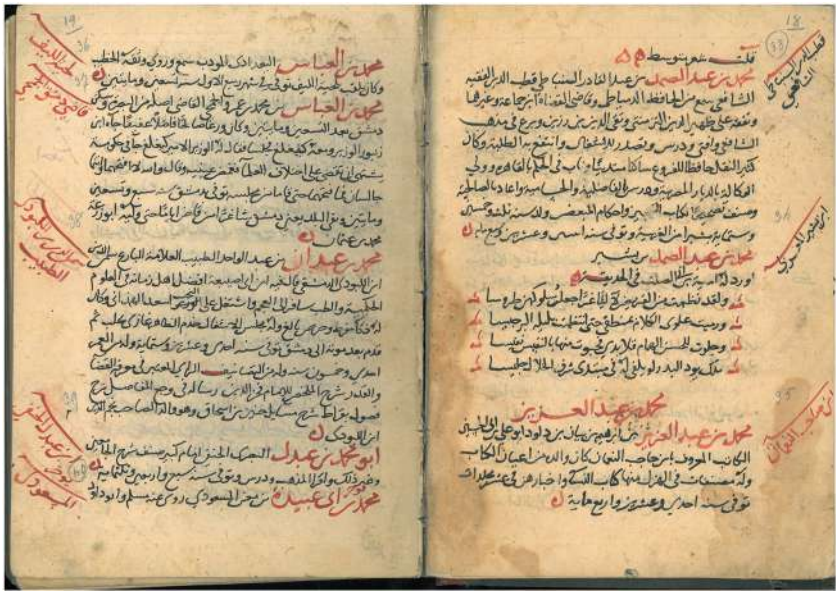

Fig. 1.2.3 Rome, Biblioteca dell'Accademia Nazionale dei Lincei e Corsiniana, Or. 5, Ṣafadī, *al-Wāfī bi-al-wafayāt*, Damascus, mid-fourteenth century, ff. 18v–19r: an Arabic bio-bibliographical dictionary with rubrication for entry titles and names.

also have its role in the *mise en page*. As for the margins, the earliest Qurʾāns show very narrow margins (cp. fig. 2.2.5), the reason for which remains obscure.

The layout of pages with tables, geometric drawings and diagrams, in red or other colours, occurring in manuscripts of scientific works of cosmography, geometry, medicine and pharmacopoeia, have not yet been methodically investigated. Analysing the proportions between the text area and the designed portions on the margins or within the ruled frame, the one not always related with the other, may unveil further exploitation of the page by the copyist toward a higher level of autonomy of both the written and the designed parts.

The Qurʾān, the sovereign example, is divided into several units of the same dimensions: starting from the classic subdivision in *ǧuzʾ* (one thirtieth), each in turn divided in *ḥizb* (one sixtieth), the copyists succeeded in defining 15-line pages, for a format close to 180 × 120 mm. With the exception of the first and last pages, the decoration was relatively standardized, from the placing of the text in a frame, to the cartouches with the titles of each Sūra and to the marks of division in the outer margins. Other very popular texts were subjected to analogous layouts. From the beginning of the fourteenth century, above all in Persia, numerous Qurʾāns have three lines per page with large writing, between which two pairs of lines of small writing appear, often in black, the bigger letters being in blue or gold. The particular dimensions of the page made it necessary to place the script within a circular or octagonal frame. Effects of mirror-image placement of the text, or of the same words, on two facing pages were sought with particular tenacity and find their most characteristic expression in later Ottoman Qurʾāns, in which entire sequences of text were laid out symmetrically. These combinations point out the role of the *mise en page* and the attempts carried out by copyists to rationalize the written area and the non-written area of a page (Déroche – Sagaria Rossi 2012, 132–136).

As for annotations, glosses and later comments added to a text, usually they were placed according to a reader's decision or need, although additions made by the copyist himself cannot always be excluded (fig. 1.2.3).

Subscriptions (colophons) are usually found inscribed in a triangular space at the end of the text. The formulae placed in a rectangle on two or more lines and separated from the text by an empty space or by a decorated divider are quite ancient (twelfth century). Later the colophon mostly took the shape of a circle or a lobed mandorla with rosettes.

2.5. Text structure and readability (VSR–AVN)

2.5.1. Writing (VSR)

The *mise en texte* (text layout), at times adopted for practical rather than aesthetic reasons, may vary according to period, regional customs or text genre. Compact and homogeneous text layout, with continuous word flow, is very common, for example in Arab-Islamic prose from the formative and classical periods (ninth to fourteenth centuries CE), while a more precise and articulate textuality is found in the centuries that follow, when the need to trace and highlight parts of the text (chapters, headings, names, words) stimulated the copyist to elaborate more effective reference systems. Among the most common patterns

connected to genre and content are the separation of verses into several columns or, within a prose text, the insertion of schemes and diagrams, in a centred position or indented, into scientific texts, and the highlighting in red of proper names, letters, or key words in historical biographies and in Islamic religious texts (Déroche – Sagaria Rossi 2012, 191–204).

The copies of the same work generally show similar layout, even if examples with fully identical textual patterns are rare. Even incomplete copies reveal the stages in elaboration of the layout and the distribution of the sections of the work or its parts; for example, in Persian manuscripts, the *ǧadwal* frame pre-determins the length of the written lines (see fig. 1.2.1), producing a pattern that is more rigid and less subject to significant variations, as is shown by spaces, lines and columns left blank.

The title page, whether accompanied by the author's name or not, is usually found on the recto of the first page of the text. The title can also appear on the top or bottom margin, on the flap of the binding, on a tag glued to the front cover, or perhaps in the colophon, sometimes together with the name of the commissioner. From an early period, the title of a work might be indicated quite briefly, particularly for works that were frequently copied, but in many classical works the titles are very detailed and elaborate, in large characters, without decoration. In the most routinely produced works, also without decoration, we find a variety of scripts, sizes of characters, and layouts for the title and author's name, the former in a more prominent position than the latter; placing the elements in a sort of upside down pyramid was a rather widespread practice in later periods; the title might also be found above a circle, painted in several colours, where the name of the author was written. It is not always found on the recto, but might occur on the verso of the first page, in a composition that frames and contains the beginning of the text, as in the case of the illuminated title that introduces the text, *ʿunwān*, most frequent in Persian manuscripts. In this frame, sometimes repeated and placed symmetrically on the facing page, the title is inserted either in its complete form or abbreviated, either with or without the author's name, in some cases containing a pious formula, often the *basmala*, which is the introductory verse of each Qurʾānic Sūra and of every text of the Arab-Islamic tradition.

In Qurʾānic manuscripts there is no real title page; a quotation from the holy text or, in the case of multi-volume Qurʾāns, the indication of the number of the volume may appear on the recto of the first page. In the earliest period, the first page did not have decoration on the recto, while the verso of the first and the recto of the second pages constitute a diptych occupied, in the most refined works, by geometrical or floral ornamentation; the text starts on the following page, without any introduction.

In the most refined examples, the decoration of the front page may also include a framed table of contents. In specimens containing Arabic prose texts, generally more sober in the division of the presentation elements, this item takes a more detailed and functional form, though attention is paid to proportions and visual impact.

The canonical beginning of every text, placed generally on the verso of the first page, is the propitiatory *basmala* formula and the doxological *ḥamdala* (praise to God). The temporal adverb *baʿdu* (after) or *ammā baʿdu* (as to, after), generally marks the beginning of the prologue and may be highlighted by thicker strokes or larger-sized letters, in black or red; it may introduce a more or less detailed preface, with justification of the choice of the subject, dedication, abbreviations of authors and cited works, title of the work and, sometimes, a brief list of the contents. Eulogies of various types fill and conclude the preface.

The practice of subdividing the text is very ancient and is already found in the first Qurʾāns, where the main sections of the text were separated by an empty space, originally corresponding to a line. Later this space was occupied by a panel of a basic shape, decorated with vegetal or geometric motifs, presumably inspired by architectonic or textile designs. At the end of the Umayyad epoch headings for Sūra were introduced into this space (fig. 1.2.2).

The terms *kitāb* 'book', *faṣl* 'section', *maqāla* 'treatise', *bāb* 'chapter', *ǧuzʾ* 'part', *qism* 'section', *sifr* 'book', in the manuscripts of the Old Testament, *maṭlab* 'question, inquiry', *maqṣad* 'objective, purpose'—also accompanied by numbers—indicate chapters, paragraphs and internal divisions; often marked in red, they are sometimes highlighted by overlinings in black or red. The size of these sections is variable and does not always interact in a significant way with the structure of the *mise en texte*. Interpolated clauses, explanations and digressions of various types, are often incorporated in the body of the text and, at most, introduced at specific points by terms such as *bayān*, or *tibyān* 'explanation', *taḏkira* 'retrieval', *fāʾida* 'information', *išāra laṭīfa* 'small reference', *mabḥaṯ šarīf* 'noble examination', and others. Chap-

ter headings in prestigious manuscripts are written in a style different from the text, as in the case of the Qurʾāns from the eighth and ninth centuries CE with titles of the Sūra in *ṯuluṯ* within illuminated frames.

The poetic sections are centred with reference to the written panel and the two hemistichs set slightly apart; in Persian manuscripts, the column layout makes the poems immediately recognizable (see fig. 1.2.1). Starting from the fourteenth century CE, Persian copyists sometimes placed sayings and verses about their work and the text copied by the calligrapher around, before or after the section dedicated to the colophon.

The end of the text copied cannot be recognized by any particular concluding formulae or graphic artifice; it is simply announced by *tamma al-kitāb* or *intahā al-kitāb* ('the text is finished') or merged into the graphic space dedicated to the colophon, which follows separated by a space in the classical period; in later periods, from the fourteenth and fifteenth centuries onward, it may become part of the elaborate colophon.

Among the aesthetic effects, there is the alternation of passages in different colours, and of styles of writing in numerous Qurʾāns. This practice does not correspond to any hierarchy, and its only aim is to enliven the overall presentation of the text. The earliest decorations are found in the outer (but also lower) margins of the Qurʾāns, so that they stand out better and carry out their function as highlighting in a more satisfactory way. In the later classical period, decorators and miniaturists used these non-written spaces to give their fancy free rein, as is shown in particular in the technique of framing the page.

2.5.2. Decoration (AVN)

According to Muslim belief, the Qurʾān and works of Islamic science cannot be decorated or illustrated with representations of human beings or animals, and so decorators and painters of religious manuscripts developed aniconic ornamentation (*taḏhīb* in Arabic, *tezhip* in Turkish). It is based on three components: geometry (*tasṭīr*), stylized vegetal motifs with arabesque (*tawrīq*), and epigraphy. Figural decoration was confined to profane manuscripts, which were very limited in the Arabic tradition, more important in the Persian, Turkish and Indian traditions (see fig. 1.2.1).

Since the first century of Islam, painted decoration was added to the Qurʾānic manuscripts. Many illuminated copies were produced at the end of the eighth and during the ninth centuries, but aside from minor stylistic variations according to times and places, the basic ornamental repertory of the Qurʾān became standardized rather quickly. Secular manuscripts also developed complex programmes of decoration, very few in the Arabic copies, flourishing in the Iranian, Turkish and Indian ones.

Some decorative elements are found in the scribal tradition, but the main use of ornamentation, beyond the embellishment of the book, is to indicate to the reader the different parts of the text, for the Qurʾān and also for religious or profane texts. Decorative elements are found at the beginning and at the end of text units and mark divisions within the text (see fig. 1.2.2).

The text is usually written in black ink, and as the Arabic script does not know capitalization, or punctuation, and ignores paragraphing, the copyist uses bold characters and rubrics to highlight the keywords or the articulations of the text, in red or gold and, for the western Islamic tradition, in coloured inks. These practices have served to bring out the signs particularly in order to avoid difficulties in reading. In Abbasid Qurʾāns, coloured dots, above and below the letters, were the first way to differentiate short vowels (see fig. 2.2.6). This use of colour for vowels and orthoepic signs has continued in the western tradition in a decorative way for *de luxe* Qurʾāns (see fig. 2.2.7). Chrysography and writing in silver has appeared in sumptuous Qurʾāns and other luxury copies. Calligraphy can also be considered as a mode of decoration since the copyist used different styles and sizes of writing to differentiate textual parts.

In Qurʾānic manuscripts, the frontispiece is a decorated, often illuminated page or a double page preceding the main text at the beginning of a volume or a section of it. From the late eighth to the tenth centuries, some horizontal-format volumes open with a full-page rectangular decoration of the same dimension as the written area, with vignettes protruding into the margin. Decoration is governed by geometric principles, largely inspired by the practices of the Late Antiquity, and incorporates also vegetal elements. For a short time at the end of the Umayyad period, architectural patterns occur, for example in a manuscript discovered in Sanaa with a frontispiece depicting a mosque (Sanaa, DAM, 20-33.1; cf. von Bothmer 1995). From the eleventh to the sixteenth centuries, the frontispiece is often a double-page carpet, each page being the mirror-image of the other, sometimes followed by other double pages. These pages are generally built as a composition of geometrical figures radiating from a central point and filled

with arabesques. After the sixteenth century, the double carpet page often becomes ornamented with two medallions (*šamsa*) facing each other. With or without a decorated frontispiece, the Qurʾānic text necessarily begins at the first opening of the volume and is often arranged within a frame. Frequently, two headings, one above and one below the text, indicate the number of the volume and/or contain quotations from the Qurʾān. The first Sūra is more often on a verso and the second on the facing recto. The text is often written in 'cloudbands', a motif that came from China. The end of the Qurʾān is less decorated than the beginning. Full-page decorations may recall those of the initial pages.

In the earliest Qurʾāns, the Sūras are separated by a blank space, sometimes filled by a band with a simple geometric design, sometimes in coloured ink. Afterwards, the Sūra headings are written in gold or enclosed in a framed band with a palmette or medallion in the margin, or still later in a band containing a cartouche. The inscription gives the name of the Sūra, generally the number of verses (*āyā)* and the place of revelation.

Inside the Sūra, rosettes separate the verses; in the text or in the outer margin, groups of five or ten verses are indicated by other decorative elements, circles or medallions with the mention of the verse account written in letters (*ḫams* or *ʿašr*). The letter *hāʾ* is also used for the groups of five verses. Divisions of the Qurʾān into thirty sections (*ǧuzʾ*) of equal length, subdivided in halves (*ḥizb*) and quarters for devotional reading, are marked in the outer margin by ornaments shaped as circular medallions. The mention of ritual prostration (*sağda*) in the margin does not have a standard form.

In non-Qurʾānic manuscripts, the text also usually begins on the verso of the first leaf, the recto being left blank. However, in precious copies, a decorated title page opens the book, on a recto. Taking the shape of rectangular, square or circular ornament, it contains the title of the book, the name(s) of the author(s) and the commissioning patron. It may be followed, in the most elaborate manuscripts, particularly in Persian ones, by several leaves with decorations and/or illuminations occupying the whole page, generally in rectangular form, very similar to those of Qurʾāns.

The text often begins with a decorated headpiece preceding the *incipit* in the upper part of the page. Executed in a variety of shapes and sizes, it is designated by the terms *ʿunwān* and *sarlowḥ*, used by different specialists with different meaning. In Ottoman Turkish manuscripts, it takes the shape of an arch (see fig. 1.2.4). Introducing the different sections of the manuscript, illuminated bands appear in the Persian literary classics, Firdawsī's *Šāhnāma* (fig. 1.2.2) or Niẓāmī's *Ḫamsa*, and in poetic anthologies for each book or poem, with smaller-size headings for smaller units. In poetic works, each verse (*bayt*) or hemistich (*miṣraʿ*) is distinguished from prose by verse markers. Verses are written in columns whose layout is ordered by frames (*ǧadwal*). Bands, decorated or plain, separate the text from the margins horizontally, vertically or even diagonally. At the end of the volumes, colophons, which are found in various forms and sizes are sometimes decorated.

Other parts of the manuscripts are also decorated. Frames, composed of one or several gilt or coloured fillets, are present in early Qurʾāns and secular manuscripts. Rarely, glosses on the outer margins can form various geometrical shapes or vegetal and architectural

Fig. 1.2.4 Leiden, Leiden University Library, Or. 11051, sixteenth century, *Šarḥ-i Dīwān-i Ḥāfiẓ*, the Ottoman Turkish commentary by Muṣliḥ al-Dīn Muṣṭafā b. Šaʿbān 'Surūrī' (d. 969 AH/1562 CE), on the *Dīwān* of Ḥāfiẓ Šīrāzī (d. 792 AH), ff. 1v-2r, photograph by KS.

patterns. Developed in Ottoman Arabic manuscripts in the sixteenth century and more frequent in some later Persian copies, this layout seems to bear a relationship to Hebrew or Byzantine traditions (Vernay-Nouri 2002). In high-quality Persian, Turkish and Mughal manuscripts, margins are ornamented with gold arabesques and animal figures, probably made with stencils. Also in precious copies, additional decorative panels are inserted, after the fifteenth century, in the text area, which harmonize the decorative programme. Coloured and decorated papers (marbled, gold-sprinkled and gold-scattered) are used in part of the manuscript or in its entirety.

The first decorations in Arabic manuscripts are derived from the Greek tradition and deal with science: diagrams, constellation charts, maps, drawings and paintings of medical or technical instruments, pictures of plants or animals, and even sometimes narrative paintings illustrate the text precisely, facilitating a better understanding of it. In the few illustrated literary works, principally al-Ḥarīrī's *Maqāmāt* and *Kalīla wa Dimna*, pictures depict scenes from the narrative.

During the thirteenth and fourteenth centuries, miniatures are rarely framed. They can be as wide as the text area but never as high, placed close to the illustrated passage. The final choice of the place depends on the choice of the scribe and of the painter. The captions are often written in red above the pictures. In some works, like the Dioscorides or the *Maqāmāt*, the manuscript begins with one or several full-page portraits of the author or the commissioning patron, depicted against a coloured background. The background of the other miniatures is blank. Arabic painted manuscripts rarely contain illuminations as well. Written in 1199 CE, the *Book of the Theriac* (*Kitāb al-Diryāq*, Paris, BnF, Arabe 2964) is a rare example of a precious manuscript featuring an elaborate layout with framed paintings, calligraphy and illuminations.

After the fourteenth century, many changes occur in the Persian area. Many poetic works, like those of Firdawsī and Niẓāmī, or historical chronicles are illustrated, often having been produced for a courtly readership. In the *de luxe* manuscripts, miniatures are part of a programme which often includes illuminated elements, calligraphy, ornamented papers or decorated bookbindings. Painted with a coloured background, the pictures are generally inserted in a rectangular frame which may also include portions of text (fig. 1.2.1). In more sophisticated layouts, some pictorial elements cross the frame into the margins. Full-page miniatures do not have a special place in the book, but some princely manuscripts begin with a double dedicatory painting with no relation to the main text.

Unfinished Arabic illustrated manuscripts give us some information about the manufacturing of the miniatures. The scribe first copies the text leaving blanks for the paintings, sometimes with captions. On completion, the painter (or the copyist himself) sketches each image roughly with a red outline. Such outlines—visible under many miniatures or in unfinished ones, such as the *Maqāmāt* (London, BL, Add. 7293)—do not always precisely coincide with the final painting (George 2012). Then the painter applies the gold and adds other colours, completing details such as faces, hands or vegetation. Used for duplicating the decorative patterns or elements of miniatures in Persian and Indian workshops, stencils were already used in the Mamluk period. Decoration and illustrations of Persian and Ottoman *de luxe* manuscripts, which were copied in princely or commercial workshops, implies a significant division of labour between the artists and their assistants and apprentices.

2.6. The scribe, the painter and the illuminator at work (VSR)

2.6.1. Persons, places and methods

Despite the fact that Arabic, Persian and Turkish literature is rich in descriptions of libraries, collectors and personalities linked to books, references to the methods of copying texts are, with the exception of the Qurʾāns, desultory, casual and fragmentary (Déroche – Sagaria Rossi 2012, 137–144).

The period spanning the Umayyad and the early Abbasid dynasties saw the growing importance of the role of copyists in culture and society. Tenth-century Baghdad is one of the rare cities for which sources about bookshops and workshops for the manufacture and sale of books abound. The job of the copyist—not an exclusive prerogative of men—underwent fluctuations and changes, from the phase of the establishment of the Arabic script to the late Middle Ages, along with the constant interference of oral transmission, a subsequent move toward writing, and the eventual establishment and fixation of the canons of textual transmission.

Colophons are generally synthetic, and it is not always easy to discover the identity of the copyist, except when the name is given, and the person—an author, a doctor, a scholar—is known from other

sources. In the absence of a catalogue of dated manuscripts and of repertoires of names of copyists, the production work is still to be precisely investigated. In the eyes of the copyist, details concerning the antigraph were sometimes relevant and are mentioned in the colophon, though this simple statement was the only guarantee of accuracy.

Certainly most copyists (*nassāḫ*, singular *nāsiḫ*) did not earn a living only from transcribing texts; in fact this was only one of the elements in the transmission of knowledge, as is shown by the certificates authorizing text transmission (*iǧāza*) that are found in manuscripts in many cases. The mastery of the calligraphic art was a common goal of the education of each Muslim endowed with basic culture, and it is possible to encounter both finely written copies, carried out for one's own use or for an acquaintance, or others of mediocre execution. The category of calligraphers is separate from that of copyists and, at the same time, difficult to identify and distinguish. In fact, many colophons of ancient manuscripts contain the names of copyists or calligraphers, who do not define themselves as such. In some cases, instead, they explicitly define themselves as *ḫaṭṭāṭ* 'calligrapher'. Starting at a certain point in the seventeenth or eighteenth century, in the Ottoman world, specialized works about these individuals and the system of teaching, based on that of the religious sciences, introduced the *iǧāza* for calligraphers. Thus it seems suitable to integrate the calligraphers into the vast panorama of the professional copyists (Déroche – Sagaria Rossi 2012, 139–142).

Soon the *warrāq*—from *waraq* 'paper'—came on the scene, a figure to whom it is difficult to assign a precise role. He is defined as an artisan of the book, bookseller and stationer all at the same time, a sort of modern publisher who produced and sold books, and occasionally also worked as a copyist. Thus in the crafts related to the book, the rule seems to be a certain degree of versatility in assuming functions and roles (Pedersen 1984, 43), and it is hard to distinguish between the establishment of textual canons and the application of copying practices, as the two processes, intellectual and physical, overlap (Déroche – Sagaria Rossi 2012, 140–144). It is not clear if the copyists who defined themselves as *nassāḫ* had more specific functions than the *warrāq* or if their products were intended for a more modest kind of customer. Much later, at the beginning of the seventeenth century, we find the *warrāq* in Central Asia carrying on their business in the bazaars.

Colophons and *iǧāza* certificates are also sources of information for other professionals more or less occasionally engaged in the transcription of texts, intended to guarantee the quality of their products.

The *kātib* was a secretary of the chancellery or administration, who might also copy texts, although his tasks in this context are not always clear. *Kuttāb* did not work as regular copyists in important centres, nor were they in contact with princes. Actually, when the chancelleries offered them the possibility of carrying out their work at court, these figures ended by giving up their service as independent professionals, in favour of the administration of the court library. Scholars and students also acted as copyists, both to earn money and to enhance their studies, a combination of interests that made a notable number of texts available to them and was a factor in the process of transmitting knowledge. The final appearance of the manuscripts could vary considerably. A transcription for a third person demanded a certain level of readability, while an entirely different level of care was needed when the copy was only for oneself, and the scribe also worked as a binder. Some exterior criteria, like the layout, may supply relevant information. Amateurs could also become copyists, as happened in the production of Qurʾāns or of works for charity.

Copyists attribute many derogatory adjectives and titles to themselves, intended to indicate their unworthiness. In the Arab-Christian environment, the copyist is called *nāqil* 'he who transports, transcribes', *kātib* 'he who writes', *nāsiḫ* 'he who copies' or *rāqim* 'he who writes, recounts'. In these cases, colophons may bear no reference to the transmission or to the collation with the original. Christian manuscript production, which appears towards the middle of the tenth century CE, descends from three traditions, the Greek used by the Melkites, the Coptic used by the Miaphysite Egyptians, and the Syriac used by the Maronites—these with strongly Arabized literature—and the Jacobite Syrians and the Nestorians, these latter only weakly Arabized.

Our most complete information comes from careful and refined examples, rather than from products made for the mass market. The more important patrons had their own workshops, where artists, with their assistants and apprentices, worked under the supervision of one or more masters. This is how many Ottoman sultans had luxury copies of manuscripts produced, and the documents preserved in the archives of Istanbul supply details of the sums paid and the parties involved. At the height of its splendour, in the sixteenth and seventeenth centuries, the imperial atelier employed numerous specialized artisans in

activities such as ruling, the design of the margin, the design of the writing panel, and gilding motifs and arabesques. Workshops were usually rather modest in size and produced works that often reached high levels of execution. The styles of the miniatures produced in Shiraz in the Safavid period, for example, enjoyed wide favour and had an obvious influence on Indian artists and those of other regions. As mentioned already, copyists, including those who copied manuscripts for their own personal use, could also be responsible for less ambitious miniatures.

Painters and decorators did not usually sign their work, and we still know very little about the conditions of their work. Were it not for a few Persian drawings and illustrations of tools and the working environment, it would be hard to imagine any technique related to the profession. They generally worked seated, legs crossed, with the written sheet on their right thigh, the angle between the upper body and the legs varying depending on the region or the epoch. The Persian and Ottoman miniatures show copyists seated in front of rather low pieces of furniture, tables or chests, on which their tools were set up (Baer 1998). It is more difficult to discover how they held the calamus, a piece of information that has been overlooked in the studies, but which is extremely important for understanding the execution of some letters and marks.

The place where scribes and painters worked is rarely mentioned in early manuscripts and written sources. Colophons rarely mention the city, and even more rarely the exact place where the work was carried out.

Certainly real workshops, of differing size, were active in Umayyad Spain, where women may also have been active as scribes; others were created under the direct orders of the bibliophile princes. One famous representative of this category was the Timurid Sultan Baysonqor (d.1433), who gathered at his court in Herat the most illustrious illuminators, painters and calligraphers. In Constantinople, in the area around the royal palace, the artisans of the book were allocated structures which guaranteed their livelihoods. From the middle of the sixteenth century, we find the image of a house transformed into and used as a family workshop, integrated with the domestic functions and highly specialized; probably this activity did not seem to require a specific environment, but a room or cell was sufficient, and it is probable also that in the big cities most of the booksellers dwelt in the same areas where the copyists' activities are attested too.

Libraries and the centres of institutionalized teaching were privileged places for scribal activity. The Bayt al-ḥikma in Baghdad (tenth century), with its one or more copyists, can be taken as emblematic. The library of the Dār al-ḥikma of Cairo, the library of the Fatimids, made its holdings available to those who wanted to transcribe texts. In Rabat in Morocco, the Royal Library of the Alaouites—at present, the National Library—had in the eighteenth century a room reserved for copying and copyists were recruited for the transcription of precious manuscripts. In large Middle Eastern libraries the professionals of the pen, until very recent times, offered their services to the erudite, but the status of this category of professionals and the identity of their patrons still have to be defined. In the eastern part of the Islamic world, the library of the prince (*kitābḫāna*) tended to be associated with an atelier of this type, which functioned in symbiosis with the library itself, and in which luxury manuscripts were produced. From Timurid Persia the model was later exported to Mughal India (sixteenth and seventeenth centuries). The institutions dedicated to the transmission of knowledge appear, instead, well represented in the colophons. Many were the copyists who plied their trade within a *madrasa*. The examples are numerous and extend throughout the Islamized world. Another place which was frequently used was the mosque, but also: *zāwiya*, *mazār*, *ḫānqāh* or more generally *ḥuğra.* The Rab-i Rašīdī Foundation east of Tabriz, established in 1300 by the Ilkhanid Vizier Rašīd al-Dīn Hamaḏānī, offers a noteworthy example of the organization and planning of the work: a library kept the original manuscripts and the finished copies were exhibited in the mosque within the same academic complex. Other less conventional situations are mentioned in colophons in both earlier and later periods (Déroche – Sagaria Rossi 2012, 144–149).

2.6.2. Colophons

In the Arab-Islamic manuscript tradition, information about the copying (date, place, copyist) was considered to be the seal of a unit of reading that might also coincide with a unit of coherent text, if it was a unitary entity, not separated in *aǧzāʾ* (plural of *ǧuzʾ* 'part'). In the absence of repertories of formulations subdivided by place and date, of systematic surveys taken from homogeneous collections and of studies of their content, a preliminary assessment so far has been a sample comparison of evidence representing various centuries, areas and typologies (Şeşen 1997).

In the Qurʾāns and in the many other multi-volume works, the choice to proceed by separate units, each corresponding to an autonomous item (*ǧuzʾ*, or *muǧallada* 'volume'), seems to have been dictated by needs of convenience to facilitate consultation or by the necessity of managing an abundant mass of text. For this reason, it is not an anomaly to find within the same volume sequences of information of the ends of copies, with the function of indicating the end of each *ǧuzʾ*. At any rate, what is placed in this space is variable in its manifestations and in its contents and does not constitute a constant, above all in Arabic examples, which often do not have this informative area, unlike Persian and Turkish volumes, which usually do have it. This tendency takes on a more disciplined aspect later, in the eighteenth and nineteenth centuries, when we find that colophons containing all the canonical information rapidly become widespread.

Colophons are usually found at the end of the text, or of a certain portion of it, though in some examples they are placed at the beginning. There is also a graphical and textual continuity between this section and the text itself, so that the real end of the text sometimes cannot be perceived. At times there is a line after the last line of the text, separating it from the block of information concerning the copying: in these cases, the lines of the colophon are still justified, yet shorter than those of the text, or they can take peculiar shapes (like a triangle or an inverted trapezoid); rectangular frames of variable width placed in sequence constitute other variants and were chronologically the first to appear. Starting from the fourteenth century, we also find the practice of inscribing colophons within a circle, or in geometric figures with more complex outlines. Decorated subscriptions like those found in some Qurʾāns are extremely carefully done in refined frames illuminated in gold.

Not infrequently the copyist adopted a distinctive graphic style, even only for a few lines, as occurs in particular in Qurʾān manuscripts; he might also write a series of letters, the م *mīm*, the abbreviation of *tamma* 'it is terminated', or the ه *hāʾ*, for *intahā* 'it is finished', often disposed in a triangular shape. In some initial formulae, such as *tamma al-kitāb* 'the book is finished', some of the internal letters can appear elongated. Colophons that are more or less capably counterfeited or modified, whether partially or completely, are not uncommon.

As to the contents of the subscription formulae, date, location and name of the copyist are, when indicated, an integrated communication, within which it is not always easy to establish the demarcation between information related to the exemplar, to the transmission, and to the collation of the copy itself. The introduction of the dating, placed at the end of the manuscript, strengthened the importance of chronology in the Islamic tradition. Generally drawn up in the third person, the wording is often extremely concise and limited to essentials, above all in the eighth and ninth centuries CE, and appears without any regularity. Over the following centuries, a marked propensity for more literary constructions developed, and new elements are found integrated in the stratification of the information relative to the collation and the editorial activity of the copyist. Starting from the thirteenth century, the date of the copy is more regularly expressed, together with the mention of the models and of the list of persons who collaborated on the collation of the text.

Formulations at the end of Persian copies appear in the twelfth century and in Turkish starting from the fourteenth century CE. The name of the copyist does not appear systematically, above all in the case of the lapidary formulations that give only the year of the copy. When, instead, a scribe reveals his name it may only be as an *ism*, the initial segment of the Arabic name, or perhaps the entire genealogical list, with appellatives and nicknames; the same copyist could use more or less complete versions of his name in different manuscripts. This is followed by indications of the means used, the hand or the calamus. It would be wrong to overlook the role of the formulae of benediction and various recurring statements.

The place of the copy is mentioned less often, often in a vague and unspecific way; only rarely is the exact location of the copying revealed.

The patron is often named in the subscription, above all when he is a person of a more modest class, while the name of an important person is generally found at the beginning of the work.

Compared with Arab-Islamic manuscripts, Arab-Christian colophons are composed of fully developed formulae, regular in their recording of dates and methodical in their presentation. The terms used are the same as those found in Arab-Islamic manuscripts. Almost all the examples have a declaration of the end of the copying and the date, accompanied by several elements: the day of the week, the time of day, the day of the month generally expressed in figures, the month according to its Coptic, Syriac or Arabic name, the year indicated according to the Era of the Martyrs, the Era of the World, the Era of Alexander, the Hegira or the Christian Era. The copyist is always declared, but his name is not revealed with the same regular-

ity; beside his self-assumed derogatory attributes—unworthy, servant, humble, sinner and miserable—he also introduces self-denigrating expressions. The collation of the original text is neither a usual practice nor a constructive element of these colophons. The precise place where the copying was done is less often given; it might be a city, a monastery or a church. The person who was to receive the codex is occasionally mentioned. At the end of the colophon we can find two types of request from the copyist to the reader: a supplication that the scribe be pardoned for his sins, so that he could enter the Heavenly Jerusalem, and that the reader correct the errors and lapses that he will encounter while reading the copy (Troupeau 1997). More prolix formulations are intended to obtain the reader's favour: they differ from those found in mediaeval Arab-Islamic manuscripts, which were non-standardized, sober, synthetic and essential.

2.6.3. Dating systems

The date of copying is not mentioned in a significant portion of Arabic manuscripts. There might be the simple mention of the year without any indication of the day or month, indicated according to the Hegira, which started on 1 *Muḥarram,* corresponding to 16 July 622 CE. As the calendar based on the Hegira is lunar in type, it is necessary to convert the dates to the Gregorian calendar. The term *sana* 'year', more rarely *ʿāmm* 'year', precedes the date which is usually expressed in letters, but there are examples in which it is indicated in *abǧad* and in numbers, which, however, is a later practice. It is not unusual to encounter a mention of the lunar month of the Islamic calendar.

The date may be also expressed alphanumerically or as a chronogram, based on the sum of the numeric values of the *abǧad* letters. This consists in a brief enunciation, introduced by *taʾrīḫ* 'date', *sana* or *ʿāmm*, *fī* 'in', and followed by a graphic association of letters, in red or overlined in black or red. This system first appears in prose texts, but above all in poetry, where it can constitute the hemistich of a eulogy in celebration of an event. This way of proceeding is found mainly in Persian and Turkish manuscripts starting in the fifteenth century; it enjoyed considerable favour in the Ottoman area, but it was also used in western areas, in particular in Morocco, where from the sixteenth century it was used to date inscriptions, documents and manuscripts; in later periods, chronograms are also found with a sub-Saharan African provenance. The date is more rarely expressed in fractions, found in Arabic and Turkish manuscripts; though this method is generally attributed to Aḥmad b. Kamāl Pāšā (d.1533), it already existed in the first half of the fourteenth century. The year is divided into two halves, which are then divided into sixths, corresponding to months, divided into three ten-day periods; the dates of either the editing or the copy may be expressed in fractions.

In parallel, other dating systems based on traditional divisions of the solar year could be used in non-Muslim contexts. As the Julian calendar was known, the eastern Melkite community referred to the Era of the World, beginning on 1 September 5509 BCE. The Coptic Christians in Egypt usually referred to the Era of the Martyrs, or Era of Diocletian, which started on 29 August 284. The Era of Alexander, or of the Seleucids, or Greek Era started on 1 October 312 BCE. The Era of Yazdigird was in use in the Iranian world. This was named after the Sassanid king Yazdigird III (reigned 632–642) and began on 16 June 632 CE. It was then adopted by Malikšāh who established the *ǧalālī* or *malikī* era—from the name of the third Seljuk sultan Ǧalāl al-Dawla Malikšāh (reigned 1072–1092)—that started on 15 March 1079. An example of Ptolemy's *Almagest* commented by the astronomer Naṣīr al-Dīn al-Ṭūsī (d.1274) has four parallel dates: according to the Hegira it was 1076, the Era of Alexander 1976, the *ǧalālī* era 587, the Era of Yazdigird 1034, corresponding to 1664 or 1665 CE. However, the concordance among the several dating systems was not always exact. In Mughal India, the *ilāhī* era was established in 1584 by the Emperor Akbar (reigned 1556–1605). It was commonly used to date inventory notes. The practice of dating based on regnal years of sovereigns is encountered above all in manuscripts coming from Persia or India. In al-Andalus, the Spanish Era, *tāʾrīḫ al-ṣufr*, began in 38 BCE (Déroche – Sagaria Rossi 2012, 206–215).

2.6.4. Duration of copying

The rapidity of executing a copy of an Arabic text is information that was recorded quite early in the history of Arabic manuscripts and was used as a criterion for evaluating the quality of the copy: this criterion seems to have enjoyed a certain reputation in the eyes of mediaeval authors, such as the aforementioned Ibn Bādīs, who explains that ancient writings are related to the speed of execution. Sometimes the copyist indicates the time spent in accomplishing the copying of a text, specifying the beginning and the end of his work. In the great majority of cases, the transcription was a solitary exercise, but from the beginning there were cases of manuscripts copied by more than one person, as is the case of some fragments of two very

ancient Qurʾāns, both attributed to the second half of the seventh century CE, regardless of any homogenization of the styles adopted. Later manuscripts made for ordinary use were also transcribed collectively by several scribes. Nevertheless, a variation in writing, in particular at the end of a work, is not certain evidence that there was a change of copyist (Déroche – Sagaria Rossi 2012, 149–155).

In the case of copying in two or several *aǧzāʾ* ('parts'), the work was carried out in stages requiring a few days, some weeks, or even longer, the one part being executed independently from the other. It was a usual practice to circulate large portions of many multi-volume works (Humbert 1997). Unfortunately, we do not have any systematic study of the length of time required for copying, nor have the works with several intermediary colophons been sufficiently examined.

2.7. Bookbinding (FD)

Leatherworking was widely practised throughout the Islamic world. The commonest skins were goat, though sheep and calf were also employed. The binders prepared the skins carefully, scraping the inner face of the leather in order to reduce its thickness as much as possible.

A number of kinds of book covering were known to the Islamic world. These types can be divided for convenience into three major groups (Types I, II and III).

The largest group of early Islamic bookbindings known today belongs to Type I. They are as a general rule oblong in format with wooden boards. The chief distinguishing feature is a continuous leather protective wall or strip of the same thickness as the text block, glued to three rims of the lower book cover to form a box or case whose spine constitutes the fourth side (Déroche 2005, 286–287). When the book is shut the pages' edges lie snugly within the leather surround. Such a binding-cum-case (or 'box-book') is customarily fitted with some kind of fastening. So far, it has been exclusively associated with Qurʾānic manuscripts.

Type II is by far the most common kind of Islamic binding and is widely known as 'flap binding' (see figs. 1.2.4, 1.2.5). Its most salient feature is the presence of the fore-edge flap and the envelope (or 'tongue') flap, two elements connected by flexible hinges, which extend from the long side of the lower cover. Rectangular in shape, the 'fore-edge flap' is that part of the covering which lies over the fore-edge to protect it when the volume is closed. As broad as the book is thick, the fore-edge flap continues over a second hinge into the pentagonal 'envelope flap', tapering to a point in line with the central axis of the manuscript. In a few early examples of Type II bindings, a strap was attached to the point of the envelope flap in order to keep the book tightly closed. A further characteristic of this type of bookbinding is the absence of a shoulder. Arabic treatises on bookbinding are adamant that any 'swell' at the jointing must be 'knocked out' with a maul or reduced in the press. Finally, the edges of the book covers were flush with the text block.

From a technical point of view, Type II is close to the modern 'pasted down to ends' style in case-binding in which the block is attached directly to the endpapers. Once the gatherings are sewn, the back is lined ('backed') with a strip of cloth (the 'spine lining') wider than the thickness of the volume so that there is enough space to paste the edges down to the boards. Depending on the taste and style of an individual bookbinder, the paste-down consists of the initial (or final) leaf, or else of a genuine doublure whose extremities are stuck to the first or last leaf, thereby ensuring the coherence of the whole. Type III shares the same components as those of Type II, with the exception of the fore-edge and envelope flaps. It represents only a fraction of eastern bindings, notably manuscripts produced in Central Asia—in the broad sense—in later times.

Book boards were made out of wood, particularly for 'bindings-cum-cases' (Type I). However, the most common material employed by bookbinders in forwarding was paper pasteboard. In the Ottoman world and more generally wherever the Ottoman binders' methods predominate, fine bindings occasionally played on differences in layer among the various components of a decoration by creating pronounced relief effects during the preparation of the pasteboard (Sakisian 1927a, 278, n. 5). Lacquer binding boards are traditionally dubbed 'papier mâché': this term in fact disguises the familiar pasteboard made out of layers of sheets of sized paper (Khalili et al. 1996, 10).

Covering the inner surface of a book board fulfilled the purpose not only of enhancing the binding's appearance, but also of strengthening the cohesion between binding and text block; doublures were in fact

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often set across the 'hinge' that served to reinforce the binding as a whole. It is common to find restoration work in these areas, evidence of the high level of wear to which they were sometimes subjected.

Very fine leathers could be used to line the inner cover, and in this instance the edge overlaps slightly onto the endpaper to which the leather is glued. They were sometimes completely devoid of decoration; however, there was a range of methods at the binder's disposal, including all those techniques employed for the outer boards (Haldane 1983, 145, 148, 158–159), together with leather gauffering (Haldane 1983, 22, 24–5, 26–27; Bosch et al. 1981, 130–135, 141–142, 153, 175–176; Déroche 2005, 271).

The methods by which books were forwarded, and more particularly the importance of the endpapers in ensuring that the final product remained robust, inevitably led to paper being favoured as the lining material for inner covers. Be it the same paper utilized for the gatherings or some special material paper attained a level of popularity that never waned. In the Ottoman world, for example, marbled paper met with enduring success as doublure, while coloured papers with gold decoration also enjoyed a certain vogue. Sometimes, the use of paper was limited to a specific portion of the doublure: a case in point is the filigree decorations executed in paper (see below). Fabric has also been used, for doublures as well as for the coverings.

Oriental headbands were usually built over a fine strip of leather or parchment laid flat along the head of the volume and not connected to the boards, but the Type I bindings may have been somewhat different in this respect. This strip was anchored primarily by threads of the same colour as that serving to sew the gathering, the bookbinder embroidering a chevron design in two colours of thread over a core (*Tranche-files* 1989, 86–89). This component is not purely decorative, however; the headband also improved the cohesion of the volume.

Stamping is far and away the most common decorative technique in bookbinding (fig. 1.2.5). In the Muslim world, tools utilized for stamping leather left imprints of variable dimensions, from small motifs to large-size panels. In the former case, the binder would use a combination of tools in the decoration, while the latter allowed him to decorate a large surface in one fell swoop, ranging from the central ornament to the whole surface of the board.

Once the use of larger stamps became widespread—by the second half of the fifteenth century—block-stamping was occasionally used in conjunction with preparations designed to improve the end result. Ottoman bookbinders increased the relief effects obtained with panel stamps on boards by recessing the zone destined for the motif (Sakisian 1927a, 278 n. 5; Raby – Tanındı 1993, 216). Another process was to obtain contrast effects by applying to the site of the decoration a thin piece of leather or paper cut to the size and shape of the block, but of a different hue from the rest of the binding. Gilding was frequently applied to eastern bookbindings, sometimes in conjunction with blind-stamping. Later Ottoman bindings from the ninth century are often decorated with gold paint applied directly onto the leather.

Be that as it may, two general tendencies as to composition have been discerned: on the one hand, there are decorations that cover the entire available space, while others rely on a contrast between an element stamped in the centre of the board and a field left plain. In this second category, furthermore, the composition may be completed by other ornaments around the perimeter (pendants, corner-pieces, and edgings of variable thickness); such auxiliaries will not be addressed in the following survey. Max Weisweiler proposed a typology for binding decorations using *petits fers* (Weisweiler 1962; Déroche 2005, 292–299).

Toward the end of the fifteenth century, technical advances were having a profound impact on the art of bookbinding. Irons had grown larger over the course of the preceding decades, particularly those employed for framing covers; all that remained was to increase their size marginally and it would become possible to apply a whole unit, or even an entire decorative scheme, in a single strike. The two major categories described above (central motifs on the one hand, and ornamentation of an entire cover on the other) remain pertinent to these cases. The Ottoman central panels rely on a few patterns covered in part by a typology (Déroche 1985, 17–26; Déroche 2005, 300–309).

Larger panels, which made it possible to lay in decorations covering the whole of the board, have not yet been adequately classified: they usually associate arabesque with geometrical motifs or else, though this is less usual, borrow their decorative stock-in-trade from miniatures (Haldane 1983, 87 and 104); once stamped, the decoration was normally then totally gilded. Thanks to this process, it became feasible to apply in a single operation both figurative and non-figurative decoration to the entire cover of a

small-size volume (excluding the frame if desired; Haldane 1983, 160–161). Such tools presupposed a measure of consistency in the formats available.

Other techniques have also been used: on some early Qurʾānic bindings, designs were applied to the covers by setting (or perhaps pasting) cords on the wooden boards (Marçais – Poinssot 1948, 21, 228–232; Déroche 2005, 283), then stretching a piece of damp leather over the boards. The technique of filigree has long been known. It involves creating a decoration by cutting leather or paper into a pattern; the resulting lattice can be set off against a coloured fabric or paper insert. Filigrees were mainly used for decorating inner covers, these being less exposed to rubbing (Sakisian 1934, 150).

Fig. 1.2.5 Rome, Biblioteca dell'Accademia Nazionale dei Lincei e Corsiniana, Or. 75, Egypt, fifteenth century, front cover and flap with gilt-stamped brown leather.

Paper has also been widely used for outer coverings and bookbinders seem to have preferred paper that was already decorated, tinted, or otherwise enhanced. In the Ottoman world, marbled paper began to be used in covers and wrappers during the seventeenth century (see fig. 1.2.4) and frequently appears in quarter-bindings with leather-drawn spines (Bosch et al. 1981, 218–219). In Central Asia and Iran, glossy tinted papers were employed in bookbinding from the seventeenth century; they may even be stamped in the same fashion as leather.

Fabrics too were put to use as a book covering. When cloth is used to wrap the boards, there is normally a thin border strip of leather around the edges in order to protect the textile. The combined use of leather and fabric for decorative purposes is attested in the case of filigree work.

The most common lacquer technique consisted in executing the decoration on boards made of pasteboard. The oldest examples date from the fifteenth century and were made at the court of Ḥusayn Mirza at Herat (ruled 873–911 AH/1469–1506 CE) (Khalili et al. 1996, 16–17). However, earlier examples from the second half of the fourteenth century demonstrate that craftsmen originally applied lacquer decoration to leather-drawn boards (Khalili et al. 1996, 232). In terms of decoration, these bindings are closer to illumination or miniature painting than to bookbinding proper.

References

Baer 1998; Bayani et al. 1999; Beach 2004; Ben Azzouna forthcoming; Bloom 1989, 2001; Bosch et al. 1981; von Bothmer 1995; Colini 2008; Déroche 2005, 2006, 2009, forthcoming; Déroche – Richard 1998; Déroche – Sagaria Rossi 2012; D'Ottone 2006; Dreibholz 1991; Estève 2001; *FiMMOD*; Gacek 2001, 2002, 2008; Gascou 1989; George 2011, 2012; Grohmann 1967; Haldane 1983; Haran 1985; Houdas 1886; Humbert 1998, 2002; Irigoin 1950, 1993; James 1992a, 1992b; Karabacek 1888, 2001; Khalili et al. 1996; Khan – Lewincamp 2008; Levey 1962; Lewis – Mingana 1914; Marçais – Poinssot 1948; Orsatti 1989, 1993, 1997; Parodi 2010, 2011; Parodi et al. 2010; Parodi – Wannell 2011; Pedersen 1984; Porter [Y.] 2003; Raby – Tanındı 1993; Regourd 2006; Roxburgh 1995, 2001, 2005; Ryder 1991; Šabbūḥ 1995; Sakisian 1927a, 1927b, 1934; Schopen 2006; Şeşen 1997; Silbergeld 1982; Soudavar 1992; *Tranchefiles* 1989; Troupeau 1997; Vernay-Nouri 2002; Weisweiler 1962; Welch et al. 1987; Wright – Stronge 2008.

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3. Armenian codicology (DK)*

3.1. Materials and tools

The history of the writing supports used for Armenian manuscripts is less complicated than for the Greek or Latin tradition. Though Greek and Syriac writing are textually referred to in the sources, and though there are some pre-seventh century Latin lapidary inscriptions from Greater Armenia, suggesting that Latin during Roman dominion might have also been written, no manuscript example of writing by Armenians has survived from before the invention of the Armenian alphabet between 404–406. The material for writing was parchment from the beginning, with an early introduction of paper in the tenth century and its dominance by the end of the twelfth century

3.1.1. Papyrus

There is a unique papyrus in Greek completely written with Armenian letters, once thought lost but rediscovered (Paris, BnF, Arménien 332, 1512 IV, see fig. 2.3.1) during research for the *Album of Armenian Paleography* (Kouymjian 1996b; 1998a; 2002a). As the only known papyrus with Armenian letters and the only surviving non-book manuscript before the twelfth century, it is an important link between the origin of the alphabet and the earliest codices four hundred years later, thus a key document for the evolution of Armenian writing. It provoked Yakob Tašyan to write his study of Armenian palaeography (1898). Since the text is entirely in Greek, it has been conjectured that the author was either an Armenian merchant (Tašyan 1898, 102) or soldier in the Byzantine army stationed in Egypt trying to perfect his Greek (Leroy [M.] 1938, 514). On historical grounds, it probably dates to the late sixth or early seventh century. Whatever its exact date, it is the oldest example of Armenian manuscript writing and the only early writing in an informal script. The single papyrus sheet (226 × 160 mm) has a twenty-seven-line text on each side. The contents are a run-on list of expressions in everyday Greek, quotations from maxims, for instance of Diogenes, and grammatical exercises (Clackson 2000). Most of the letters have the form of a cursive angular or slanted *erkatʿagir* (majuscule, see details Ch. 2 § 3) with some letters looking more like *bolorgir* (minuscule) and others even like *šłagir* cursive with connected letters (Mouraviev 2010, 152–153).

3.1.2. Parchment

Virtually all Armenian manuscripts up to the mid-twelfth century were of parchment, even though paper was introduced two centuries earlier. During the tenth to the twelfth centuries, a parchment manuscript was always a bit larger than a paper one. The largest Armenian manuscript (Yerevan, Matenadaran, 7729; Venice, Mekhitarist library, 1614/229; *Album* 222–225, nos. 52–53), a collection of homilies of 1202, 705 × 550 mm, is supposedly of calfskin (Matʿevosyan 1969, 138). It is one of the rare Armenian manuscripts laid out in three columns. Originally there were some 660 folia, today only 606, including the two in the Venice Mekhitarist collection, remain; each bifolium, made from calfskin, is made up of two folia sewn together in a sort of chain stitch. For the majority of Armenian manuscripts goat and sheepskin were used, but little has been published on the production of parchment in Armenia compared to the many recipes signalled in catalogues. A discussion of five late Armenian recipes (Yerevan, Matenadaran, 1849 of 1440, 551 of 1650, 7322 of 1694, 6924, eighteenth century, and Jerusalem, Armenian Patriarchate, 1136, undated) can be found in Peter Schreiner's (1983) article on parchment making formulas beginning with Greek and Coptic. The Armenian examples are treated based on an article in Russian by a chemist (Galfajan 1975a). The recipes are short and usually begin with the word 'advice' (*xrat*) or 'concerning' (*vasn*) or even both. They are collected along with longer texts in miscellaneous manuscripts called collection of texts (*žołovacu*), but also in medical treatises (*bžškaran*) and chemistry works (*kʿimiakankʿ*). Some of the texts speak of a treatment of thicker and harder skins with pigeon droppings, following their soaking in one or more hydrated lime (calcium hydroxide) baths; the two more recent texts prescribe bran or barley flour with the same function. Such recipes for parchment, ink, and pigments are found under chemical treatises in the indexes of certain manuscript catalogues. In the catalogue of more than 11,000 manuscripts in Yerevan (*Matenadaran abridged catalogue* = Eganyan et al. 1965, 1970, 2007, see also Ch. 4 § 2.2), there are 122 recipes listed, from which three more on parchment can be added to those treated by Gal-

* Much of this material, originally prepared for the COMSt handbook, has been also used, often without change, in Kouymjian 2014 (DK).

fajan – Schreiner: Yerevan, Matenadaran, 10200, dated 1624–1666; 9303, mid-seventeenth century; 1395, seventeenth/eighteenth century. Among the most important centres of parchment production were the monasteries of Glajor and Tatʿev in the northeast and the Cilician kingdom's scriptoria in the southwest.

A Jerusalem manuscript's text 'This is Advice about (Preparing) Parchment' of some 350 words is published in its entirety (Połarian 1966–1991, IV, 212–213), and Schreiner has translated a large segment of it. It begins, 'First select skins from goats, lambs, doe, deer, wild sheep, hare, and fish from which one can make parchment' (f. 214). Note that cowhide or calfskin is not included. Though there are no Armenian manuscripts on fish skin, there are at least two large fish heads used for writing and especially for very accomplished miniatures from the Life of Christ, one in the Mekhitarist library in Venice and another in a private collection in Paris, both unpublished but probably of the eighteenth century. Though no serious work has yet been done in comparing the various texts or versions of these recipes, one might suppose that the original exemplars must have dated prior to the fourteenth century, after which the use of parchment for codices was dramatically reduced.

Statistical data suggest that by the last quarter of the twelfth century, the number of paper manuscripts surpassed parchment ones; a century later, shortly after 1300, parchment was no longer used as a writing surface except for presentation copies of Gospels or Bibles, and these were very rare (Kouymjian 2013, 27 Table 2). This shift was a matter of economy; it was accompanied by the transition from majuscule to minuscule, thus the smaller sized paper manuscripts still contained as much or a greater amount of text. In the thirteenth century, manuscript production had increased in quantity and dramatically improved in quality; paper had become the dominant medium, and though manuscripts were smaller in size than in the ninth to the eleventh centuries, 280 × 180 mm, they were nearly 15% larger than those of the twelfth century. Nevertheless the trend was moving toward a smaller book. Eventually there was a size standardization from the fourteenth to the nineteenth centuries, roughly 200 × 140 mm, about half that of the earliest manuscripts, which is the size of *quarto* common paper (Italian 'rezute').

Though no coloured Armenian parchment manuscript or fragment has survived, in palaeo-Christian times purple parchment was used as attested in the early seventh-century treatise in defence of images by Vŕtʿanēs Kʿertʿoł, *locum tenens* of the catholicosate of the Armenian Church 604–607. He remarks, 'Car nous voyons le livre des évangiles peint avec de l'or et de l'argent et, de plus, relié avec de l'ivoire et du parchemin pourpre' (Der Nersessian 1973a, I, 385). After the transition to printing, there are several luxury printed books of the seventeenth century, including copies of the 1666 Amsterdam Bible printed on a very fine light blue, paper.

Parchment, an expensive product, was often recycled, most commonly by erasing sheets or at times full manuscripts in order to over-write on them. The palimpsests produced by this procedure preserved old manuscripts or fragments, which with advances in technology are providing a new source of early texts. The Matenadaran, the Repository of Ancient Manuscripts in Yerevan, reports there are about a thousand manuscripts in the collection that are palimpsests or contain fragments of palimpsests (*Rinascimento virtuale* 2002, 91–92). Many of these are guard leaves, since there was a very early tradition that newly copied and bound manuscripts should incorporate protective sheets in the front and back from older parchment manuscripts. Sometimes the underlying strata of palimpsests are Greek or Georgian, while recycled Armenian parchments are found in Arabic (Brock 1965), Georgian (Renhart 2009), and other traditions. A model of methodology in the photographing, transcribing and analysing Armenian palimpsests is offered in Jost Gippert's study of two substantial Armenian biblical fragments reused for a tenth-century Georgian manuscript from Sinai (Gippert 2010a). Thus far, the analysis of such material is firmly in the domain of philology rather than codicology. Nevertheless, it is evident that with the number of documents still to be exploited, information beyond the textual from palimpsests will provide insights not just on textual history and palaeography, but on the construction of the codex: formation of quires, ruling and pricking, signatures, often from a moment prior to the earliest dated manuscripts. By establishing a firm *terminus ante quem*, palimpsests can serve as more powerful tools than palaeography in evaluating the date of some Armenian manuscripts judged to be older than the Mlkʿē Gospel of 862 (Venice, Mekhitarist library, 1144/86; *Album* 2002, nos. 2–3).

3.1.3. Paper

Paper was introduced early into Armenian manuscript production. The oldest example dates to 981, a religious miscellany, entirely of paper (MS Yerevan, Matenadaran, 2679; *Album* 2002, nos. 10–11, 138–141);

it is one of the smallest, 280 × 190 mm, among tenth-century codices. Nevertheless, the precocious date of 981 is followed by a succession of dated paper codices of 1113, 1118, 1137, 1155, 1166, 1167, 1169, with twelve more up to the end of the twelfth century in a random sampling of dated examples from catalogues. Twenty-three are found in the same list from the next fifty years and seventy-seven from 1250–1300. They are from every region of Greater Armenia, from Cilicia to the Georgian border, from Erzinjan to Edessa and Adana. Paper was used to copy Gospel texts from the eleventh century (MS Yerevan, Matenadaran, 6975, dated by style) and specifically 1113 (MS Yerevan, Matenadaran, 6763, Gospels from Drazark in Cilicia), with four more dated examples to 1200. It is generally assumed that parchment was reserved for Gospel manuscripts; in fact, even before paper replaced parchment as the most used support in the late thirteenth century (Kouymjian 2012a, 19 Table 1), paper was commonly employed for Gospels, ten recorded from 1201–1278, but fifteen for the last two decades of the century. The first Bible written on paper, incomplete, was in 1214 (Jerusalem, Armenian Patriarchate, 417); in all there are at least six Bible manuscripts, three complete including the lavishly decorated and illustrated Erzinjan Bible of 1269 (MS Jerusalem, Armenian Patriarchate, 1925), from the thirteenth century, by the last quarter of which, 80% of Armenian codices were of paper. From about 1400 on, paper was the exclusive medium for manuscripts; the rare exceptions were for Gospels or Bibles.

There are a handful of other undated paper manuscripts of the eleventh century and several of mixed parchment and paper. Levon Xažakyan (1984) has reported that paper and ink analysis of the manuscript of 981 and others of the period point to a local production of both the paper and the ink; his conclusion is based on chemical analysis and infrared spectrography. Unfortunately, the colophons of the manuscripts do not mention the exact place of copying. Though this may be the first evidence of paper making in Armenia, it is not the last. Another documented instance is from seventeenth-century Iran, where an abortive attempt to print the Bible in the short-lived press established by the bishop Xačʿatur Kesaracʿi (1636–1650) in New Julfa, the Armenian suburb of Isfāhān founded in 1605, resulted in the issuing of a number of titles (Kévorkian 1986, 114–119) on paper manufactured there as attested by the colophon of the Lives of the Fathers printed in 1641 (Minasyan 1972, 16; Kévorkian 1986, 116; Voskanyan et al. 1988, 24). Though of a mediocre quality, some of this paper was probably used for copying manuscripts, a flourishing art in New Julfa until the eighteenth century.

We have other documented information on paper production at the Holy See of Etchmiadzin (Ējmiacin) initiated by Catholicos Simeon Erevancʿi in 1776 (Abrahamyan 1947). In Armenia, however, already by the last quarter of the twelfth century the majority of manuscripts were made of paper (Kouymjian 2013, Table 2), much of which was supplied from such centres as Baghdad, and later from Damascus and Tabriz as attested by colophons (Abrahamyan 1973, 282, 357; Merian et al. 1994a, 126). Though 'lines' in paper, presumably oriental, are mentioned in some catalogues, there is no specificity about the disposition of laid and chain lines; preliminary research on such a codicological matter needs to be engaged. Watermarked European (*franki, pʿaranki*) paper was also employed, but there seemed to be a preference among scribes for Damascus (Yerevan, Matenadaran, 8689, f. 88, colophon of scribe, 1417); paper types are listed in the *Master catalogue of the Matenadaran* and other collections, but rarely with specificity, though Tašyan in his Vienna catalogue of 1891–1895 already noted consistently whether the paper was polished or not and its colour or tint. The study of the watermarks and the variety of oriental papers waits to be initiated.

3.1.4. Inks

Many early Armenian manuscripts written in majuscule *erkatʿagir* employed iron gall ink that turns rusty brown with time, as compared to the black hue of an Indian or Chinese ink. The same brownish hue is seen in *bolorgir* or minuscule manuscripts of the later twelfth and thirteenth centuries. Yet the majority of manuscripts use ink that remains black, most probably a soot or carbon based type for which at least one eleven line recipe survives: *Vasn mur sineloy* ('On Making Soot-Ink'), Yerevan, Matenadaran, 1261 copied in 1725 in Jerusalem. There are also two recipes entitled 'Advice on Parchment Ink' (Yerevan, Matenadaran, 752, fifteenth/sixteenth century; Yerevan, Matenadaran, 738, seventeenth century). There are a vast number of recipes entitled either 'Advice' or 'On Making or Cooking Ink' dating from the fifteenth to the nineteenth century. In the Yerevan collection alone there are at least thirty-six, including ten with the title *Kerb tʿanakʿ patrasteloy* ('Method for Preparing Ink') from the seventeenth to the early twentieth century. That these are traditional Armenian recipes for ink is perhaps confirmed by a recipe

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Franki murakʿap šinel (‘[How] to Make Ink of the Franks’), Yerevan, Matenadaran, 737 of 1680-1730. Some work has been done on these texts, but in studies that are hard to access, one in Armenian *The Use of Pigments and Inks in Old Armenian Manuscripts* (Harutʿyunyan 1941), written when the Yerevan collection was half the size, and two in Russian on the preparation of iron-gall ink in mediaeval Armenia and the effect of pigments and ink on paper (Galfajan 1975b, 1975c). An in-depth scientific analysis of the ink that was used on the earliest paper manuscript of 981 (Yerevan, Matenadaran, 2679) with a detailed chemical analysis of all components, including trace elements, has been provided (Xažakyan 1984, 164–165).

3.1.5. Pigments

The most important research on pigment use in Armenia has been by scientists Diane Cabelli and Mary Virginia Orna and art historian Thomas Mathews. In some twenty articles, whose aim was to determine with precision the palette used by painters and illuminators, pigment samples of a large number of Armenian manuscripts were analysed using polarized light microscopy and X-ray diffraction, the methodology outlined in detail (Orna – Mathews 1981; Mathews – Sanjian 1991, 48–51). Three groups of Armenian manuscripts, twenty-four in all, from the tenth to the fourteenth century were analysed and compared with the analyses of Byzantine manuscripts (nine from the tenth to the thirteenth century), and three groups of Persian, Indian, and Turkish manuscripts of the fourteenth century and after (forty-two manuscripts). The detailed list of manuscripts and results of pigment identifications are summarized in a general article on Armenian codicology (Merian et al. 1994b). The results showed that though Armenian artists used some organic pigments, particularly reds, the majority were mineral based, whereas in the Byzantine palette the majority were organic dyes. The main pigments used in the important and brilliant painting tradition of the Cilician kingdom (twelfth to the fourteenth centuries) were white lead, gold, orpiment, red lake, ultramarine, and vermilion (Merian et al. 1994b, 129). Research began on an early fourteenth century Glajor Gospels (Los Angeles, CA, UCLA, Arm. 1) on which five artists worked; the results showed that the source of certain colours was not always the same for each of the painters and offered a codicological way of checking classic stylistic conclusions. It also means that artists, even working in the same monastery, had different paint sets.

The methodology developed is a model for the examination of pigments in a non-destructive way on all oriental manuscripts. It is to be regretted that a further effort was not made to examine and discuss the pigment recipes found in Armenian manuscripts, which are regarded as detached from the actual pigments found in the manuscripts. Nevertheless, already in the early seventh century Vrtʿanēs Kʿertʿoł had listed a number of colours in his treatise on the defence of images: ‘As for those who say that the pigments are vile, they accuse themselves with their own words, because the pigments used for writing are vitriol, gall and gum … while the materials used for the images are milk, eggs, arsenic, blue, verdigris, lime, and other similar materials’ (Der Nersessian 1973a, I, 387). Early in the last century a recipe from a manuscript of 1618, ‘Advice for the Painter’ (Paris, BnF, Arménien 186, ff. 216v–217v), were published and translated (Macler 1924, 13–23). Among unpublished recipes a fifteenth century treatise, *About Different Colours* (Yerevan, Matenadaran, 573, ff. 238v–242v) offers advice on various colour and gold pigments with thirty-seven recipes for preparing them (*Matenadaran master catalogue* = Eganyan et al. 1984–2013, II, col. 1328). Other recipes are found in later manuscripts on making yellow pigment (Yerevan, Matenadaran, 551 of 1650), on colours (Yerevan, Matenadaran, 8424 of 1744–1748), on preparing colours and using them (Yerevan, Matenadaran, 6285 and 9986, both nineteenth century), but it must be kept in mind that these post mediaeval recipes might have been copied from earlier exemplars. Finally, there is a vast specialized literature and even a research institute in Armenia devoted to the local cochineal red dye, *vordan karmir* known as *kirmiz* in the Near East, from an insect indigenous to the Ararat plain and used for red dyes (perhaps the red lake organic pigment referred to in the scientific analyses above) in brilliant Armenian miniatures as well as Armenian rugs and textiles (Babenko 1988).

3.1.6. Writing instruments

The preferred writing instrument of scribes using papyrus was a split reed from Egypt, the *calamus*, Armenian *kalam*, used in Armenia for codices from the earliest centuries. Use of metal styluses for Armenian manuscripts is unlikely despite the term *erkatʿagir*, iron letters (Kouymjian 2002b, 67–68).

The Armenian instruments have not been the subject of serious studies, therefore, it is not clear if the drawings show the actual tools of the scribe working on the manuscript in which they appear or simply

a recopying of earlier tradition. A gateway into this research can be provided by a miniature painting of St Matthew as a scribe in a Gospel manuscript of 1338 from Erzinjan (Yerevan, Matenadaran, 7643, f. 2v) showing fourteen instruments to his right stacked vertically from the top down with nine identifying labels: ruler or straight-edge (*kʿanon*), paper polisher (*tʿłtʿi kokičʿ*), ink pots (two, *kał[a]mar*), pen (*gričʿ*), large and small, scissors (*mkrat*), trimmer, rounded and straight-edged (*ǰewičʿ*), knives (two, *danak*), chest with pots for black and red ink (*sntuk*), cover for the chest (*xupʿn*); the miniature of St Luke in the same manuscript shows a marble slab before the scribe-evangelist used like an artist's palette to mix and test colour pigments (Ałakʿelyan 1958, 311, fig. 38; Abrahamian 1973, 283–284). Among innovations was the fabrication of the forerunner of the fountain pen: a small glass reservoir of ink was attached to a goose feather quill allowing ink to run drop by drop without the need constantly to dip into an ink pot (Abrahamian 1973, 357–358).

3.2. Book forms

3.2.1. The roll and the rotulus

In the Armenian tradition there are neither tablets nor *ostraca* or other writing surfaces beside codices and rolls. Armenian vertical rolls or scrolls are most often from after the fifteenth century, but with possible earlier antecedents. They are usually regarded as magic amulets with prophylactic powers. They exist in all major Armenian manuscript collections; there must be close to a thousand that have survived. By the seventeenth century, during the transition from manuscript to print, such scrolls were printed.

Magical talismans, *hmayil* in Armenian, were executed on paper rolls 6 to 10 cm wide and at times more than 20 m long, containing diverse prayers illustrated by miniature paintings. Despite their length, they were portable when rolled up and could be carried easily. Often they were left to hang in the room of a sick person.

Dated examples are known from 1428 to the nineteenth century, most from the seventeenth century and after. Little research has been done on these rolls except a pioneering work *Amulettes de l'Arménie chrétienne* (Feydit 1986); almost nothing has been said about their ultimate origin. In some Armenian Gospels the evangelists depicted as scribes are seen copying from a vertical roll instead of the expected codex. The first surviving Armenian appearance of this anachronism is in the early eleventh-century Trebizond Gospels (MS Venice, Mekhitarist library, 1400; Kouymjian 1977, 1979), which was strongly influenced by Byzantine iconography with both Mark and Luke copying codices from rolls on their lecterns. Yet, this tradition of the roll survives well into the Cilician period and curiously is also found among provincial manuscripts that owe nothing to the Byzantine tradition in either style or iconography (Kouymjian 1992a, nos. 67, 75, 85), including a portrait of 1224 of the four evangelists together each holding a roll rather than the expected codex (Halle University Library, Arm. 1, f. 4v; Kouymjian 2011a, 134, fig. 24, 2011b, 97 ill.). Such relatively late examples could have provided the inspiration for the amulet-scrolls of a century and a half later.

3.2.2. The codex

The early history of the Armenian codex is obscure and may remain so. Our oldest dated manuscripts are the Venice Mlkʿē Gospels of 862 (Mekhitarist library, 1144) and the Lazarian Gospels of 887 in Yerevan (Matenadaran, 6200). Claims that certain not-specifically-dated manuscripts in Yerevan are even earlier are not always convincing on palaeographic grounds (Mouraviev 2010, Annex VI), though some of the collection's 3,000 fragments, mostly recycled as guard leaves, are credibly earlier. Many of these have been studied philologically, but few codicologically. The Armenian case is remarkable because we know with certainty that the first manuscripts were produced between 404–406, but is confounding due to the hiatus of 450 years between the invention of the alphabet and the first surviving dated codices. There are, however, four pages (a bifolium) bearing an equal number of impressive full-page miniatures, but no text, dated by general agreement to shortly after 600, certainly from a Gospel codex bound together with the Etchmiadzin Gospels (Yerevan, Matenadaran, 2374, ff. 221–221v) of 989, but they have not been the subject of detailed codicological analysis (Der Nersessian 1964). We are certain that hundreds of texts were copied and recopied in scores of scriptoria in this 'empty' period simply because those texts have survived to our day through such transmission. It is hard to imagine that the technique of producing books remained static for four and a half centuries. We do not know what the evolutionary processes in the structure of the Armenian codex and the changes in such things as the script form and quire size were.

The philologist Charles Mercier, following a then accepted notion borrowed from Latin palaeography, wondered whether the evolution from an upright *erkatʿagir* to a slanted one might be due to the passage from the papyrus roll to the codex (Mercier 1978–1979, 52, 57). Did Mesrop and his disciples first use rolls before codices? If so, none have survived. Nevertheless, it has been conjectured by archaeologists that the thousands of clay seals found in two archives in the excavations of the early capital Artaxata (176 BCE–120 CE) were originally attached to rolls of papyrus or parchment because they resemble seals still attached to rolls (Khachatrian 1996; Manoukian 1996).

The codex triumphed over the roll in the fourth century. Therefore, it is likely as postulated already in the late nineteenth century (Tašyan 1898, 93) that when Maštocʿ devised an alphabet in the fifth century, Armenians used the codex right from the start without a transition from the roll.

3.3. The making of the codex

3.3.1. The making of the quires

No specific studies have been published on the subject, thus all is speculation and assumption, for instance the controversy about whether parchment was folded and refolded to create a four folium group. In a database of 300 dated manuscripts to the year 1600, nearly all Armenian manuscripts to the mid-thirteenth century consisted of quaternions, even though almost all have some inconsistent gatherings of random size from one to seven bifolia. Of the twenty-eight thirteenth-century codices, there are seven gathered in quaternions, two in quinions, fifteen in senions, three in octonions, and one with ten bifolia. By the fourteenth century thirty-two are in senions, one is a septenion, and three are in octonions, while in the sixteenth century there are only eighteen in senions (Kouymjian 2012a, 19, Table 2).

Diagrams illustrating Armenian quire structure are now included in monographs on individual manuscripts (Mathews – Sanjian 1991, 32–42). In the last years of the twelfth and the first of the thirteenth century one encounters ten-folium quires, but these never became popular. In Cilicia starting early in the thirteenth century, the twelve-folium quire took hold and became the standard for Armenian books until the end of the scribal tradition. Nevertheless, from the thirteenth to the sixteenth century, we find occasional manuscripts with gatherings of seven, eight, and even ten bifolia. There has been no study to localize the use of various sized quires, a relatively easy task using published catalogues. The chronology has already been given: the quaternion structure was the most popular at the beginning, but replaced by a larger quire of six bifolia with the shift from parchment to paper and the change in script from majuscule (*erkatʿagir*) to minuscule (*bolorgir*) in the late twelfth and thirteenth centuries (Kouymjian 2012a, 19, Tables 1–2).

3.3.2. Pricking and ruling

Pricking was used in the earliest Armenian manuscripts, the holes made either with a fine pointed tool or knifepoint. These holes are found on both the outer and inner margins. Pricking in the gutter can be seen in the Gospels of 986 (Yerevan, Matenadaran, 7735, f. 128, *Album,* no. 12); Adrianople Gospels of 1007 (Venice, Mekhitarist library, 887, f. 75, *Album*, no. 19); Gospels of 1045 (Yerevan, Matenadaran, 3723, f. 59, *Album*, no. 21); Homilies of John Chrysostom of 1046 (Yerevan, Matenadaran, 988, f. 116, *Album*, no. 23); Gospels of 1064 (Jerusalem, Armenian Patriarchate, 1924, f. 64, *Album*, no. 28). Pricking on both sides of the sheet is even visible on very small codices such as a paper miscellany of 1371 for Kaffa, Crimea, 120 × 80 mm (Yerevan, Matenadaran, 5295, f. 20, *Album*, no. 127). There are also examples of double sets of pricking (Yerevan, Matenadaran, 2374, Gospels of 989, f. 225, *Album*, no. 14). Pricking is sometimes found for vertical lines to fix the boundaries of text columns. One also occasionally finds pricking holes in the gutter to mark the place were a notch, usually triangular (*grecquage*), is to be cut as a sewing station (Merian 1993, 23, 36–37). It has been observed that in later centuries pricking was very discrete or replaced by other ruling methods.

Ruling was done with a straight edge using the pricking holes as guides. In Gospels, where the Eusebian concordance numbers are indicated at the bottom of the pages, three or four narrow lines are also ruled there. Otherwise, the ruling is evenly spaced but used variously in different periods. Sometimes letters (usually uncials) stand on the line, other times letters (usually minuscule) hang from the line above. In some earlier manuscripts, an empty ruled space is left between lines, giving the appearance of writing on every other line or double spacing; majuscule letters are tangent to both the upper and lower ruling: the Lazarian Gospels of 887 (Yerevan, Matenadaran, 6200, f. 73, Xalatʿeancʿ 1899; *Album*, no. 4); Gospels of

909 (Yerevan, Matenadaran, 6202, f. 71, I, no. 5); Gospels of 1181 (Yerevan, Matenadaran, 6264, f. 222v, *Album* no. 45); the Homilies of Muš, 1202 (Venice, Mekhitarist library, 1614/229, f. 5v, *Album* no. 52). Ruling also sometimes changed within a manuscript, even one with a standard and single text, for instance the same Gospels of 887. At times regular ruling was executed apparently without the help of pricking, in a free hand manner, with the horizontal ends extending irregularly toward the margin beyond the vertical ruling line (Yerevan, Matenadaran, 6200, f. 111 first folium of quire no. 13). Though most ruling was done with a blunt stylus, already in the late tenth or early eleventh century lines drawn with a lead point or carbon are clearly visible: Roman Breviary of 1381 copied in Bologna (Paris, BnF, Arménien 107, f. 144, *Album* no. 129), both horizontal and vertical. By the thirteenth and fourteenth century we find the occasional use of red ink for vertical ruling: the mixed parchment and paper Glajor Bible of 1332 (Venice, Mekhitarist library, 1007/12, f. 356, *Album*, no. 120; see also fig. 2.3.6 for an example from the seventeenth century). There is no study devoted to ruling and pricking in Armenian manuscripts, just remarks in surveys (Abrahamyan 1973; Merian 1993). Ruling boards were used in later Armenian manuscripts similar to and probably copied from the Arab *miṣṭara*, called in Armenian *tołašar*, literally 'line arranger' (Abrahamyan 1973, 287; Merian 1993, 27–29 for examples).

3.3.3. Ordering systems

Numbers in Armenian manuscripts or other media are always expressed in letters of the alphabet, each of the thirty-six original letters of the Armenian alphabet has a numerical value. The easiest way to grasp the system is to arrange them in four vertical columns of nine letters each: digits, tens, hundreds, thousands. The first letter in each column starting with the A (*ayb*) represents 1, 10, 100, 1000; the last or thirty-sixth letter Kʿ, the bottom of the last column, has a value of 9000. Most quire numbering uses this system, which for convenience is called the alphanumerical system. There are cases, however, in which the value of the thirty-six letters is treated as a continuum of one to thirty-six; this might be called the continuous or alphabetic system. Whereas in the most frequently used method the number eleven would be expressed by two letters, ten plus one (ŽA), in the continuous system eleven would be a single letter, the eleventh (I) of the alphabet, which in the numerical system represents twenty.

Quires of Armenian manuscripts were numbered in the oldest surviving codices. The letter-numbers were most commonly placed at the bottom centre of the recto of the first folium and again at the bottom centre of the verso of the last folium. This is consistently the case from the thirteenth century, even in a single column layout. Among the earliest manuscripts, late ninth to twelfth century, the situation is unstable, though the lower margin was the preferred location. In the Lazarian Gospels of 887 already mentioned, the first signature (no. 2, f. 3) at the beginning of a quire is placed at the bottom in the middle of the first column of this two-column manuscript; the closing signature (f. 10v) is centred to the right below the middle of the second text column. By quire no. 26 (f. 171) all surviving signatures on this badly damaged manuscript are centred at the bottom in between the two columns. Another example affords the same uncertainty, the Gospels of the Catholicos (MS Yerevan, Matenadaran, 10780; Matʿevosyan – Izmaylova 2000, facsimile) of the late tenth or early eleventh century. The initial quaternions of this two column manuscript in majuscule has its first signature (no. 2, f. 6) at the bottom flush with the first letters of the second column, whereas the closing signature (f. 13v) is flush with the last letters of the first column. But the closing signature no. 3 (f. 21v) is centred between the two columns, though the facing no. 4 (f. 22) remains flush with the second column. It is only with the ending signature no. 6 and the initial no. 7 (ff. 45v–46r) that all numbering is centred between the two columns. Other anomalous positionings of numbers are bottom left of centre, one column text (MS Venice, Mekhitarist library, 1268, Gospels, 1001, f. 224, *Album*, no. 16); extreme lower right, again single column, but repeated twice more within red wreaths in the upper right margin and within the text at the third line (MS Dublin, Chester Beatty, 554, 1174 Edessa, f. 11, *Album*, no. 42); upper right corner, two column Gospels of 1007, Adrianople (MS Venice, Mekhitarist library, 887, f. 75. *Album*, nos. 18–19); upper right margin or corner (MS Yerevan, Matenadaran, 2743, Gospels, 1232, f. 39 *Album*, no. 70, MS Yerevan, Matenadaran, 7700, Gospels 1237, Cilicia, f. 45, *Album*, no. 71).

In the Gospels of the Catholicos, quire eleven is marked in the continuous manner with I, the eleventh letter, and not the usual ŽA (11), and continues to the final quire no. 34 (W). This is not an isolated case, since the famous Etchmiadzin Gospels of 989 (MS Yerevan, Matenadaran, 2374; Macler 1920, facsimile)

numbers its twenty-eight quires consecutively, each signature placed within a wreath-like coloured roundel in the top margin of the opening folium between and above the text columns; there are no signatures on the final verso folium of the quires. It has been hypothesized (Merian 1993, 184–185; 1995) that this practice of alphabetic numbering began in the Cilician period, twelfth to fourteenth centuries, as a European inspired system during a time when the Crusaders had very close contact with the Cilician Armenian kingdom. This assumption is no longer acceptable because of the Etchmiadzin Gospels and related manuscripts.

One often reads that in Armenian Gospel manuscripts the first gathering with the Eusebian Letter and Canon Tables was not counted, but it is clear from some of the early examples cited above that the first text quire is often numbered two and not one, thus the initial Eusebian apparatus was counted. Caution is necessary, however, until more data is recorded because the opening text quire of the Etchmiadzin Gospels of 989 has one (A) as signature number (Macler 1920, f. 90), thus ignoring the first quire.

Catchwords were almost never used in Armenian manuscripts until after the printing of the first Armenian book in Venice in 1512. Printed books used catchwords not just for quires but eventually for every page. Some manuscripts of the late seventeenth century and after borrowed this habit from Armenian printed books, which was itself borrowed from the west.

It is hard to find Armenian manuscripts with folium numbers that can be dated to the moment of the copying. In almost all cases the numbers were added in modern times. There are, however, isolated exceptions, for instance MS Yerevan, Matenadaran, 7, a prayer book of 1212, has in the right margin almost mid-way down next to the single column text the number fifty-six (*cz*) in the same hand as the scribe, corresponding exactly to the modern numerical foliation found at the top right corner (*Album*, no. 56). Columns were never numbered in Armenian manuscripts, because texts except for a few exceptions were either one or two columns.

3.3.4. The codex as a complex object

There are no studies on multiple text manuscripts combining more than one physical unit. Nevertheless, binding different writings under a single cover, a practice common to all traditions, was common in Armenian scriptoria. When counting the number of discrete items within bound volumes of the largest Armenian manuscript collection, it was clear that there were anywhere from 6% to 9% more items, that is manuscripts or fragments, than the actual number of catalogued codices (Kouymjian 2012a, 19). The components of these multi-manuscript volumes were usually, but not always, on related subjects. A different phenomenon is represented by books containing multiple and often unrelated texts copied in a single sequence by one or more scribes. In Armenian such manuscripts are labelled collections or miscellanies (*žołovacoy*); among the earliest is the paper codex of 981 discussed above (Yerevan, Matenadaran, 2679). These often represent what it is now fashionable to call ‘one-volume libraries’. Many are devoted to specific subjects: theology, medicine, advice, and history, while others combine elements at times in a random fashion. Though some are limited to a few texts others contain twenty, forty, and even more works, some long, others less than a *folio* in length. Their number is remarkable: taking the Matenadaran collection, nearly a quarter of the more than 11,000 manuscripts are such *žołovacoy* or collections of sermons.

The most popular text in the Armenian manuscript tradition is the Gospel book. Up to the fourteenth century, 50 to 75% of all extant manuscripts are Gospels; and up to earlier date limits, the percentage was even higher. Their structure and layout are often determined by the required illustrations: Canon Tables, evangelists’ portraits and headpieces of the Gospels, and miniatures from the life of Christ.

3.4. The layout of the page

The earliest manuscripts were very large. Those of the ninth and tenth centuries, mostly Gospels, are on average 340 × 270 according to a sampling of 285 dated Armenian codices from various collections (Kouymjian 2007a, 42). Eleventh-century manuscripts remain quite large, 310 × 240, until the last two decades when they drop in size to less than A4. There are also in the eleventh century at least two very small manuscripts, both now in Venice, signalling a future trend: the aforementioned Gospels of 1001, 180 × 140 mm (Venice, Mekhitarist library, 1268, *Album* no. 16), and one of the tiniest books, a Gospel of John dated 1073, measuring 64 × 47 mm, much smaller than a credit card (Venice, Mekhitarist library, 2050); an even smaller codex is preserved in Yerevan (Matenadaran, 7728). Afterward, the size drops

dramatically: twelfth-century manuscripts are about 28% smaller, 230 × 160 mm, than eleventh century ones and more than a third smaller than those of the ninth and tenth centuries. In part this is explained by text and writing surface; Gospels, Bibles, and other liturgical texts were always larger, and parchment manuscripts were a bit bigger than paper ones so with the increase of the variety of texts and the use of paper, size was reduced. Furthermore, the twelfth century was difficult for Armenia, kingless and under Seljuk occupation; yet, the next century was the high point in Armenian book culture. Manuscript production had increased in quantity and improved in quality; paper had become the dominant support, and though manuscripts were smaller than in earlier centuries, 280 × 180 mm, they were nearly 20% larger than those of the twelfth century. Nevertheless the trend was moving toward a smaller, more conveniently manipulated book, as was the case in Byzantium and Europe where manuscripts became more portable as a larger public became literate. Eventually there was a size standardization from the fourteenth to the nineteenth centuries, roughly 200 × 140 mm, about half the size of the earliest manuscripts, 45% the size of an A4 sheet.

The general shape of Armenian codices is rectangular, the height always larger than the width. There are no oblong books until late in the printing era. There are unique items, for instance a small (700 × 125 mm) parchment liturgical miscellany copied in 1441 in the northern monastery of Mecopʿ (Yerevan, Matenadaran, 5667, *Album* no.139), which is an oblong volume, but when open it is evident that the text is written in lines parallel to the short side of the volume, that is vertically at right angles to the long axis; instead of turning pages from right to left, one turns the page up to read the text at the top of the verso which follows down to the next recto. Another atypical single paper sheet (406 × 292 mm) of 1653, with apotropaic prayers written in minute minuscule sometimes in red, at other times in black in harmonious alteration within sixteen spaces created by the intersection of large squares and triangles enhanced with three magnificent miniatures in roundels in the centre field of Christ enthroned flanked by Mary and John the Baptist, all with sixteen texts running in six directions (London, BL, Add. 18611, *Album*, no. 168).

The two-column text arrangement for the ease of reading was reserved for Gospels, Bibles, and liturgical texts. Philosophical works, collections, and commentaries were written in a single column, for instance the religious miscellany of 981 (Yerevan, Matenadaran, 2679, *Album* nos. 10–11). There were exceptions to both arrangements, for instance the single-column Venice Gospels of 1001. A later Bible manuscript from New Julfa – Isfāhān of 1648 has its last four quires in three columns (Venice, Mekhitarist library, 623/337, Merian 1993, 29–30).

3.5. Text structure and readability

3.5.1. Decoration

There is a vast literature on Armenian manuscript decoration due to its quantity and remarkable quality. A general introduction to the ornamentation and illumination of Armenian manuscripts including how they were used to structure texts can be found in *The Arts of Armenia* (Kouymjian 1992a, 'Miniature Painting', 27–38 and online), and specifically on their use in the organization of Gospels (Kouymjian 1996a). The Gospel book was by far the most decorated text. Other liturgical manuscripts were also decorated, but in smaller numbers: Bibles (see fig. 1.3.2), lectionaries, menologia and synaxaria, psalters (see fig. 2.3.7 for an ornamental band in a religious miscellany). Almost all surviving manuscripts with ornamentation and miniatures dated before 1300 are Gospels; the exceptions are a codex of the Elegies of Gregory of Narek dated 1173 (Yerevan, Matenadaran, 1568) with four portraits of the author, the Erzinjan Bible of 1269 (Jerusalem, Armenian Patriarchate, 1925), decorated psalters, among the oldest that of Leo II dated 1283 (London, BL, Or. 13804), the Lectionary of Hetʿum II of 1286 (Yerevan, Matenadaran, 979; Drampian 2004), one of the most lavishly ornamented and illustrated Armenian codices, as well as hymnals and ritual books, mostly from the late thirteenth century.

Therefore it is apparent that Armenian manuscript painting is almost entirely devoted to Biblical scenes especially from the life of Christ (see fig. 2.3.3). In the early Gospels miniatures were normally full-page and were grouped at the beginning before the text, after the Canon Tables and portraits of the evangelists. They could also be half or quarter page, sometimes very small placed within one of the two columns of the text. Marginal decorations of all kinds were also common sometimes in red ink and even coloured. Besides the narrative scenes with their figures and landscapes, miniature painters had to be skilled in drawing animal and bird forms, geometric and floral ornaments of great complexity, evangelists' and donor por-

traits, and very ornate letters composed of bird, animal, and human forms used to decorate chapter headpieces and the opening lines of each Gospel. The illustrating of a Gospel manuscript followed a fixed pattern that some believe had already become traditional in the fourth century: the Eusebian apparatus and the evangelists' portraits. These were in time individually placed on the verso of the folium facing the *incipit* of each Gospel, usually lavishly decorated. In the more important Gospels there was a series of full-page paintings usually placed at the beginning together with and just after the Canon Tables, traditionally in a single quire. Miniatures can be divided into three types: symbolic representations (for example, a cross), portraits (for example, the Virgin), and narrative scenes from Christ's life.

Fig. 1.3.1 Los Angeles, CA, J. Paul Getty Museum, MS 59, Zeytʿun Gospels, 1256, 265 ×190 mm, f. 8r, photograph courtesy of the Paul Getty Museum.

The physical arrangement of Armenian Canon Tables and their evolution serve as important codicological tools for identifying schools and scriptoria (Kouymjian 1996a, 1025–1042). Both the Mlkʿē Gospels of 851–862 (Venice, Mekhitarist library, 1144) and the Etchmiadzin Gospels of 989 (Yerevan, Matenadaran, 2374) have elaborate Canon Tables (Kouymjian 1977; IAA online), the latter closely resembling those of the Ethiopic Gospels of Endā Abbā Garimā (see fig. 1.6.8). As the tradition became conventionalized, the *Letter of Eusebius* was placed on two facing pages followed by the ten Canon Tables laid out on four more pairs, each set with a unique mirror image decoration. In some luxury thirteenth-century Gospels a lavish twin-page dedication highlighted in gold was also added and decorated like the canon arcades (Washington, Freer Gallery of Art, 44.17; Jerusalem, Armenian Patriarchate, 251; Baltimore, Walters Art Gallery, 539; Yerevan, Matenadaran, 10675; Der Nersessian 1993 for details).

Armenian miniature painters preferred to use the hair side of parchment when they had a choice (Merian et al. 1994a, 128). One regularly finds in the most accomplished scriptoria, especially of the Cilician period, that the scribes when laying out the manuscript accommodated the painter by leaving the flesh side of the bifolium blank resulting in an alteration of facing blank pages and decorated pairs in the Eusebian apparatus. This is the case for the manuscripts just cited as well as for the Glajor Gospels (Los Angeles, UCLA, Arm. 1; Mathews – Sanjian 1991). Specialists regard certain Armenian Canon Tables such as those of the Etchmiadzin Gospels (Yerevan, Matenadaran, 2374) as faithful models of Eusebius's prototype of five centuries earlier (Nordenfalk 1938; Kouymjian 1993b, 130). Several mediaeval Armenian recipe-like treatises on the decoration of Canon Tables have survived, but artists were rather casual about following them (Russell 1991; Łazaryan 1995). Nevertheless, such traditions as placing peacocks above the arch of the first page of the Eusebian Letter at the beginning of the series, were carefully maintained.

In the earliest Gospels, the evangelists were portrayed in pairs, either standing (the majority) or seated (Kouymjian 1977–1979, 1996a). Gradually, following the Byzantine tradition, the evangelists were individually painted seated in the posture of a scribe before his lectern. The Mlkʿē Gospels reserve a single full-page portrait for each evangelist two seated and two standing as in the Syriac Rabbula Gospels of 586.

Fig. 1.3.2 Los Angeles, CA, J. Paul Getty Museum, MS Ludwig I 14: Bible, Isfāhān, 1637/1638, 252 × 183 mm, f. 3r, photograph courtesy of the Paul Getty Museum.

In time the portraits were moved into the text opposite the ornamented first page of the evangelist's Gospel.

The Armenians never developed a fixed series of twelve liturgical scenes such as the dodecaorton of Byzantine icons; among eleventh century Gospels there are cycles from seven to fifteen scenes while in the post-Cilician period cycles of sixteen miniatures and more are common. In most Gospels these were grouped together at the beginning before the Gospel texts; however, as early as in the eleventh century, two manuscripts have very extensive cycles of large and small miniatures of major and minor episodes scattered throughout the four Gospels rather than grouped at the beginning. One of these, the exquisite classicizing, but partially mutilated, Gospels of King Gagik of Kars (Jerusalem, Armenian Patriarchate, 2556) originally had over 227 miniatures (Mathews – Sanjian 1991, Table 8): full page, half page, and smaller sizes embedded within one of the two columns of text usually accompanying the corresponding text. The other, the Gospels of the Catholicos (Yerevan, Matenadaran, 10780; Matʿevosyan – Izmaylova 2000) with about seventy subjects, perhaps executed in Arcʿax-Karabagh, is painted in a provincial, indigenous style, far removed from the classical tradition of the other. When, after a hiatus of nearly a century due to the devastation of the Seljuk Turk invasions in the second half of the eleventh century, manuscript production started again in the second half of the twelfth and thirteenth centuries both methods of illustration—grouping narrative miniatures together at the beginning or continuously illustrating the text with an expanded cycle—were practised.

The earliest illustrated secular works date from the late thirteenth century, but they are rare. These include an illustrated History by the fifth-century author Agatʿangełos of 1569 (Yerevan, Matenadaran, 1910) and scenes from the Battle of the Avarayr (451) as narrated in Ełišē's *History of Vardan and the Armenian War*, also fifth century (Kouymjian 2007b), but also pictures in hymnals (Yerevan, Matenadaran, 1620 of 1482), medical and scientific texts, illustrated zodiacs and astrology (Kouymjian 2007c), and a book on devs (Venice, BNM, no. 210; Macler 1928, 29–42). By far the most illuminated secular text is the *History of Alexander the Great* by Pseudo-Callisthenes (Kouymjian 1999, 2007d, 2012b), though even that text was given a Christian slant through the addition of *kafas* or moralizing poems by Xačʿatur Kečʿarecʿi (1260–1331). Artistically the most important and beautifully illustrated *Alexander*, the Venice Mekhitarist codex (Venice, Mekhitarist library, 424), is also the oldest illustrated example, *c.*1300–1320 (Traina 2003). Twelve other Armenian *Alexanders* with miniatures are known dating from 1535 to nineteenth century, with equally long cycles averaging some 125 scenes, often different in subject, style, and iconography from that of Venice. Codicologically, these manuscripts are laid out in one column like non-liturgical works often with space left within the frames of the miniatures for the extra-textual commentary of the *kafa*-poems. The *Alexander* manuscripts demonstrate that the layout and arrangement of text and commentary were entirely subjected to the illustration laid out by the scribe prior to the copying; the text with its pictorial representation moved forward in lock step. These largely unstudied Armenian examples

offer answers to many codicological questions particularly with the information offered by two examples in which the pictorial component was left incomplete but scribal instructions to the painter preserved (Jerusalem, Armenian Patriarchate, 473 of 1536; Połarian 1966–1991, II, 460–466; Yerevan, Matenadaran, 8003, nineteenth century).

The copying and decorating of manuscripts was exclusively the prerogative of the clergy, usually monks in monasteries both in Armenia and the diaspora; however, a few lay people are noted in colophons and even occasionally a female scribe. Within the scriptorium a team of scribes, artists, and binders usually produced manuscripts. The layout of a manuscript was directed by the principal scribe, especially for illustrated codices like the Gospels or a secular work like the *History of Alexander the Great*. We know this from incomplete manuscripts, which preserve a variety of instructions for the craftsmen. For the Gospels, after the scribe or scribes finished the copying, the book or its quires would be passed onto the artists, who, after illuminating it and decorating the initial quire with the Eusebian Letter and Canon Tables, would pass it back to a scribe, often a different individual specialized in inserting the columns of concordance numbers in the canons. It would then be passed on to an in-house binder. There are innumerable indications of the time needed for copying, from months to years; a specific example from the long and very detailed colophon of a Bible copied in 1332 at the monastery of Glajor (Venice, Mekhitarist library, 1007/12; Sargisyan 1914) gives details of prices paid: it reports that the 471 folia in quinions in two columns of 53 lines were accomplished in eleven months by two scribes, roughly 43 pages a month for each scribe (Sanjian 1969, 10–12).

A particular instance of the working process between the scribe and artist is indicated in red ink in and around picture frames in an *Alexander History* copied by the monk Margarē in 1536 at the Monastery of Varag, high above Lake Van, and illustrated by the Catholicos of Ałtʿamar Grigoris (Jerusalem, Armenian Patriarchate, 473; Połarian 1966–1991, II, 460–466). There are twenty-three preserved miniatures but some one hundred framed empty spaces for the remainder of the miniatures with indications of what is to be painted and small exchanges between the collaborators as the manuscript passed back and forth between the neighbouring monasteries: ‘Paint a mounted horse here’ f. 16; ‘Artist leave some space, oh spiritual brother’ f. 47; indication in the empty square, ‘Thebans greeting Alexander’ f. 50v (Kouymjian forthcoming b).

A pioneering work bringing together an immense corpus of artistic and codicological data from decorated and illustrated Armenian manuscripts was accomplished by Astłik Gēorgyan (general decoration, 1973; portraits, 1978; zoomorphic and anthropomorphic letters, 1996). Her final monograph based on the 11,000 manuscripts in the Matenadaran presents in chronological order the 464 artists identifiable by their colophons (Gēorgyan 1998), and a second volume lists 903 anonymous artists (Gēorgyan 2005). These tomes not only identify all manuscripts in the Matenadaran collection painted by each artist, but provide a complete list of every scene painted, the place of execution, a short biography and bibliography on the artist, and useful for codicology, complete artists’ colophons; it is a fundamental resource for the life of artists and how they worked within scriptoria.

3.6. The scribe, the painter and the illuminator at work

3.6.1. Colophons

Thanks to the regular use of colophons by Armenian scribes, illuminators, binders, painters, and patrons, we know much about the making of an Armenian manuscript, with or without paintings, perhaps more than any other book tradition (Sanjian 1969, 1–41; Sirinian 2014). The scribes added one or more such memorials, which in formulaic manner provide date and place of execution, the patron’s name, the ruling authority (king, governor, foreign overlord, catholicos), the painter’s and even the binder’s name (often in separate colophons), and naturally the scribe’s, with family details, the circumstances of copying, and frequently political and economic conditions (Sanjian 1969, 8–9; Sirinian 2014, 74–85). The earliest colophon still attached to a complete codex is from 887 (Lazarian Gospels, Yerevan, Matenadaran, 6200). The thousands of dated colophons are a major source on the scribe’s work and the organization of scriptoria, as that of a Gospels of 1053, which mentions by name the scribe, painter, binder, the parchment softener, the gold ink preparers, and a general assistant (MS Yerevan, Matenadaran, 3793; Aṙakʿelyan 1958, 310). The largest group of Gospel commissioners was Armenian nobility and upper clergy; these were for personal use or as an offering to a religious institution. Merchants and other members of the bourgeoisie were active patrons after the thirteenth century, increasing in number as the nobility began to disappear with the

fall of the kingdom of Cilicia in 1375 after which the upper clergy led less privileged lives. In theory, at their inception all Armenian manuscripts had a colophon, but since memorials were usually on the last pages, they were vulnerable to loss.

Colophons were also important for their historical information; as early as the late thirteenth century Stepʿanos Orbelian used them in his *History of the Province of Siunikʿ*. Though invaluable sources for codicological questions—organization of scriptoria, division of labour, duration of copying, source and quality of paper, parchment and ink—thus far they have been only rarely and randomly exploited. At times they discuss the price paid for copying and the extremely difficult environment of the copyist as well as relationships between scribes and painters and their superiors and patrons (Sanjian 1969, 9–33). Armenian colophons are usually given in toto in manuscript catalogues. The first collections of Armenian colophons were made in the nineteenth century, but only since the 1950s has their systematic publication been undertaken, now comprising ten large tomes with some 16,000 individual colophons from 8,000 manuscripts. The only translation of collected colophons in a western language is a pioneering work covering a selection from 1300 to 1460 (Sanjian 1969). The late Jos Weitenberg initiated a project to digitize in a searchable database all published Armenian colophons; the Matenadaran and the Academy of Sciences in Yerevan continued the work. The project 'Accessing Armenian Colophons', begun in the 1990s, was focused on lexicography and palaeography. When completed it will provide access to some 7,500 printed pages of colophons. In the period 1995–1997, the project was put online: the complete texts of colophons published by the Matenadaran, including indexes and unpublished corrections and additions (an update on these projects can be found in Sirinian 2014, 71–72).

3.7. Bookbinding

Armenian bookbinding technique was influenced by the Coptic leather bindings, perhaps through the intermediary of Syria and Byzantium. Leather covered boards were the standard for Armenian manuscripts. Like Byzantine examples, the text block and the size of the boards are the same; there is no overlapping or 'squares' as in European bindings. Both traditions used a raised, embroidered headband at the two ends, which required that manuscripts be stored lying flat.

Binding structure has been very well studied by Sylvie Merian (1993; 1994, Merian et al. 1994a, 130–134): the use of *grecquage* (the v-shaped notches for sewing bifolia), the distinctive Armenian headband sewing, the method of attaching the book block to wooden boards, the use of cloth linings to cover the board attachments (but not their artistic analysis as textile fragments). Their decoration has been analysed (Kouymjian 1992b; 1993a; 1998b; 2007e); the characteristics of a particular style, the New Julfa – Isfāhān school of the seventeenth and eighteenth centuries, influenced by westernized decoration has been published (Kouymjian 1995). However, in the same period rural centres far removed from contact with voyagers and merchants, such as the monastery of Tatʿev, held strictly to the traditional motifs. This archaizing tendency coupled with repeated rebinding present problems of dating even when binder colophons exist. Little attention has been paid to these traditional motifs. Fashioned almost exclusively of tooled rope work or braided guilloche bands, they have been classified into three groups, each contained within a guilloche frame: 1) a braided cross on a stepped pedestal, 2) a rectangle filled with braided tooling, and 3) an intricate geometric rosette (Kouymjian 2008a, 2008c).

Yet, among Near Eastern binding traditions, Armenian craftsmen employed a number of different techniques, first pointed out hastily (van Regemorter 1953, modified in 1967), then more thoroughly (Merian 1993; 1996). Armenians used supported stitching to sew quires together, whereas in the Byzantine or other Middle East traditions, quires were sewn to each other without supports. Merian suggests this might have happened through Crusader influence during the Armenian kingdom of Cilicia, but pre-Cilician Armenian bindings seem also to have used supported stitching. Boards of Armenian bindings were usually much thinner (2–5 mm) than Byzantine or Syrian ones; they were also placed with the wood-grain running horizontally, while other east Mediterranean binders placed them running vertically. Furthermore, Armenian leather bindings usually had a flap, precisely the size of the fore-edge, attached to the lower cover forming a box-like container. Armenians always covered the inside boards with a doublure of some distinction (Dournovo 1953; Tarayan 1978). These linings are of cotton, silk, linen, and other fabrics and have both woven and stamped patterns; sometimes they are embroidered. A large number of them were fashioned outside Armenia: Iran, India, Byzantium, and the west. Because they were consistently used, there are thousands of them; only a few dozen have been published.

Armenians decorated the leather with blind tooling, using a variety of stamping irons, though never ones with bird, animal, or heraldic designs. Stamps were usually not applied to the spine, which was normally decorated with thin vertical fillets. Gold stamping was almost never practised. On some volumes binders reinforced the designs of the tooled decoration with rounded metallic studs; these also served to protect the covers of the book (Merian et al. 1994a; Kouymjian 2006, 2008a, 2008c).

The principal decorations on Gospel bindings are a braided cross on a stepped pedestal, sometimes called a Calvary cross, on the upper cover and a vertical rectangle made of dense braids or rope work on the lower. There are some variants of these motifs, which are often made entirely with stamping irons rather than hand-tooled braiding. These designs underline the central theme of the Gospel narrative: Crucifixion and Resurrection. The rectangle on the lower cover represents the empty tomb of the risen Christ (Kouymjian 2008c). The paired motifs seem to be the oldest decoration found on surviving manuscript covers, going back perhaps to the eleventh and twelfth centuries and continuing to the end of the seventeenth. Almost all such bindings are Gospels. Sometimes on bindings other than the Gospels—hymnals, rituals, and secular texts—an elaborate geometric rosette composed of intersecting triangles or squares replaces one or both motifs. Similar designs, ultimately of Coptic origin, but reinforced by Islamic decoration, are found in Mudejar and other traditions.

Though the decoration of Armenian binding continued unchanged until very late, the decor of leather bindings in specific regions underwent a change in the seventeenth century (Kouymjian 1995), when the meaning of the rectangle became obscure. Binders simply replaced it with a visually clearer image of the Resurrection to match what by then had become a very iconic Crucifixion instead of the barren cross; this was especially true of silver bindings of the eighteenth and nineteenth centuries (Kouymjian forthcoming a).

The earliest binder's colophons are from the tenth and eleventh centuries, though the bindings are not preserved: Gevorg, tenth century and Yovannēs, restorer and binder of 1284 (Yerevan, Matenadaran, 5547, ff. 7, 149v); Gevorg, binder-scribe, early eleventh century, Ani (Yerevan, Matenadaran, 988); Grigor, later eleventh century (Yerevan, Matenadaran, 275); Yakob, 1190, Airivank (Yovsēpʿyan 1913, 197); Gevorg, 1194 who mentions his teacher Tʿoros the binder (Yovsēpʿyan 1951); Aṙakel of Hṙomkla, 1260 (Ališan 1901, 489). By this period bookbinding had become a specialized and highly developed art in mediaeval Armenia.

A particular feature of bindings from New Julfa – Isfāhān in the seventeenth and early eighteenth centuries is the presence of stamped inscriptions, usually dated, on the leather covers. More than a hundred are recorded (Kouymjian 1995, 13); they provide precise dates for codicological features of late Armenian manuscripts. Silver bindings (see below) survive from the thirteenth century. There are also silver-enamelled bindings, and at least one of a seventeenth-century Gospel with an icon-like painting executed directly upon the upper leather cover (MS Venice, Mekhitarist library, 1580/183, Sargisyan 1914, no. 183; Kouymjian 2008a, 170 fig. 10). Though leather bindings differ by region and century, they belong to a single recognizable family.

There is a small group of bindings from the eighteenth century decorated with concentric rectangles filled with floral scrolls, the innermost band with a dated inscription: one of 1725 has a western inspired Crucifixion stamp in the centre (Isfāhān, New Julfa, no. 452; Kouymjian 1995, 16 fig. 2). Similar concentric rectangle decorations are known in early Latin bindings (Paris, Bibliothèque Mazarine, no. 142 of *c.*1200, Coll – Conihout 2003, no. 7). Just how this style was adopted in New Julfa is not clear; perhaps through Amsterdam, where the first printed Bible in Armenian was issued in 1666 (Kévorkian 1986, 51–60). One should also mention a series of late bindings from several localities with simple intersecting diagonal, horizontal, and vertical fillets, much like Byzantine bindings (Federici – Houlis 1988, types 3–8, pl. XIX; van Regemorter 1967, pl. XVI–XVII); these simple patterns have been associated with binders from the Armenian colony in the Crimea (Aṙakʿelyan 1958, 198–200), but they can be found in late bindings from several regions.

Despite these affinities with Byzantine and European decorative systems, the mass of Armenian leather covers demonstrate a clear and immediately recognizable native look, even if motifs are occasionally copied from the European traditions. There was a change in design in the post-Byzantine period, particularly in the colonies of the seventeenth-century Armenian diaspora. The traditional blind tooled braided cross rectangle are abandoned as archaic motifs.

The most characteristic regional style is that of New Julfa – Isfāhān. The leather is lighter in colour; new stamping tools are employed, often western in style and historiated, principally Christ on the cross and the Virgin. An elaborately blind stamped design with a crucifix with radiating tongues of flame like a 'sunburst' is on the upper cover, while on the lower, a stamp of the Virgin within a similar circle with stars replacing the flames for a 'starburst'. The stamped and dated inscriptions serve to date the stamping tools (Kouymjian 1995, 32–35).

In Constantinople, the most important Armenian diaspora community, active in the late eighteenth and nineteenth centuries, western binding techniques replaced conventional Armenian ones, especially printed books, which may have come bound from European centres of printing (Kévorkian 1986, 7).

There were holdouts here and there; occasionally one finds a traditionally bound and decorated Armenian book or manuscript in the early nineteenth century (Tbilisi, National Centre of Manuscripts, Arm. 41 of 1823). Fine binding continued until the twentieth century, however, it was almost always with silver plaques attached to leather covered boards. Liturgical books, considered holy objects, were displayed on the altar with their silver and gilded covers. The tradition continues today; however, silver bindings are purchased from specialized international companies, in most cases Greek Orthodox suppliers, thus, a Greek connexion through bindings continues.

The term silver binding refers to all metal plaques applied to Armenian manuscripts and printed books. Some 95% of these are of silver, the rest in baser metals, often covered with clusters of ex-votos (mostly inscribed crosses and charms). There are rare bindings in solid gold (Etchmiadzin inv. 224 of 1410; Durand – Tarayan 2007), though many of the silver specimens are parcel gilt or have been completely gold washed. A large majority of these double bindings are in the form of individual plaques attached, usually nailed, directly over the tooled leather of the functional binding. Some have silver spines; a small number retain the custom of a fore-edge flap in silver attached to the lower cover. Almost all have, or had, clasps, most commonly two, to hold the covers closed.

Though we use the term silver bindings because of the attached plaques, these crafted rectangles of precious metal added nothing to the solidity of the volume, rather their extra weight contributed to eventual deterioration. They were usually worked in repoussé and were sometimes adorned with gems, gilding, enamelling, filigree work, engraved inscriptions, polishing, chiselling, and other techniques practised by jewellers. Another difference between the making of sliver and leather bindings is the competence and training of the craftsmen involved. Leather bindings were executed by binders, also responsible for the assembling of the manuscript or book: their sewing and consolidation. Silversmiths were only responsible for enhancing the object and not usually involved with the actually binding of the volume.

Through colophons we know there were cases where a scribe would also be the painter and sometimes the binder of the book, but for silver bindings it is hard to find an example of a scribe or miniaturist or even a bookbinder who also fashioned a silver one; silver covers introduced the silversmith or jeweller into the chain of book production. Unlike the rural, monastic production of manuscripts, the crafting of precious metals was in secular hands and an urban activity. We can surmise that the painters of Gospels, Psalters, and other liturgical books understood the rules of how religious scenes were to be constructed, because they were trained within the monastery. How then did the jeweller who might have been very close to the church, but was not formally part of it, learn Christian iconography? There is much less information on these skilled artisans than there is on miniature painters. We might suppose there was an apprenticeship system, which included imitating early objects and copying illustrations from manuscripts or printed books, Armenian and European.

The oldest extant Armenian silver binding was made in the kingdom of Cilicia, now a treasure of the Cilician Catholicosate dating to 1254 on the Barjrberd Gospels of 1248 (Antelias, Catholicosate of Cilicia, no. 1, Agemian 1991; Kouymjian forthcoming a, 'Part II, Silver Bindings', no. 1). The second oldest is also from Cilicia, dated 1255 on a Gospel book of 1249 now in the Matenadaran in Yerevan (Yerevan, Matenadaran, 7690; Durand 2007, 266–267 no.116).

Notable is the school of silversmiths of Caesarea/Kayseri, where by the end of the sixteenth century half of the population was Armenian (Kouymjian 1997, 28–29); there are over forty elegant inscribed bindings produced from the 1650s to the 1740s often with inscriptions mentioning the name of the artist (Kʿurdyan 1948; Merian 1994; Malxasyan 1996; Merian 2013, 170–181 Table 1 lists 47). They eschew the usual Crucifixion-Resurrection motifs for elaborate Biblical scenes often enclosed in frames with busts

of the apostles and prophets. The binder-silversmiths' names suggest that they were members of several families of craftsmen who probably immigrated from New Julfa – Isfāhān in the seventeenth century (Malxasyan 1996, 186–190). The rendering of the scenes often follows engravings from Armenian printed books, especially the heavily illustrated Bible 1666 (Merian et al. 1994a; Merian 2013, 182–185, Table 2). Unfortunately, the profiles of other workshops have not yet been established. The Cilician Catholicosal collection has some thirty silver bindings offered by pilgrims or parishioner mostly in the eighteenth and nineteenth centuries, which reveal the outlines of a Cilician school perhaps centred in Adana, for instance the cover of the prized Ritual book of 1765 (Kouymjian forthcoming a, Part II, no. 2).

Who were the silversmiths who fashioned these precious objects? We have little information other than for the Caesarea/Kayseri. Inscriptions mention a large number of towns and cities: Edirne/Adrianople, Constantinople, Kütahya, Karin/Erzurum, Muš, Van, Lim, Arckē, Kars, Ējmiacin, Diyarbakır/Tigranakert, New Julfa, Kishinev/Chișinău, St Petersburg, Moscow, Calcutta, Adana, Sis, Izmir, and smaller localities served by the Cilician Catholicosate. Identifying provenance is doubly difficult because almost all the silver over-bindings are found on printed books published in Amsterdam, Venice, or Constantinople and not on manuscripts in which the expected colophon could have contained the information.

References

Abrahamyan 1947, 1973; Agemyan 1991; *Album* = Stone et al. 2002; Ališan 1901; Ařakʿelyan 1958; Babenko 1988; Brock 1965; Coll – Conihout 2003; Clackson 2000; Der Nersessian 1964, 1973a, 1993; Dournovo 1953; Drampian 2004; Durand 2007; Durand – Tarayan 2007; Eganyan et al. 1965, 1970, 2007; Federici – Houlis 1988; Galfajan 1975a, 1975b, 1975c; Gēorgyan 1973, 1978, 1996, 1998, 2005; Gippert 2010a; Harutʿyunyan 1941; Kévorkian 1986; Khachatrian 1996; Kouymjian 1992a, 1992b, 1993a, 1993b, 1995, 1996a, 1996b, 1997, 1998a, 1998b, 1999, 2002a, 2002b, 2006, 2007a, 2007b, 2007c, 2007d, 2007e, 2008a, 2011a, 2011b, 2012a, 2012b, 2013, 2014, forthcoming a; Kʿurdyan 1948; Łazaryan 1995; Leroy [M.] 1938; Macler 1920, 1924, 1928; Malxasyan 1996; Manoukian 1996; Matʿevosyan 1969; Matʿevosyan – Izmaylova 2000; Mathews – Sanjian 1991; Mercier 1978–1979; Merian 1993, 1994, 1995, 1996, 2013; Merian et al. 1994a, 1994b; Minasyan 1972; Mouraviev 2010; Nordenfalk 1938; Orna – Mathews 1981; Połarian 1966–1991; van Regemorter 1953, 1967; Renhart 2009; Russell 1991; Sanjian 1969; Sargisyan 1914; Schreiner 1983; Sirinian 2014; Tarayan 1978; Tašyan 1895, 1898; Traina 2003; Voskanyan et al. 1988; Xačʿikyan 1950, 1955, 1958, 1967; Xalatʿeancʿ 1899; Xažakyan 1984; Yovsēpʿyan 1913, 1951. Web sources: Kouymjian 1977, 1979; *Rinascimento virtuale* 2002.

4. Christian Palestinian Aramaic manuscripts (AD)

The relatively few surviving Christian Palestinian Aramaic manuscripts have not previously been the subject of any codicological research. A proper study of the papyrus used, an analysis of the parchment (animal species, technical treatment), of the paper (origins of materials, forms) and an analysis of the ink remain a desideratum, as does a comprehensive overview of layouts (formats, rulings, quiring) and of binding typology. In the following, a first survey based on the available data is presented.

4.1. Materials and tools

4.1.1. Papyrus

In the ancient period (fifth to tenth centuries), Christian Palestinian Aramaic manuscripts are sometimes written on papyrus but mostly on parchment; they are written in uncial-like characters.

Archaeology reveals that parchment and papyrus coexisted during the same period at Kastellion. Papyrus probably came from the shores of the Dead Sea (just some twelve kilometres away); it has been preserved thanks to the climatic conditions of the Judaean desert. The Sinai 'New Finds' brought to light nine more papyrus fragments, all belonging to the same document, *Apophthegmata patrum*, according to the alphabetical tradition (Sinai, St Catherine, New Finds ΣΠ 1-9N). The script is to be assigned almost to the same period as that of the papyrus of the Laura of Marda (Jerusalem, Rockefeller Museum, Mird 1236, 1238, 1239). Written on both sides, these are fragmentary leaves of a codex.

4.1.2. Parchment

The main corpus of Christian Palestinian Aramaic manuscripts is made up of parchment documents. Already in use in the ancient period simultaneously with papyrus, parchment continued to be employed in the mediaeval period (tenth to twelfth centuries). An early eleventh-century lectionary of Sinai, St Catherine, New Finds, CPA Sp 2, is made of parchment. So is Vatican City, BAV, Vat. sir. 19 (lectionary A), which is very similar in terms of script and dates to 1030 CE, and two more lectionaries from Sinai, St Catherine, New Finds, M41N (lectionary E, with the fragments Sp 9, 10 and 11) and M42N (lectionary F).

Although much of what survives is scattered leaves, one can conclude that the majority of the manuscripts were biblical books (both Old and New Testament: Pentateuch, historical books, Prophets, Psalter, Gospels, Acts of the Apostles and Epistles), as well as lectionaries arranged according to the Melkite calendar, and also some patristic texts and hagiographical collections and apocrypha.

The existence of a large number of Christian Palestinian Aramaic palimpsests raises several questions. The fact that many ancient manuscripts were reused for Greek, Syriac, Georgian and Arabic texts suggests that they had fallen out of use around the tenth century. At the same time, this does not explain how it happened that the tradition was revived in the eleventh century, in a cursive script different from the uncial of the earlier manuscripts. Furthermore, a number of not insignificant Christian Palestinian Aramaic parchments were reused for new Aramaic texts during the mediaeval period.

The palimpsests feature superior texts in Christian Palestinian Aramaic (for example, many fragments from Sinai, including the F lectionary and a new version of the *Apophthegmata patrum*), in Greek (for example from Khirbet Mird), in Syriac (for example numerous manuscripts from Sinai, including the famous *Codex Climaci rescriptus*), in Georgian (Sinai), in Arabic (Sinai) and in Hebrew (the Cairo Geniza manuscripts). One can even find double palimpsests such as in the manuscript Sinai, St Catherine, Arab. 588: the Aramaic text of 1 Kings 2 is covered by a Syriac text that has not yet been identified and which is itself covered by an Arabic text of a prophetologion; according to Gwilliam (et al.) 1896, even a triple palimpsest might be found.

In the eleventh century, parchment fragments written in Christian Palestinian Aramaic were often reused for book covers (Sinai, St Catherine, New Finds X17). This practice was not characteristic of Aramaic Melkites.

4.1.3. Paper

The exact date of the introduction of paper is unknown. It remains an open question whether parchment continued to be used for liturgical Aramaic Melkite books beyond the first quarter of the twelfth century and whether paper replaced parchment or the two materials coexisted until the end of manuscript production, at least at Sinai. In any case, it was with paper that the parchment lectionary in the Vatican collection was

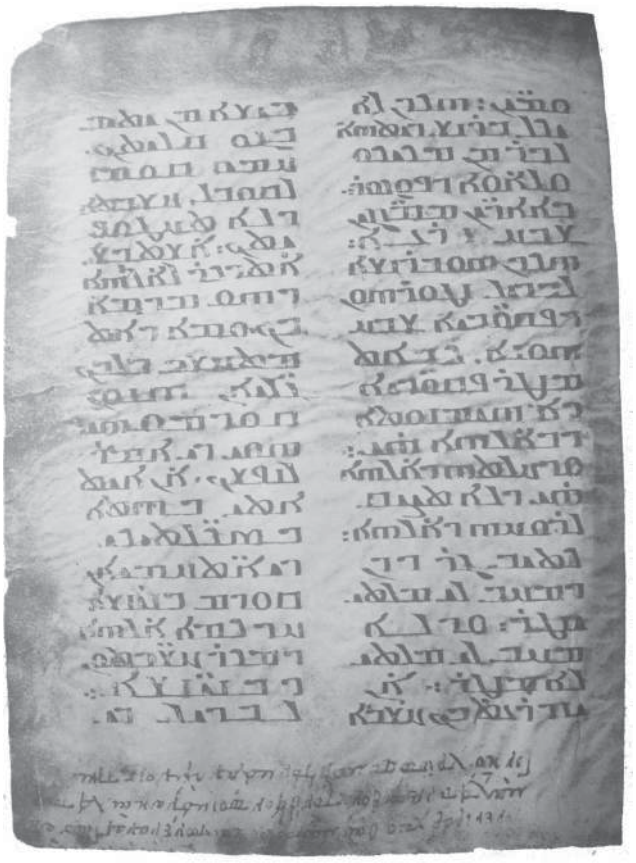

Fig. 1.4.1 St Petersburg, RNB, n.s. 21 (from Kokowzoff 1906, f. 1r): ancient period.

restored. Only five Christian Palestinian manuscripts are made, at least in part, of paper. One is the manuscript Berlin, Staatsbibliothek, Or. oct. 1019 (Black 1954), a horologium written in Jerusalem on 3 October 1187 CE, but found in Cairo (probably originating from Sinai). Two such manuscripts are now in the British Library: London, BL, Add. 14664, f. 34, of the twelfth century, containing three hymns on St John the Baptist, and Or. 4951, a liturgical Melkite book, also of the twelfth century, the writing of which is not very meticulous. The layout corresponds to the ancient parchment manuscript tradition (see also Ch. 1 § 4.3), with well-balanced margins, blind ruling, and the book is sewn tightly with five sewing stations. The quires are mirror-signed. The bifolia of Göttingen, Universitätsbibliothek, Syr. 27, fragments of a Melkite ritual containing a hymn to John the Baptist, a hymn to St Peter and an ordination ritual with Arabic translation, are on thin brown 'eastern paper', possibly of textile origin.

A special case is the aforementioned lectionary A (Vatican City, BAV, Vat. sir. 19): a parchment codex, it has a paper bifolium carefully inserted at the centre of its twenty-fourth gathering, sewn in very skilfully with a thread from the original binding, and with the upper margin aligned with that of the other leaves. The reading that it bears for a fixed celebration (on 20 *Tammuz* = 20 July) attests to a double use with that of Sundays (in the tenth century). Therefore, this addition is evidence for a liturgical update in an age when parchment books were still in use, but paper was already known; possibly a paper bifolium seemed easier to insert, or no parchment was readily available.

4.1.4. Inks

All the manuscripts of the ancient period are written in black ink, but by the tenth century, some leaves also have red ink used for subtitles.

On the majority of parchment leaves, today the ink appears brown: it is possible that the inks used were iron-gall inks that have changed colour from the original black. In some cases, the ink took on an orange hue, probably indicative of the particular metal used in the manufacture of the ink. In rare cases, such as that of the *Apophthegmata patrum* of the Sinai 'New Finds', the ink is deep black.

In the paper manuscripts, three inks were used, black for the text, and both red and green for the (sub)headings, punctuation, liturgical columns and decorations. The black ink remains deep black, and the paper has not corroded, which is a strong indication that it is a carbon ink. The red ink remains a nice red vermilion. All the assumptions concerning the composition of inks still need chemical analysis to be verified.

Luckily, an ink recipe has been found in Christian Palestinian Aramaic, in a small booklet of six parchment leaves, called 'the magical booklet' and discovered at Khirbet Mird in the Judaean desert during the excavations of De Langhe, now preserved at the Université Catholique de Louvain. The editor, Maurice Baillet (1963), dated the booklet to sixth or seventh century. The recipe gives the proportions to be used in making an ink composed of gum arabic, galls and blue vitriol (chalcanthum), which no doubt corresponds to copper sulphate ($CuSO_4$). The recipe goes on to mention the different colours, unfortunately without specifying their compositions: cinnabar, grey green, yellow ochre, marine blue, light green, sky blue, gold, white lead, vermilion, black ink.

4.2. The making of the codex

4.2.1. The composition of the quires

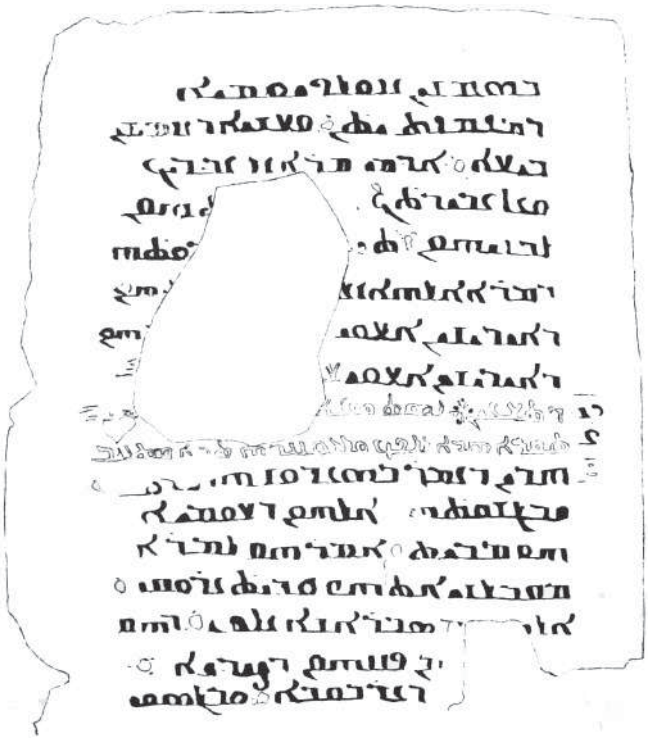

Fig. 1.4.2 London, BL, Add. 14644, f. 29r (drawing by Land 1875, plate VIII): mediaeval period.

All the manuscripts from the ancient period, or almost all of them, are dismembered and scattered, so that their structure is no longer detectable. The manuscript in Cambridge, Westminster Theological College, known as *The Forty Martyrs of the Sinai Desert, Eulogius the Stone-Cutter and Anastasia* (Lewis 1912 = Müller-Kessler – Sokoloff 1996a), however, is sufficiently well preserved that one can still see how it was made. It is composed of quaternions that follow Gregory's Rule, with the flesh side on the outside. The quires are mirror-signed, a system that seems to be characteristic of Christian Palestinian manuscripts (in any case, this system is not found in Syriac manuscripts): the verso of the last leaf of quire 1 and the recto of the first leaf of quire 2 are signed *alaph*=1; the verso of the last leaf of quire 2 and the recto of the first leaf of quire 3 are signed *beth*=2, and so on, in such a manner that the position of a quire within the codex is known from the verso of the last leaf of the quire, the mirror-signature being there to ensure the correct succession of the quires. Moreover, in certain manuscripts such as the Cambridge lectionary of Westminster College (Lewis 1897), the letters do not really correspond to the Semitic numbering system; indeed, after the initial *kaf* form comes the final *kaf* form, after the initial *nun* form comes the final *nun* form, after *phe* comes *pe inversum*, then after *taw* follows double *alaph*, double *beth* and so on. The remains of the manuscript Sinai, New Finds M58-59N display an identical system.

One may conclude that the parchment manuscripts of the ancient period are regularly composed of quaternions (with an exceptional presence of some quinions), and the quires follow Gregory's Rule; only two of the Sinai manuscripts have flesh side on the outside.

The manuscript Sinai, St Catherine, New Finds X17 is a special case. It seems to date from the tenth century, thus between the ancient and the mediaeval periods. It is the only manuscript known to use the 'Syriac' system of quire signatures: the same number is found on the recto of its first leaf and on the verso of its last leaf.

Finally, one should note the presence of signatures on many scattered leaves, thus demonstrating that codices were usually signed. All signatures are placed at the centre of the bottom margin; some are simply decorated with points or dashes around the letters functioning as numerals.

The mediaeval-period manuscripts are much better preserved than those of the ancient period. They are similarly composed of quaternions and mirror-signed. This is the case with lectionary B of Sinai (Palest. syr. 1, dated 1104 CE), lectionary E (M41N, twelfth century), and lectionary F (M42N, twelfth century). The Westminster College Cambridge lectionary (Lewis 1897) consists of twenty-four quaternions and five quinions, all mirror-signed. Lectionary A (Vatican City, BAV, Vat. sir. 19, dated 1030 CE and possibly coming from Antioch), which presents a text similar to lectionaries B and C, is composed of twenty-three quaternions and one quinion. It is singular, however, in using a particular signature system, unique within the Christian Palestinian corpus: quire 2 is signed *alaph*=1 on the recto of its first leaf, quire 3 is signed *beth*=2 on the recto of its first leaf, and so forth, from right to left; in addition, at the same places, it bears a Greek numeration starting from the last quire, so as to enumerate, from left to right, as in a Greek codex. This oddity in the quire signatures may have resulted from a restoration to repair the sewing and the binding.

Thus, the mediaeval parchment manuscripts follow the tradition of the codex structure of the ancient period, except that the leaves, always set flesh against flesh and hair against hair, compose quires with the hair side on the exterior.

As to paper manuscripts, it is difficult to draw a general rule, for there is only a very small number of them, and only two are complete books. The manuscript Berlin, Staatsbibliothek, Or. oct. 1019, dated 1187 CE, is composed of quaternions, except for one ternion and two quinions, mirror-signed. The manuscript London, BL, Or. 4951, of the twelfth century, is composed of seven quinions, mirror-signed. It is possible that these examples indicate a certain technical laxness during the Middle Ages, at the time when paper replaced parchment.

4.3. The layout of the page

One can scarcely reach any definitive general conclusion regarding the dimensions of manuscripts of the ancient period, given the fragmentary state of the documentation and especially the fact that palimpsests were often trimmed to a smaller size. Nevertheless, one can collect information and get an idea of what the dimensions of some manuscripts might have been.

The majority of surviving manuscripts have an average size similar to A4, but generally of greater height (fig. 1.4.1). The *Codex Zosimi rescriptus* Gospels (Oslo, Schøyen, 35 and 36) clearly exceed the A4 dimensions at 315 × 230 mm and the codicological unit containing Cyril of Jerusalem in the same codex reaches 330 × 270 mm. These are obviously books designed for the liturgical service. The *Apophthegmata patrum* codex has a small size, nearly A5, and the Psalter of the Sinai 'New Finds' is even smaller (195 × 125 mm); these are without doubt books designed for individual reading. Between the great A4 and the small A5, a certain number of codices are of average size, like the Gospel of *Codex Climaci rescriptus* (240 × 180 mm). One can also note the sizes according to proportions; one codex with proportion 2/3 (0.67), one with 3/4 (0.75), one with 5/7 (0.71), and six with 4/5 (0.80).

The mediaeval manuscripts are clearly smaller (fig. 1.4.2): only one, a Gospel book of the Sinai 'New Finds' (M41N), is around A4 size; the others are A5 size or a little larger; one is smaller than A5, and a single small manuscript is A6 size (140 × 100 mm). Nevertheless, these are all lectionaries or books with liturgical rituals. This obviously corresponds to the situation of a minor community, progressively moving toward extinction. The proportions remain the same as those of the ancient manuscripts. The stability of these proportions is probably explained by the nature of the materials, but also without doubt by the aesthetics and the ergonomics of reading; this seems to be proved by the constant layout.

A first evaluation of the preparation of the page presented below is based on thirty-two manuscripts of the ancient period and eight mediaeval manuscripts, which is a representative corpus, given the small number of surviving Christian Palestinian manuscripts.

In manuscripts from the ancient period, ruled lines are drawn with a dry point, always on the flesh side. The interline space varies between 8 and 12 mm, usually 8–9 mm. The layout is usually in two columns from 60 to 70 mm wide with an inter-column of *c.*20 mm (but one-column manuscripts exist as well). The most commonly used ruling pattern, represented in fifteen cases, is the one that allows the best regularity: four vertical bounding lines and a horizontal line for each line of writing. Other patterns include: all horizontal lines and three vertical ones: the right margin and two for the inter-column (one example); all writing lines and two bounding lines for the inter-column (two examples); all horizontal lines and one bounding line, for the right column (three examples); all writing lines and no bounding lines (three examples); one horizontal line for two (one example) or three (one example) writing lines and four bounding lines; top and bottom writing line and four bounding lines (one example); one (top) writing line and two vertical lines for the inter-column (one example); only two bounding lines for the inter-column (one example). In some cases, pricking is used instead of or alongside blind ruling. Two manuscripts (Cambridge University Library, Taylor-Schlechter 16325 and *The Forty Martyrs*) have pricks at the ends of all lines, while the writing lines themselves are not visible. Three manuscripts only show pricks, for two columns and at the ends of all written lines; one manuscript shows pricks for text lines and four bounding lines. The desire for harmony in the layout can be appreciated from the fact that at an opening, the bottom margin is equal to the outer margin, and the inner margin is about half the width of the outer margin. Many manuscripts carry running titles, divided between the last page of one quire and the first page of the next.

In the mediaeval period (twelfth and thirteenth century), the signature system and the ruling system stay the same as that of the ancient period, but page preparation is much less meticulous, often lacking justification. Two columns are still employed, with inter-column space reduced to 10 mm. Interlining measures between 7 and 9 mm. For the manuscripts written in two columns, one finds ruling patterns of four vertical and all the writing lines; two vertical and two horizontal lines, top and bottom; four vertical and one horizontal top line; only four vertical lines. For two manuscripts written in one column, the ruling includes two vertical and two horizontal lines forming the outer frame of the text area. The ruling of lectionary A (Vatican City, BAV, Vat. sir. 19) seems to follow no particular logical pattern.

4.4. Bookbinding

Almost all bindings have been lost, but at least three fragmentary examples have been preserved at Sinai. The oldest binding fragment is probably that of Sinai, St Catherine, New Finds M52N (eighth/ninth century) which has kept its spine glued on canvas. The lectionaries B (Palest. syr. 1, 1104 CE) and C (1118 CE) have both preserved the leather covering of the wooden boards.

The other examples are even more fragmentary. Sinai, New Finds, M41N (lectionary E, beginning of the twelfth century) has preserved a part of its headband. Of the binding of manuscript Göttingen, Universitätsbibliothek, Syr. 27 only a wooden board with its strings remains (Byzantine binding type Z1?); it is particularly interesting, for the parchment fragment used as a paste-down carries an ancient Christian Palestinian Aramaic script, datable possibly to the eight century. It is really remarkable that this vestige comes from Mount Athos. The paper bifolia of Göttingen, Universitätsbibliothek, Syr. 27 carry five sewing stations (a central one and two at each side). The sewing of Sinai, St Catherine, New Finds, M41N is three double points (one central point and one point at each side); the quire sewing points are of thick string, the headband sewing points are of thin string.

References

Albert et al. 1993; Baillet 1963; Bar-Asher 1977; Black 1954; Brock 1995a; Delavault et al. 2010; Desreumaux 1979, 1983a, 1983b, 1987a, 1987b, 1989a, 1989b, 1990–1991, 1992, 1996a, 1996b, 1998a, 1998b, 1998c, 1998d, 1999, 1999 [2001], 2002, 2008, 2009; Desreumaux – Schmidt 1989; Griffith [S.] 1997; Gwilliam et al. 1896; Humbert – Desreumaux 1998; Kokowzoff 1906; Lagrange 1925; Land 1875; Lewis 1897, 1912; Merk 1957; Metzger 1977; Milik 1953; Müller-Kessler 1991; Müller-Kessler – Sokoloff 1996a, 1999; Perrot 1963; Rutschowskaya – Desreumaux 1992; Schulthess 1903, 1905, 1924.

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5. Coptic codicology (PB–SE)*

5.1. Materials and tools (PB)

5.1.1. Papyrus

In Coptic (which borrowed many words from Greek), papyrus was referred to mostly by the Greek loanword *chartēs* (cf. Latin *charta*), forms of the Greek word *papyros* (itself a loanword from earlier Egyptian) occurring only rarely in Coptic; as elsewhere (cf. English *charter*, French *charte*), the word *chartēs* came in Egypt to mean simply 'document', regardless of material (Crum 1926, 186–187). Papyrus continued to be used in Egypt even after paper became available about two centuries after the Arab Conquest in the middle of the seventh century, but during the tenth century, when the Egyptians began to manufacture paper for themselves, papyrus fell entirely out of use (Grob 2010, 11–14 (her chart 3 is on p. 10, mislabelled 'Chart 2'; her chart 4 is on p. 14, mislabelled 'Chart 3'); Bloom 2001, 27–29). The latest securely dated Coptic papyrus presently known is a tax receipt of 27 December 942 (Till 1958, 10–11 no. 13), but there is also a private letter on which the date 2 April 959 was added secondarily, presumably by a later writer (Crum 1905b, 502 no. 1213); the latest dated Arabic papyri are from 970/971 and 981. Sometime thereafter, even the papyrus plant, the raw material for making papyrus paper, disappeared from the Nile valley, surviving up until modern times only much farther south (Sudan, Ethiopia).

There is no reason to think that the process of manufacturing papyrus in Egypt changed in any fundamental way during the four millennia of its history, nor that the wholesale form in which papyrus was delivered from the factory was ever anything other than rolls, created by pasting together series of papyrus sheets (*kollēmata*), the individual sheets being normally rather narrow, rarely as wide as even half a metre, typically only 150–200 mm wide and 190–330 mm tall, with twenty *kollēmata* per roll being the norm (Johnson 2004, 86–91; Johnson 2009, 257; scribes could paste multiple factory-standard rolls together to create bookrolls of greater length: see Johnson 2004, 143–152). But as the codex form of book came to predominate over the roll, around the fourth century, there occurred a significant innovation in the manufacturing process, in that very long *kollēmata*—well over a metre in length, sometimes approaching two metres—began to be produced and used in rolls whose purpose was, as it seems, specifically to be cut into bifolia for use in codex quires. Papyrologists have discovered such very long *kollēmata* by reconstructing the rolls that were used in the manufacture of certain papyrus codices, especially Coptic ones (Emmel 1998, 38–39; cf. Robinson [J.] 1978, 39–42).

5.1.2. Parchment

Parchment was already in use in Egypt at the beginning of the Coptic period. What is thought to be one of the oldest Coptic codices of all (perhaps from the third century) is a parchment codex containing a translation of the Old Testament book of Proverbs into an otherwise unknown Coptic dialect (Kasser 1960). Parchment remained in use alongside papyrus, and later on alongside paper. Perhaps parchment was always considered to be generally the better material (as papyrus was considered superior to *ostraca* of limestone, and the latter superior to potsherds, at least in the area around Thebes: Crum 1926, 187–190), and the trend over the centuries seems to have been to replace papyrus books with parchment, and the latter eventually with paper. The scant evidence that survives about the costs of blank papyrus and parchment indicates that parchment was the more expensive material, at times perhaps even as much as twice as expensive (Bagnall 2009, 52–58).

To designate parchment, Coptic used the Greek loanword *me(m)branon* (which could be Copticized as *mefrōn*) or the native Egyptian word for 'skin' *šaar*, which could also be used to refer to one or more codex leaves or—in its meaning 'leather'—to a bookbinding (Kotsifou 2011, 221). There survived in Coptic a fragment of a papyrus codex—two leaves, pages 3–6 (present whereabouts unknown), perhaps from the sixth or seventh century—containing a series of instructions for how to improve the writing surface of a parchment leaf (Crum 1905a; Maravela-Solbakk 2008, 32–33). Each instruction relates to a particular condition of the leaf and its surface. Some details of the nine conditions described are obscure, but they include wrinkled, rough, 'corroded', and sticky (?) surfaces, as well as surfaces on which the ink runs. The remedies mostly involve the use of pumice (*kesile* or *kesilei* (?), from Greek *kisēris*), whether 'soft' or 'hard', apparently either as a powder that can be wiped off (or not), or as a stone with which to rub

* The authors would like to thank Ewa Balicka-Witakowska for her valuable comments on § 5.5.2 of this chapter, and Karin Scheper for her help with § 5.7.

Fig. 1.5.1 Turin, Soprintendenza Archeologica del Piemonte e del Museo Antichità Egizie, cod. I, f. 23v, *Vita Eudoxiae*, papyrus, *c*. sixth/seventh century, photograph Archivio fotografico.

the surface, as well as white lead (*psemithei*, from Greek *psimythion*, *psimithion*, etc.) or a mixture of white lead and alum (*obn*), in either case crushed and then shaken through a linen cloth as a powder, either to be worked into the surface or else wiped off; the use of ochre (*okhru*) is also mentioned. Apparent Coptic neologisms based on Greek words are verbs 'to polish' (*leantērie*) and 'to pumice' (*kesile*), the latter apparently meaning to apply powdered pumice.

We do not know of any studies referring to analyses on which firm statements about the manufacture of parchment in Egypt could be based, including statements about skin sizes and manufactured sheet sizes, although one manuscript was said by its editor to be 'mostly or entirely of goat skin,' without giving any reason for this claim (Worrell 1923, xv). In any case, there is no reason to suppose that there were different markets for the production of books in Coptic and for the production of books in Greek (and Latin) and later Arabic. Investigation of the raw materials of Egyptian book manufacture must take into consideration all the surviving products, regardless of language.

With specific regard to Coptic codices, it has been observed that coloured parchment is very rare (Crum 1905b, xiii and 24 no. 112, two bifolia of a Gospel manuscript 'dyed a bright saffron'). Less rare but still rather uncommon are Coptic palimpsests, and those that exist have not been studied systematically as such. See Thompson 1911 for an example of a Coptic parchment codex that was reused early in the tenth century for a Syriac text; Layton 1987, 76 (no. 72) for Greek written over Coptic; Crum 1905b, 14–15 (nos. 48 and 55) and 242 (no. 505) for Coptic over Greek and Latin; Depuydt 1993, 64–65 and 455–456 (nos. 46 and 263) for Coptic over bilingual Coptic-Greek; other examples are Coptic written over Coptic (for example Layton 1987, 215–218, pl. 23.5–6), including magical spells written over erased biblical texts (for example Emmel 1990, 14–22, pl. 1) and over sub- or non-literary texts.

5.1.3. Paper

'Paper had been introduced to Egypt from Syria in the ninth century, and it was manufactured there by the tenth' (Bloom 2001, 74), but 'there is no evidence that the Copts as a distinct social group ever manufactured their own paper, though it is well known that paper was for a time actively produced in Mediaeval Egypt; European copyists' paper seems to have taken over the Egyptian market in the later fourteenth century' (Layton 1987, lx; cf. Babinger 1931). Coptic paper manuscripts were made both from oriental and from European paper but have rarely been described in sufficient detail as to distinguish them and their characteristics. The earliest dated paper manuscripts in Coptic come from deep in southern Egypt, from the end of the tenth century (Boud'hors 1999a, 76). As with papyrus and parchment, further investigation into the material of paper manuscripts from Egypt should proceed without prejudice to language (see, for example, Humbert 1999).

5.1.4. Other writing surfaces

Still other supports employed in Egypt by Coptic writers were leather, wood, potsherds and chips of limestone (together called *ostraca*), bone, ivory, and cloth, not to mention stone inscriptions, carved wooden architectural elements or the like, and various sorts of writing on walls, whether as graffiti or as legends in association with wall paintings, icons, and so forth. These diverse materials were mostly used for

documentary and ephemeral—sometimes magical—purposes and so mostly as individual pieces, much as single sheets of papyrus, parchment, or paper were also so used. For a number of Coptic legal documents on leather, see Crum 1905b, 182–217 nos. 389, 396, 435, 447–456. Coptic *ostraca* have been published in large numbers, along with documents on other materials, especially papyrus (consult the online *Checklist of Editions of Greek, Latin, Demotic, and Coptic Papyri, Ostraca and Tablets*: <http://library.duke.edu/rubenstein/scriptorium/papyrus/texts/clist.html>), and sometimes *ostraca* are inscribed with excerpts from literary works; a particularly interesting example is nine lines of text from a known work by the famous Coptic author Shenoute written around some 75% of the circumference of a complete ceramic amphora (discovered broken in an archaeological excavation; see Hasznos 2006–2007).

Wooden tablets were used in two different ways. Either the scribe might write directly on the wood with ink, sometimes after having first coated the surface, for example with some sort of white paint, or a shallow recessed area was whittled out from most of the surface of one or both sides of the tablet in order to hold a thin layer of wax that could be incised and then erased any number of times. A set of tablets could be fastened together along one edge (normally the long edge, parallel to which the writing was often done) to form a diptych or polyptych, i.e. a wooden notebook that formally is the oldest forerunner of the literary codex, although literary texts in the strict sense on wooden tablets are the exception rather than the norm (Van Haelst 1989, 13–15; Sirat 1989; Lalou 1992; Worp 2012). The absolute dimensions of the surviving examples vary considerably, but two main types have been distinguished: (1) tablets that are only somewhat more oblong than square, with proportions of approximately 1.25 to 1.6 (or *c.*0.6 to 0.8), as opposed to (2) those that are markedly oblong, for example with proportions ranging from something more than 2.0 up to 3.0 and even 4.0 (or *c.*0.25 to 0.5). The great majority of surviving examples are Greek, although a few of those tablets include also some Coptic (Worp 2012, 60–61); of the fifty or so purely or largely Coptic wooden tablets known thus far, all but a very few are single pieces inscribed with ink, with no example of a waxed tablet (Worp 2012, 55–60; no. 399 was created to be a waxed tablet, and was perhaps so used originally, but finally it was inscribed directly upon the wood). Particularly noteworthy—for being quite unusual—are two wooden tablets of the fourth century from Dakhleh Oasis with Manichaean Syriac-Coptic glossaries of words and phrases (Franzmann – Gardner 1996, 101–126, pls 17–18*bis*; Gardner 2007, 173).

5.1.5. Inks

The ink on one specimen of Coptic parchment (a handwriting exercise of unknown date) has been thoroughly analysed recently, using several different non-destructive spectroscopic methods (Rabin et al. 2012). Among other results, the ink was found to be iron-gall (but with a difference in the metal salt composition of the inks on the two sides, which might have been written by two different scribes). Although iron-gall ink might have been preferred for use on parchment, of course soot-based ink was also widely used in Egypt throughout its history (Lucas 1922; Lucas 1962, 363–364), and there is no particular reason to think that purely tannin inks were not also in use.

Lucas recorded a method of making soot (carbon) for ink that was reported to him by a Coptic priest: ‘Put a quantity of incense on the ground, and round it place three stones or bricks, and resting on these an earthenware dish, bottom upwards, covered with a damp cloth; ignite the incense. Carbon is formed and is deposited inside the dish, from which it is removed and made into ink by mixing with gum arabic and water.’ We may also note here that in the list of instructions already mentioned above for how to improve a parchment writing surface (Crum 1905a), the remedy in the case of running ink is to dilute the ink with ‘a drop of’ some liquid substance, unfortunately not determinable because the word was too badly damaged for the editor to be sure what it was (with hesitation he suggested possibly alum, but some source of tannin is perhaps more likely). A Syriac manuscript from Dayr al-Suryān in Wādī al-Naṭrūn (north-west of Cairo) contains a recipe for the ink that ‘the Egyptian Fathers who lived in this desert used for writing’, which states: ‘If you wish to make ink for parchment, take the parings of the root of a tree which grows in this desert, called *arta*, and pound them whilst fresh, and boil them on the fire in black wine and vinegar made from wine. Then strain, and add a little vitriol and gum arabic’ (Evelyn-White 1926, xlv).

5.1.6. Pigments and dyes

Another recent investigation, using only Raman spectroscopy to analyse the pigments black, red, yellow, blue, and green, sampled from a small number of brightly decorated leaves from one Coptic parchment

codex (tenth century?) and one Coptic paper codex (mid-sixteenth century), revealed that black was obtained from carbon (soot), red from cinnabar (mercury (II) sulphide, vermilion), yellow from orpiment (arsenic sulphide)—whereby orange was obtained by mixing together the pigments red and yellow—while blue was obtained for the parchment manuscript from lapis lazuli (with an admixture of carbon and some aluminosilicate) but for the paper manuscript from indigotine (indigo carmine), whereas green for the parchment manuscript came from a compound of orpiment and indigotine and for the paper manuscript from some unidentifiable organic substance (Coupry 2007; cf. Coupry 2004). A previous investigation using particle-induced X-ray emission focused on Coptic inks and pigments on a variety of supports thought to be from the sixth to eighth centuries (except for one parchment thought to be of eleventh century) and gave somewhat different results (MacArthur 1995). The red in these samples was either from minium (lead oxide, red lead), or from a mixture of minium and cinnabar, with four different mixtures being detectable without any difference in colour apparent to the eye; alongside orpiment, possibly massicot was used for a pale yellow pigment; and here too the source of green proved rather difficult to determine, but the investigator suggested malachite (copper carbonate) and verdigris (copper acetate) as two possibilities, the evidence suggesting also the possibility of deliberate mixtures of pigments to obtain a range of green colours. With regard to the black inks, a clear distinction was found between the use of carbon ink on pottery *ostraca*, and iron-gall ink on parchment.

5.1.7. Writing instruments

Coptic scribes wrote on the various supports available to them using a pen made from a hollow reed (*Phragmites australis*), which when new might approach 300 mm in length. Sharpening a pen meant trimming its length, whereby it eventually became too short to use, unless the scribe extended its life by sticking a piece of wood into one end. Surviving examples show that the pens were 'pointed and split like old-fashioned quill pens, and … the taste of different individuals varied from pointed to stub nibs' (Winlock – Crum 1926, I, 93–94, on pens found at the site of the Monastery of Epiphanius in western Thebes). A pen might be sharpened on both ends, presumably either for different styles of lettering, or for using two different inks (black and red) simultaneously. The scribes kept their pens and other tools (which might include a pointed stylus, or several of them, either for use when writing on a waxed tablet, or for marking ruling lines on some surface) in small boxes of wood (*c.*235 × 69 × 36 mm, for example) with sliding covers and several compartments, including a shallow removable metal ink container (Depuydt 1993, 601, pls 465–467; Friedman et al. 1989, 168–169, where in addition to a writing box, a pen, and three styluses, a ceramic inkwell is also shown), or in pouch-like holders made of leather (Bosson – Aufrère 1999, 276–278, 281–282, nos. 96–101; Rutschowscaya et al. 2000, 64–65; for a carved wooden lid showing a monk-scribe carrying such a pouch over his shoulder, see: Rutschowscaya et al. 2000, 110–111; Gabra – Eaton-Krauss 2006, 80–81; Whitfield et al. 2010, 124, and p. 126 for another example of a leather pen case).

5.2. Book forms (SE)

5.2.1. Miscellaneous forms. The roll and the rotulus

Books in Coptic Egypt were almost with no exception codices, made of either papyrus, parchment, or paper. The very few sets of wooden tablets fastened together like codices and written in Coptic have already been mentioned (Worp 2012, nos. 378 and 379 seem to be the only certain examples; Greek and Coptic combined: nos. 132 and 244, no. 102 = Gabra 2014, 88). Coptic rolls and rotuli are also hardly known. Apart from a number of magical and documentary texts in these formats (which remained in use for documentary purposes for many centuries, well into the second millennium; for example Plumley 1975, two very long rotuli from the late fourteenth century, one in Coptic, with a Greek postscript, the other in Arabic, each *c.*4.82 × 0.34 m), we know of only thirteen Coptic manuscripts in either rotulus or roll form. Within the context of Coptic literature as a whole, these thirteen items are oddities, not at all typical for Coptic manuscript culture in general in any period of its history. Just over half of these items—two papyrus rolls, one parchment roll, four parchment rotuli (Robinson [J.] 1990–1991, 34; his items 8 and 9 are rolls in vertical rotulus form)—are only long enough to contain but a single letter (in one case two letters) by the traditional founder of communal monasticism in Egypt, Pachomius, or one of his two of his successors; measuring, for example, only about 300 × 150 mm, or 500 × 100 mm, and in some cases quite irregular in shape (for example, 570 × 90–155 mm (Quecke 1975, 426–427; Robinson [J.] 1990a, photograph no. 14 facing p. 15),

or 520 × 94–166 mm (Krause 1981, 220 and 233 n. 4)), some of these manuscripts are more like strips of waste material that were nonetheless put to use. The dimensions of the three rolls are not on record.

The remaining examples known to us of Coptic rotuli and rolls are all made of papyrus: (1) a rotulus written both front and back, 670 × 260 mm but originally somewhat taller (*Psalms* 77–78; Vergote – Parássoglou 1974); (2) the last three columns (of varying dimensions) of a roll, with a final column written on the back, 293 × 443 mm but originally longer (*Didache*, excerpt; Layton 1987, 236); (3) three columns (of varying dimensions) of a roll (later than 413), from which at least one column is missing at the beginning but possibly no more at the end, 280 × 780 mm but originally both taller and longer (Cyril of Alexandria, *Ep. fest.* 1; Till 1931; Camplani 1999); on the back, an unidentified homiletic work was written *transversa charta* (so in rotulus form), starting at the beginning of the roll; (4) the last column of a roll, with a few vestiges of the preceding column, blank on the back, 250 × 208 mm but originally longer (unidentified Psalm-like text; Lefort 1939, 1–7, pl. 1); (5) the first four columns of a roll, with traces of writing (later? earlier?) on the back, 235 × 480 mm but originally longer (*2 Maccabees*, excerpt; Lacau 1911, 68–76, pl. 2); and (6) a roll written in about eighteen columns on the back of a (reused) Greek document of perhaps the third century; the dimensions of this latter roll were not recorded (it was in any case already fragmentary when first seen), and the whereabouts of the manuscript are now unknown, but the only scholar who saw it estimated that originally it was approximately 1.8 m long (*Ascension of Isaiah*; Lacau 1946).

5.2.2. The codex

By contrast, Coptic codices have survived in great numbers, albeit often in a pitiably dismembered, deteriorated, or otherwise fragmentary condition, with the surviving fragments often now dispersed among a number of museums and libraries as a result of the various haphazard ways in which Coptic manuscripts were discovered and sold beginning especially in the eighteenth century. But some of the oldest surviving Coptic codices that are well preserved, in particular several of the thirteen Nag Hammadi codices (NHC), are among the oldest specimens of papyrus books in codex form that survive in any language, dating as they do from around the end of the fourth century. Most of the NHC are single-quire codices, as are a good number of other Coptic papyrus codices, but one is made of three (irregular) quires, and a good number of multi-quire Coptic papyrus codices survive, some of them likely more or less contemporary with the NHC. Thus both types were in use at the same time, as was the case with Greek papyrus codices already in earlier centuries (Turner 1977, 98–99).

By the beginning of the Coptic period, papyrus and parchment were both also in use for manufacturing codices (cf. Turner 1977, 35–42): what is thought to be one of the earliest Coptic manuscripts of all is a parchment codex (*P.Bodmer* VI, Proverbs, perhaps from the late third century, and unlikely—because of its unique dialect—to be much later than the fourth century). Probably papyrus continued to be used for codices down to the end of its use for any purpose at all in the tenth century. Although we cannot say with certainty whether we have any papyrus codices, or fragments of papyrus codices, from as late as the tenth century, we may reasonably identify as such a small group of fragments that were used to make *cartonnage* ('papyrus pasteboard', better termed papyrus laminate) for the bindings of six parchment and four paper codices that were copied at Esna in southern Egypt between 974 and 1005 (Layton 1987, xxx and the relevant entries in his catalogue); thus the dates of the reused papyrus leaves (from at least ten different codices) could be as late as the earlier part of the tenth century, although of course some or all of them could be still earlier (Layton 1987, nos. 19+148 cannot be earlier than the later part of the seventh century, for it bears the remains of an Arabic protocol; on the dates of Arabic protocols, see Grob 2010, 13–14; see Depuydt 1993, l n. 30 for an instance showing that leaves from several mid-ninth-century parchment codices were reused only about half a century later for a paste-down in a new codex).

5.3. The making of the codex (SE–PB)

Coptic codicology is greatly hampered by a dearth of securely dated manuscripts. Dated colophons do not appear in the surviving evidence until the ninth century, the oldest being from 822/823, in a parchment codex (Depuydt 1993, no. 162; cf. pp. lxvi and l–li), but the fragmentary condition of so many of the surviving Coptic manuscripts means that many dated colophons have been lost, or else they survive only as isolated leaves, making it impossible to identify other parts of the codices to which they belong. Thus, for dating Coptic manuscripts, Coptologists have for the most part relied on the uncertain criteria of palaeographical typology (based to a great extent on Greek palaeography) and codicological typology.

Similarly, it is often the case that nothing is known about the geographical origin of the surviving Coptic manuscripts, with the lack of colophons being compounded by the fact that many entered modern collections via the Egyptian antiquities trade, without any reliable information as to provenance.

5.3.1. The making of the quires (SE)

While most known Coptic papyrus codices have been investigated codicologically, more or less thoroughly, there does not yet exist a comprehensive synthesis of the facts (but fundamental now are Robinson [J.] 1978 and 1984, 32–86). As has been stated above, it is the normal expectation regarding papyrus codices that their constituent bifolia were cut from rolls that had been manufactured by pasting together a series of *kollēmata*. The clear evidence of this practice is the occurrence in papyrus codices of the *kollēseis* where two *kollēmata* were joined in the manufacture of the roll that was later used for the manufacture of the codex (for diagrams illustrating this phenomenon, see Turner 1977, 46; Emmel 1984, 24–25); and more often than not, one can also trace the continuity of horizontal papyrus fibres from the edges of one bifolium onto other bifolia in the codex, such as to prove that they are cut-apart sections of what was originally a single roll. The rolls used to make the thirteen NHC, thirty-three of which rolls can be reconstructed to something that is surely close to their original manufactured size, varied in length between 1.44 and 3.15 m, with *c.*2.5 m being the average (Robinson [J.] 1984, 60); although narrow *kollēmata* occur in some of the NHC, most of the rolls that were used comprised *kollēmata* more than half a metre long, the longest being 1.625 m (NHC II, roll 2, *kollēma* 1; Robinson [J.] 1984, 66–70).

The simplest procedure for the maker of a papyrus codex to follow was to begin at one end of a roll and to cut it into sheets (usually from the right-hand end of the roll, working leftward to the beginning), placing each newly cut sheet on top of the growing stack of what would become bifolia for his codex. Assuming that the roll had been laid out for cutting in its usual disposition for reading, the sheets in the resulting stack would have horizontal (→) papyrus fibres facing upward, and any *kollēseis* would 'step down' from left to right. When one roll had been cut up, the manufacturer would continue with a second roll, and so on, until he had a sufficient number of sheets for his purpose. If the final sheet cut from a roll was narrower than half the width of a full-size sheet, then it could not properly be used in the codex; but as long as it was at least a centimetre or so wider than half the width of a full-size sheet, then it could be used in the codex as a leaf with a stub as its conjugate (a stubbed singleton). It is possible that the codex manufacturer sometimes trimmed off one or more *kollēseis* and discarded them, as he might also have done with a *prōtokollon*, i.e. the first *kollēma* of a roll, which was typically attached so that its vertical (↓) fibres faced upward, rather than having → fibres facing upward as in the rest of the roll. It is not always the case that each roll used to make a codex was treated in exactly the same way, there being room here for a number of variations in detail.

Even among just the thirteen NHC and the *Berolinensis Gnosticus* (Berlin, Staatsbibliothek, *P.Berol.* 8502; BG), a codex similar to the NHC, there is variation. NHC XIII was made in such a way that it was the rolls' height that determined the width of the bifolia (*c.*270 mm), rather than the height of the roll determining the height of the codex, as is much more usually the case; this unusual feature is evidenced by the occurrence of a *kollēseis* running horizontally across a bifolium, rather than vertically as one usually expects (Robinson [J.] 1984, 48–49). In several other codices there is evidence that the manufacturer varied his procedure of cutting and stacking the bifolia in other ways (Robinson [J.] 1979, 36–37). Five stubs survive in the NHC and BG, and eight more must be postulated even though they are not extant (Robinson [J.] 1978, 25–26; 1984, 41–44); but the manufacturers of these codices must sometimes have discarded remaining ends of rolls that were not wide enough either to form complete bifolia or to be used as stubbed singletons. The NHC also include several examples of the use of a *prōtokollon* in the making of a quire (Robinson [J.] 1978, 25). In NHC VII, the bottom sheet (which was cut from roll 1) was used not as the outer bifolium of the quire, but as a paste-down covering both left and right boards (but possibly not running continuously across the area where the spine met the cover's back; see Robinson et al. 1972, pl. 3; Robinson [J.] 1984, 42; 1978, 52). The maker of yet another early Coptic papyrus codex (containing *Proverbs* in the Akhmimic dialect) cut his rolls in half horizontally in addition to cutting them into sheets as usual, and in this same codex the bottom four sheets in the original stack were used for the upper layers of the laminate boards in the binding and for the paste-down (Robinson [J.] 1978, 35). For an example of a Coptic papyrus codex in which the bifolia cut from the rolls were made into multiple quires (quinions and senions) in a seemingly random order, see Emmel 2003, 92–95.

The number of leaves in the ten NHC that are certainly single-quire codices and are also well preserved, plus BG, varies between 37 (NHC XI, including one stubbed singleton) and 78 (NHC III, including two stubbed singletons), the average being *c.*50 leaves. NHC I has 72 leaves (36 bifolia), grouped in three quires of 22, 8, and 6 bifolia, respectively; thus it is not a multi-quire codex in the normal sense, but is rather to be described as a single-quire codex of 44 leaves that was extended during writing by the addition of an octonion and senion, both written by the same copyist as wrote most of the first quire (except for seven pages in its middle) and containing the continuation and end of a single work that begins three-fifths of the way into the first quire (Robinson [J.] 1984, 39–40). A much more normal multi-quire codex in Coptic, the 'Manichaean Psalm Book' in the Chester Beatty Library (Dublin), has been said to be the longest surviving papyrus codex in any language, with its 28 senions comprising 672 pages (Richter 1998, 2).

In height, the NHC vary between 237 and 303 mm; in such thick quires as occur in most of the NHC, there can be a considerable difference between the dimensions of the leaves at the outside of the quire and those at the centre, up to as much as 30 mm (Robinson [J.] 1984, 55). Measured at the outsides of the quires, the dimensions of the leaves of the codices vary from 242 × 147 mm (NHC VIII) to 303 × 140 mm (NHC I, quire 1) and from 260 × 122 mm (NHC X) to 292 × 175 mm (NHC VII), with proportions varying between 0.46 and 0.62; BG is both smaller (135 × 108 mm) and more nearly square (proportion 0.8) than any of the NHC. Another early papyrus codex of about the same height is slightly oblong: 147 × 159 mm, proportion 1.08 (Robinson [J.] 1990b, xliii–xliv). One of the largest Coptic papyrus codices on record is 365 × 265 mm (Thompson 1908, v–vi; proportion 0.73). Truly oblong papyrus codices are not known to survive (one Greek papyrus has perhaps a proportion of 1.32; Turner 1977, no. 28).

In contrast to what is known about the manufacture of papyrus codices, we know of no investigations into the precise methods of making quires out of parchment or paper (to our knowledge, quires of mixed materials have not been noticed in Coptic codices). What can be said here is that quires were usually formed by superposed bifolia, although in parchment codices there are examples of coupled leaves (seemingly rare) and also stubbed singletons. The dimensions of parchment quires vary considerably, from very small—for example: 56 × 84 mm, 58 × 90 mm, 64 × 70 mm, 66 × 75 mm (Worrell 1923, xii; if these measurements are height × width, as the descriptions seem to imply, then these small-size codices are all somewhat on the oblong side of square; for exactly square small-size codices, for example 73 × 70 mm and 85 × 84 mm, respectively, see Crum 1905b, 394 no. 947, and Emmel 1990, 24–27, pl. 3)—to very large, for example: 445 × 337 mm (Crum 1905b, 24 no. 112, the abovementioned 'saffron Gospels'). A more normal range of sizes can be seen in a group of forty-seven parchment codices from the ninth and early tenth centuries, for the most part well preserved, part of the liturgical collection of the Monastery of St Michael the Archangel in the Fayyum region, south-west of Cairo (Depuydt 1993, lxiii etc.; cf. Emmel 2005): from 387 × 303 mm down to 280 × 218 mm (Depuydt 1993, nos. 13 and 59), the extreme proportions being 0.67 and 0.89 (338 × 228 mm (no. 166) and 341 × 302 mm (no. 65)), the average dimensions being 343 × 246 mm (proportion 0.72), and the average proportion being 0.78 (which just happens to be also the average of the two extreme proportions, as well as the proportion of the average dimensions of the two extreme sizes). Roughly contemporary parchment codices from Upper (southern) Egypt show a somewhat greater range of sizes (but here we do not yet have anything like a full collection of data upon which to draw), from 389 × 297 mm (Cairo, Institut français d'archéologie orientale, Copte inv. 189 = White Monastery codex XL 260/261; Young 2001, 190, gives the dimensions of a slightly smaller leaf from this codex, 380 × 290 mm) down to 261 × 211 mm (Naples, Biblioteca Nazionale 'Vittorio Emanuele III', Sezione Manoscritti e Rari, IB 11 f. 24 = White Monastery codex XE 63/64; Buzi 2009, 239, gives the dimensions of a smaller leaf from this codex, 250 × 190 mm). The length of parchment codices also varies considerably. For the upper range we may state that the very large White Monastery codex XL was certainly 400 and another codex from the same monastery certainly 552 pages long (Emmel 2004, 116 and 147), while an eminent cataloguer of Coptic manuscripts early in the twentieth century reported having noted 'eight leaves or groups of leaves reaching to a page-number above 400, as many to above 500, three to above 700, one to above 900' (Crum 1905b, xi).

The investigation of Coptic quires made from paper has scarcely begun; but see Zanetti 1986a (especially concerning watermarked paper originating from Venice), and Zanetti 1998 (paper manuscripts in one of Egypt's most prominent monasteries from Late Antiquity to the present), both with reference to Zanetti 1986b (catalogue of manuscripts, all but one being paper, in the Monastery of Makarios in Wādī

al-Naṭrūn/Scetis); Layton 1987, esp. pp. lix–lxiii and 424–425 (concerning both European and oriental papers); Boud'hors 1999a (a survey of selected dated paper codices from the tenth to fourteenth centuries).

5.3.2. The composition of the quires (SE)

The result of the simple procedure described above for cutting up a papyrus roll to make a codex would be a stack of sheets that, if folded in half all together, would become the bifolia of a single-quire codex of twice as many leaves as cut sheets (unless there were any stubbed singletons), with one of two possible dispositions, depending on whether the quire was folded with the → fibres on the inside, or with the ↓ fibres on the inside. In the former case, the sequence of papyrus surfaces at each opening, up to the centre of the quire, is →↓, with →→ at the centre of the quire, and then ↓→ through the second half of the quire. In the latter case the openings will be ↓→ at first, ↓↓ at the centre of the quire, and then →↓ to the end of the codex. Of course the maker of the codex might alter this disposition, whether by design or by accident, a purposeful alternative disposition being to have like fibre directions facing like, whether ↓→↓→ and so on, or →↓→↓ and so on (notation is fibre direction of rectos only).

The codex referred to above with its bifolia occurring in a random order in relation to their original order as cut from papyrus rolls is a multi-quire codex in the normal sense, assignable with reasonable confidence to around the middle of the fourth century. The first thirteen quires survive (apart from twenty-nine missing leaves, dispersed among six of the quires), and these are: 2 senions, 1 quinion, 2 senions, 8 quinions (how many quires are lost after quire 13 cannot be determined at present). The disposition of papyrus surfaces in each quire is uniformly →→→ and so on, except that in quire 8 there is a false succession at the second bifolium: →↓→→→ (see further Emmel 2003). Similar irregularities—both divergent quires and false successions—are found elsewhere in Coptic papyrus codices. But at present, it is not yet possible to make generalized statements about the phenomenon. We should add, however, that some Late Antique Coptic papyrus codices survive that seem to show careful and consistent workmanship in their quire structures, such as a collection of seven Coptic Manichaean codices thought to belong to the fourth or fifth century. Despite the poor condition in which they survive, it seems clear that each codex is a multi-quire codex, some consisting either of quaternions or of senions, the disposition of all the quires being like facing like, with ↓ fibres on the outside and on the inside of each quire. In none of these codices has even a single kollesis been observed, which suggests that either the maker of the codices took care to cut the bifolia from rolls in such a way as to avoid using any sections with kollēseis, or else he used papyrus sheets that had never been pasted together into rolls to begin with (Funk 1990, esp. 530–533; Wurst 1996, 5–6).

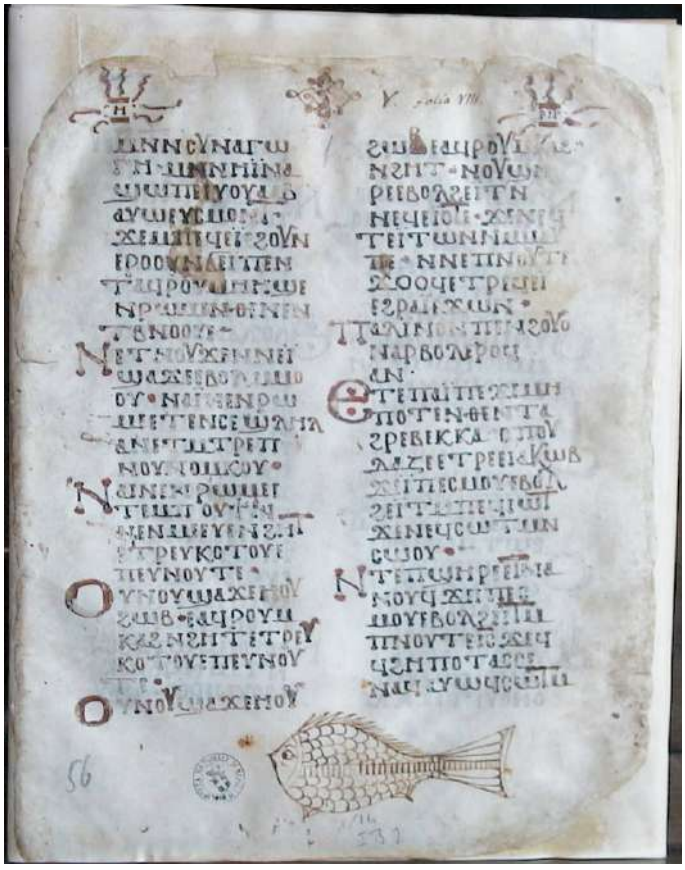

Fig. 1.5.2 Naples, Biblioteca Nazionale Vittorio Emanuele III, IB 3, tenth/eleventh century, f. 56r, Shenoute, *Logos* 5.

Normally, Coptic parchment codices consist of quaternions formed according to Gregory's Rule, with the typical disposition of flesh and hair sides being FHFH. But here too there are occasional false successions—for example, FHHH in quire 24 of a small-size codex (*c.*120 × 105 mm) thought to be from the fifth century—as well as divergent quires—for example, after 29 quaternions in the same codex, a final ternion (Schenke 1981, 9); and there are also irregular quires, for example, in a series of nineteen normal Gregorian quaternions in a codex from around the end of the first millennium,

quire 16 is an enlarged unit with disposition FH,FHF^HFH,H^FHFH, the result of repairing an omission in the text, not necessarily much later than the original making of the codex: leaves 3–8 are a replacement for original leaf 3, leaves 9^10 are the original central bifolium (originally 4^5), and leaf 11 became a singleton, most likely stubbed (Emmel 2004, 207–208; Boud'hors 2013, 9–12; due to modern trimming and rebinding, it can no longer be determined just how leaves 3–8 were joined surgically to the rest of the quire).

Coptic paper codices divide typologically into two groups. The significantly smaller number of older extant paper codices in the Upper Egyptian ('Sahidic' or southern) dialect of Coptic (fig. 1.5.2) are typically made of quaternions, whereas later codices, the vast majority of which are in the Lower Egyptian ('Bohairic' or northern) dialect, are typically made of quinions. We know of no systematic studies, but for a representative sample see Layton 1987, nos. 120, 160, 161, 163 (Sahidic), and nos. 194–210, 216, 219–221, 226–231, 233–236, 244, 251, 253–255 (Bohairic). Among the four Sahidic codices, there are several divergent senions and quinions. Divergent quires in the Bohairic codices occur, with some exceptions, only at the end of a book (see also Khouzam 1999, 134 and Table 3); for a Sahidic paper codex from the end of the fourteenth century made of quinions, see Hebbelynck 1900–1901.

5.3.3. Pricking and ruling (SE)

Pricking and ruling is found in many Coptic parchment codices. A systematic study of ruling patterns in Coptic manuscripts remains a desideratum, but according to presently available observations, the range of ruling types employed is quite limited. By far the most frequent seem to be Leroy ([Julien] 1976) types 00A2 and V 00A2 (= Muzerelle (1999) types 1-1-11/0/0/A and 1-1-11/0/1-1/0), while for single-column codices (which are on the whole less common than two-column codices) we find types 00A1 and V 00A1 (= 1-1/0/0/A and 1-1/0/1-1/0), with other types occurring relatively rarely; Leroy's X-types X 00A1 (= 1-1/0/0/A-0), X 00A2 (= 1-1-11/0/0/A-0) etc. occur (Layton 1987, 426; Depuydt 1993, *passim*; Emmel 2004, 105–107), as do codices that appear to be without any ruling at all. Pricking for individual horizontal lines occurs typically in the outer margins, but sometimes between the columns (sometimes with variation within a single codex). What we usually find is dry-point blind ruling applied on the flesh side. The fact that such ruling is often faint and difficult to discern might be a symptom of occurrences of transmitted ruling (see fig. 1.5.3 for clear pricking and discernible dry-point ruling). But for the most part, we know next to nothing about the techniques employed. Examples of plummet or coloured ruling do occur (the latter occasionally also on papyrus), as well as the sporadic use of inked points along the left margin (for example, Emmel 2004, 326; also known from some Greek papyrus rolls, see Johnson 1993, and codices, see Emmel 1996, 291–292). Even where a ruling pattern includes text lines, it is not uncommon that the scribe did not pay very close attention to them, thus suggesting that the ruling was done by someone else.

Ruling in Coptic paper codices was typically achieved by means of a ruling board (Layton 1987, lxi). The usual pattern is four bounding lines for one wide column flanked by two narrower columns. This pattern was needed for bilingual Coptic-Arabic codices, wherein the Coptic text occupies the first two columns—covering them both with a single wide column of text—with the narrow third column reserved for the more compact Arabic text.

5.3.4. Ordering systems (SE)

From the beginning, Coptic codices were typically paginated, with foliation becoming typical from the later mediaeval period onward. Both types of numbering normally occur in the top margin (fig. 1.5.2). When pagination occurs, it is either approximately centred, or else it stands at or in the outer margin, the marginal position being more frequent, especially in mediaeval parchment codices. Sometimes pagination starts over again one or more times in a codex, occasionally whenever a new work begins. Quire signatures are attested as early as the fourth century and normally occur at the top inner margin on the first and last pages of each quire (for example, Layton 1987, 4 (the fourth-century papyrus codex already mentioned several times; cf. Emmel 2003); Schenke 1981, 9–10, and Schenke 1991, 17 (two parchment codices, possibly fifth-century)). In addition to decoration of the page numbers and signatures themselves, it is not uncommon to find decorative ornaments centred between the two numbers on the first and last pages of a quire, sometimes accompanied by abbreviated pious phrases such as 'Jesus Christ' or 'Son of

God'; such ornamentation sometimes occurs also on pages within a quire (for example, Depuydt 1993, pls 299, 305, 308, 316, 324, 325, 366, 435; Boud'hors 2004, nos. 19, 28). Especially in mediaeval parchment codices, errors in the pagination are rather frequent, whereas the numbering of the quires tends to be more accurate.

Foliation is typical only of late mediaeval and early modern codices, where leaf numbers are usually found only on the versos (which are recto from the point of view of someone used to reading Arabic books; or perhaps the system was meant to number openings rather than leaves). In such codices, a signature may appear twice on the first page of a quire, or else the leaf number may be written both there and on the verso, either way making the appearance of an opening between quires symmetrical because on the left-hand pages of such openings both the leaf number and the signature occur (cf. Zanetti 1998, 176–179). In the Monastery of Makarios in Wādī al-Naṭrūn around the end of the first millennium, the practice seems to have been to paginate codices (of parchment), but to express the pagination only on the versos and on the first page of each quire; this system is found also in at least one parchment codex from the White Monastery in southern Egypt, but most probably originating in the Fayyum, and dating probably from about the same time as the parchment codices from the Monastery of Makarios (Boud'hors 2011, 107 and 108–110).

Catchwords too are a relatively late phenomenon in Coptic codices. Frequently they occur in bilingual codices, in which case they may be in Coptic or Arabic or both (for example, Layton 1987, nos. 193–199, 227, 234–237); sometimes the catchword is just a single letter (Layton 1987, nos. 228, 235). Running titles are rare but do occur in biblical codices (for example, Depuydt 1993, nos. 14 (Gospels), 34–36 (Pauline Epistles), pls 416–417 (a papyrus codex), etc.; Bosson – Aufrère 1999, 221; Boud'hors 2004, nos. 1, 6, 11).

5.3.5. The codex as a complex object (PB)

As far as one can judge despite the generally fragmentary condition of Coptic manuscripts, many were monomerous homogeneous miscellanies (terminology of Gumbert 2004), i.e. each is a single codicological unit containing multiple texts whose boundaries do not coincide with quire boundaries (except at beginning and end, or else only by chance). In most cases, such codices are either monogenetic or homogenetic and were planned from the outset to be miscellanies. Armando Petrucci, listing the first miscellaneous manuscripts of oriental Christianity, has suggested that it is very likely that the miscellaneous codex was an Egyptian creation (Petrucci 2005), possibly born in the schools (Petrucci 1986a, 179–180); one should note that most of the earliest examples of such codices from Christian Egypt belong to a context of cultural continuity between Greek and Coptic milieux. While uniform codices do occur among what are thought to be the earliest Coptic manuscripts, a number of others are miscellanies: for example, a bilingual papyrus codex assignable to around the turn of the third century that contains the *Acta Pauli* in Greek, the Song of Songs and Lamentations of Jeremiah in Coptic, and Ecclesiastes in both Greek and Coptic (Schmidt [C.] – Schubart 1936; Diebner – Kasser 1989); or another papyrus codex perhaps of about the same age, or somewhat younger, containing (all in Coptic) Melito of Sardis *On the Pascha*, 2 Maccabees 5:27–7:41, 1 Peter, Jonah, and an unidentified homily (Goehring 1990; Pietersma – Comstock 2011); or the fourth-century papyrus codex containing Deuteronomy, Jonah, Acts, and the *Apocalypse of Elijah* (Budge 1912; Emmel 2003); also, most of the Coptic Gnostic codices certainly contain two texts or more, with NHC VI containing eight texts (whereas the Coptic Manichaean codices are for the most part uniform; cf. Richter 2005).

If at the beginning of the Coptic tradition the miscellaneous codex appears to us to be a somewhat haphazard article, by the mediaeval period multi-text parchment codices seem to have become more or less normalized. Probably this change was, at least in part, the result of the Copts systematizing and codifying their literature for liturgical purposes several centuries after the Arab Conquest of Egypt in the mid-seventh century (Orlandi [T.] 1991, 1458–1459). That this was so is suggested by the evidence of the bulk of the surviving mediaeval manuscripts, for example the forty-seven well preserved codices that remain from the library of the Monastery of St Michael, mentioned above. Twenty-four of these codices are non-biblical miscellanies, about half of them with 'contents that are liturgically relevant to a single saint or day', while 'in most other cases, the works … occur in chronological sequence according to the days on which they were to be read' (Emmel 2005, 65; cf. Depuydt 1993, lxiv); the number of texts in a codex ranges from two to ten (with four being about average). A similar case is a group of eighteen papyrus codices (some quite

fragmentary) that have been assigned to about the turn of the eighth century: here too, half of the codices are miscellanies (from two to six works), although in this case the rationales behind the choice of texts remain to be discerned (Orlandi [T.] 1974; for the assigned date, see Orlandi [T.] 1995, 134).

In a sample of 171 reconstructed mediaeval parchment codices from the White Monastery—excluding biblical codices and codices with apocrypha or works of the monastery's most prolific leader, Shenoute—47 are miscellanies containing works belonging to different authors and dedicated to different and apparently unrelated subjects; these volumes contain up to seventeen works, but with four works per codex again being the average (if we were to include codices with works of a single author or pertaining to but a single subject, the number of miscellanies would be even more conspicuous). The White Monastery may have been the only Coptic library that included volumes of florilegia, a special type of miscellany (Buzi 2011a), whose relationship to liturgical lectionaries remains to be explored (cf. Emmel 2004, 116–125, on the 'Florilegium Sinuthianum', and 361–379, on lectionaries containing extracts only, or almost only, from works of Shenoute, see also fig. 1.5.2).

In modern collections of Coptic manuscripts, many items were re-bound in the form of miscellanies combining originally independent codicological units, whether in whole or in part: i.e. they are now composite codices (for example, most of the codices from the Monastery of Makarios now in the Biblioteca Apostolica Vaticana (cf. Funk 2012, 49–50), or the bulk of the leaves and fragments from the White Monastery now in Paris, Bibliothèque nationale de France (cf. Lucchesi 1981, 9–11), etc.). Coptic composite codices from the pre-modern period seem to be rare and in any case have seldom been the subject of specific studies (but see Proverbio 2012a; Nagel 1994 argued that the fourth-century papyrus codex containing Deuteronomy etc. is an ancient composite, but see Emmel 2003 for a counter-argument).

5.4. The layout of the page (PB)

By and large, Coptic codices are laid out in either one or two columns (see figs. 1.5.1, 1.5.2, 1.5.3), with three or more columns occurring only rarely: for example, Boud'hors 2004, no. 25, a Coptic-Greek lectionary; Coptic occupies the third of five columns in the pentaglot Barberini Psalter (Vatican City, BAV, Barb. gr. 372), on which see Proverbio 2012a. In Coptic-Arabic bilinguals, as mentioned above, Coptic occupies a first wide column, Arabic a second narrow column; occasionally two such pairs of columns occur on one page (for example, Boud'hors 2004, no. 3 = Gabra 2014, 104).

5.5. Text structure and readability (PB)

5.5.1. Writing

From the beginning, Coptic scribal practice was modelled on Greek practice, including the repertoires of punctuation marks, abbreviations (Christian *nomina sacra*), devices for adjusting the length of a line, means of paragraphing, and so on. Apart from adding native Egyptian letters to the Greek alphabet, the only innovation was the use of a sign (normally either a horizontal 'superlinear stroke' or a dot (*jinkim* '(way of) movement')) to mark any syllable containing no vowel, a type of syllable that is frequent in Coptic. Punctuation serves to delimit paragraphs, sentences, clauses, phrases and sometimes also words (mostly in the sense of a 'phonological word'), without there necessarily being a clear correlation between the form of a mark and its function. Space is sometimes used for separating units of text, or dividing 'words' (again mostly in the sense of phonological words, or prosodic units). Lines containing a quotation from the Bible may be marked by a sign (typically a *diplē*) to the left of each line. All punctuation occurs for the most part more or less sporadically and inconsistently, presumably depending on the competence of the individual scribes (and their supervisors); while correct punctuation must surely have been a help to reading, clearly it was not regarded as being essential, for there are manuscripts with almost no punctuation at all, as well as manuscripts with a bewildering chaos of marks that seem to have become merely decorative.

Apart from the occasional occurrence of headings and titles (whether superscript or subscript) at boundaries between texts or parts of texts, the main structural feature of a typical Coptic parchment codex page is paragraph division marked by means of a line-initial letter standing in or projecting into the margin, often enlarged and sometimes decorated and/or accompanied by a *paragraphos* or some other free-standing element (figs. 1.5.2, 1.5.3). The real beginning of the paragraph might occur in the middle of the line before the ekthetic line. Especially in mediaeval parchment codices, a single page may display a large number of paragraphs, which do not always divide the text in a way that seems meaningful to us,

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probably an interest in decorativeness being rather the main motivation. In contrast, the pages of papyrus codices, as well as of early parchment codices, are typically quite plain.

An analysis of the extension and structure of titles in Coptic manuscripts has resulted in the following typology: (1) subject titles; (2) simple structure titles; (3) simple extended structure titles; (4) complex structure titles; and (5) complex extended structure titles (Buzi 2005). Particularly characteristic of Coptic manuscripts, especially in the earlier mediaeval period, are types 3–5, normally placed at the beginning of a work, often framed by decoration and written in a script different from the following text (often right-sloping). Starting from the eighth century through to the end of the ninth, titles become progressively longer, and often their content does not fully correspond to the contents of the work to which they apply. Clearly the function of such extended and complex titles was different from the earlier, shorter types of titles and was not simply to indicate the contents of the following work. The people responsible for these very specific and targeted types of titles were the same ones who undertook to rearrange Coptic literature in new combinations, often collecting them into multi-text codices, for the liturgical purposes of the Coptic Church. Tables of contents sometimes occur, at the end of a codex, but rarely (for example, Emmel 2004, 247–249, 296–297).

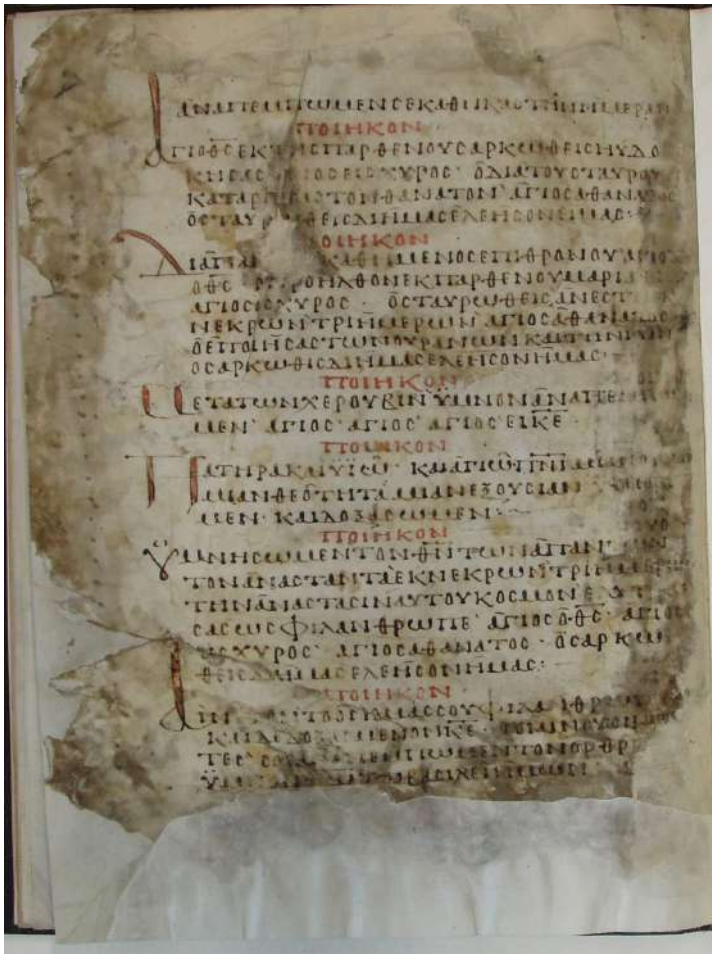

Fig. 1.5.3 Berlin, Staatsbibliothek, MS or. fol. 1609, tenth/eleventh century, f. 6v, *Canon Athanasii*.

5.5.2. Decoration

Decoration in Coptic manuscripts is limited almost entirely to parchment and paper codices, particularly from the mediaeval period and later. Apart from a relatively small number of elaborately illustrated or illuminated manuscripts, the most striking decorative features are frontispieces and miniatures, headpieces (sometimes also tailpieces), decorated initial letters and accompanying ornamented attention marks in the margins, such as *obeloi*, *diplai*, *paragraphoi*, and *coronides*, as well as quire ornaments and decoration added to page numbers and signatures. Within the text, there is sometimes colour (usually red) added to selected letters and punctuation marks, and full stops were eventually turned into small decorative elements on their own (for example Boud'hors 2004, 55; Whitfield et al. 2010, 46–47; Gabra 2014, 157). In liturgical manuscripts, rubricized text and complex layout were used to articulate the contents functionally (for example Gabra 2014, 85). In the top margin of a page at the beginning or end of a quire, the space between the embellished page number and quire signature might be filled with an elaborate ornament—formed as a rectangle, rosette or cross, filled with multi-coloured interlace or some other pattern—flanked by pious phrases (for example, Buzi – Proverbio 2012, 157–160; Boud'hors 2004, 49, 56).

But it was especially in the side and bottom margins and between columns that Coptic decorators often displayed their skills, giving free rein to their fancy. *Obeloi*, *diplai*, and *paragraphoi* might be simply highlighted with red, but they could also be stylized and transformed into intricate ornaments composed of buds, nodes, twigs, rosettes, small birds, etc. (Petersen 1954a). Especially the *coronis* came to be enlarged, extended and decorated to extremes, making the margins of many Coptic books, especially when the ini-

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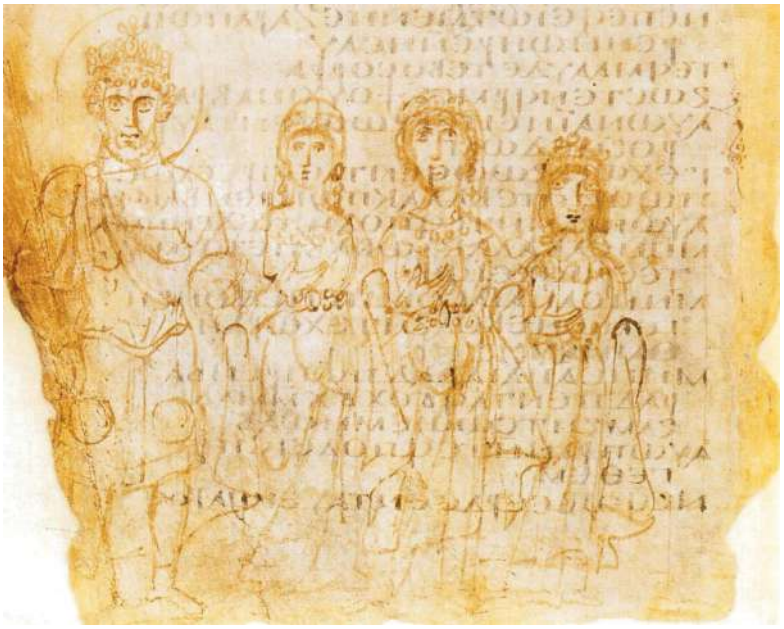

Fig. 1.5.4 Naples, Biblioteca Nazionale Vittorio Emanuele III, IB.16, *c*. tenth century, f. 4v.

tials too are elaborately decorated, a playground of spirals, nodes, curving and curling strokes, overgrown with vegetal, zoomorphic and anthropomorphic elements. In a typical composition, the swirls of stylized leaves extend into the lower margin, where they end with a bird or an animal nibbling at the tip of a final scroll (for example von Falck et al. 1996, 230; Boud'hors 2000, 27; Depuydt 1993, pls. 53, 64, 71, 75, 77, etc.; for some strikingly decorated initials, Boud'hors 2004, 11, 25, 34–38, 45, 49, 54–59; Bosson – Aufrère 1999, 162; Whitfield et al. 2010, 45, 160, 164, 173, 183; Gabra 2014, 157). These fanciful compositions are so various and often so individual that they defy any effort to typologize them.

Figural decoration of this sort was never abandoned by the Copts, whose tradition had much in common with the work of Byzantine book decorators, but they enriched their repertoire of motifs with aniconic and geometrical designs, especially in bilingual Coptic-Arabic manuscripts, partly inspired by exposure to the developing art of Islamic book decoration (a particularly striking example: Gabra 2014, 58–59). This mingling of traditions is observable, for instance, in the various forms of panels, bands, and frames that one finds surrounding or accompanying titles (headpieces): in common with the Byzantine tradition, we find open frames of the *Pi*-type, whether upright or turned sideways (usually open to the right), and the inverted-L- or *Gamma*-type, while in common with the Arabic tradition, we find closed rectangular frames and architectural motifs; all types of panels, bands, and borders were filled with interlaces and other designs, sometimes encompassing small crosses and floral and zoomorphic motifs, all presented in vivid colours (a large set of examples of all types, but reproduced in black and white: Depuydt 1993, pls. 48–198; in colour: Buzi – Proverbio 2012, 64, 70, 103, 105, 160; Whitfield et al. 2010, 157, 165, 173, 182–183; Boud'hors 2004, 39, 42–43, 58, 59; von Falck et al. 1996, 240). The repertoire of ornaments was further enriched by typical Islamic motifs: chained stars, intersecting circles and eight-petalled rosettes. In *de luxe* codices, the headings may also contain a miniature placed at the top of the page, directly above the other decorations, sometimes replacing the patterned rectangle.

The oldest surviving example of a decorated manuscript is the fifth- or sixth-century Codex Glazier (New York, Pierpont Morgan Library and Museum, G67), with a full-page miniature representing an interlaced ankh-cross (*crux ansata*), flanked by two peacocks and surmounted by three smaller birds (doves? sparrows?), on the recto of the penultimate leaf of the book (f. 110r = quire 14 leaf 6r; Bober 1967; Schenke 1991, 23–24, pl. 18; Depuydt 1993, 482, pl. 463); elsewhere in the codex, the only decoration is red ink (now reddish orange) used for *paragraphoi/coronides*, certain punctuation marks, and *diplai*, dashes, and other small signs surrounding page numbers and signatures (Schenke 1991, 24, 41–45, pls. 11, 12, 15; Depuydt 1993, pls. 461–463; for more on the similar Codex Scheide, Schenke 1981, 20–23).

Full-page ornamental crosses became and remained a feature of Coptic manuscript decoration, typically as frontispieces, although not necessarily as the initial frontispiece, but rather on the verso facing the first page of text, which is often highly decorated itself (for example Gabra 2014, 58–59; Buzi – Proverbio 2012, 102; Whitfield et al. 2010, 45; Boud'hors 2004, 33, 43, 47, 58; von Falck et al. 1996, 233; Depuydt 1993, pls. 24–44). Elsewhere we find iconic frontispieces such as representations of *Maria lactans* (von Falck et al. 1996, 250, 252; Depuydt 1993, pls. 10–23). In some extraordinary manuscripts, miniatures were used to illustrate the text. Most famous is a *de luxe* Tetraevangelium copied in Damietta in 1178–1180, now in Paris (BnF, Copte 13; one leaf in Washington, Freer Gallery of Art). It is decorated

with full-page, iconic pictures gathered at the beginning of the volume and seventy-four miniatures dispersed throughout. Unframed, the miniatures are inserted tightly in mid-page, occupying the full width of the written area (see Boud'hors 2004, no. 12 and p. 18; Rutschowscaya et al. 2000, 50, 52, 78–79; Leroy [Jules] 1974, 113–148, pls. C, D, 41–74). A richly illustrated bilingual Coptic-Arabic Gospel manuscript from 1249/1250 is also in Paris (Institut catholique, Copte 1), containing eighteen miniatures: four portraits of the evangelists, four heading miniatures, and eleven full-page miniatures containing six scenes each. The portraits and the headings are placed on facing pages and function as double-page frontispieces for the respective Gospels. The six-part compositions also occur at openings, paired with headings and depicting events from the texts that they introduce or divide (cf. von Falck et al. 1996, 237–239). A mixture of indigenous and European-style Gospel illustration (London, BL, Or. 1316) is an early-eighteenth-century manuscript decorated with 130 miniatures, partly copied from the engravings of the *Evangelium arabicum* printed in 1590 (cf. von Falck et al. 1996, 242–245).

For a list of noteworthy illuminated Coptic manuscripts up to the fifteenth century, see Buchthal – Kurz 1942, 28–62 nos. 86–309 (note pp. 5 and 6 n. 2), and for a selection of reproductions (not all in colour) of Coptic manuscript decoration of all kinds, see Cramer 1964a; Leroy [Jules] 1974; Depuydt 1993, pls. 10–330; von Falck et al. 1996, 230–253; Bosson – Aufrère 1999, 161–163; Rutschowscaya et al. 2000, 50–89; Atalla 2000; Boud'hors 2004; Gabra – Eaton-Krauss 2006, 118–133; Whitfield et al. 2010.

5.6. The scribe, the painter and the illuminator at work (SE–PB)

5.6.1. Persons, places and methods (PB)

Hagiographical works often refer to book-copying among the productive activities of monks, and although nothing authorizes us to think that all the monasteries had a scribe, it is reasonable to think that the most important ones had a more or less organized scriptorium. But the existing evidence suggests that Coptic scribes—called *kaliographos* or *syngraphos*, mostly men, but also some women—worked either alone or in small groups, whether within a monastery or in a semi-eremitic community such as the one in western Thebes in the early mediaeval period (see, for example, Kotsifou 2007; Heurtel 2007; Maravela-Solbakk 2008; Boud'hors 2008; Kotsifou 2011; on early mediaeval scribal activity in Tuton, a town in the Fayyum region, see Coquin 1991; Depuydt 1993, cxii–cxvi). A number of documents, both in Greek and in Coptic show clearly that painted decoration (as also bookbinding) was usually done by a specialist and not by the copyist of the manuscript. A kind of 'archaeological' confirmation of this practice are occasional pages on which the outlined design for a decoration, clearly meant to be coloured in (if not necessarily also illuminated), remained bare of any colour: for example, Froschauer – Römer 2008, 153 (on other pages of this mediaeval parchment codex, less elaborate marginal decoration was duly coloured in, cf. Emmel 2004, 129–130).

5.6.2. Colophons (PB)

Dated colophons as usually recognized do not appear in Coptic manuscripts before the early mediaeval period; the (limited) corpus that has been collected systematically and studied has dates from the eighth to eleventh centuries (van Lantschoot 1929). The elements that normally compose a Coptic colophon—inserted in different combinations and sequences—are: (1) name of the donor; (2) recipient of the donation (or name of the possessor); (3) name of the scribe; (4) formulas of blessing and protection (sometimes cryptographic); (5) date of the copying. Some codices have more than one colophon, for example as a result of a change in ownership, while others from the same period have none. When a colophon does occur, normally at the end of the codex (for a colophon at the bottom of a column between two works in the middle of a codex, see Coquin 2001, 4, pl. 1), it may be either in a single column, even when the end of the preceding text is in two columns, or (more rarely) at the end of the second column. Sometimes colophons are subdivided into sections by lines.

5.6.3. Dating systems (SE)

Precisely dated Coptic manuscripts do not appear until early in the ninth century, by which time colophons had come into use (van Lantschoot 1929, I/2, p. 93; cf. Depuydt 1993, l–lii). The most common system for specifying a year was according to the 'Era of the Martyrs' (*anno Martyrum*, AM), which had started out in the fourth century as a continuation of counting by regnal years of the Roman emperor Diocletian (284–305) even after his abdication; sometimes the year was also specified by its 'indiction' number, a

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recurring cycle of fifteen years counted from 312/313 (or 297/298). When a day is specified, normally it is according to the Egyptian calendar of twelve months of thirty days each, with a 'little month' of five days at the end of the year, plus a sixth, intercalated day every fourth year, which was thus a leap year. The first day of the first Egyptian month, called Thōth, was the same as 29 August in the Julian calendar, or 30 August in an Egyptian leap year (in which case the Julian year beginning four months later will be a leap year). Thus a year AM corresponds to the last four months of one Julian year and the first eight months of the following Julian year (for example AM 532 = 815/816 CE). The Copts have never reformed their calendar, so that the calendrical correspondence changed after the Gregorian reform of the Julian calendar in 1582 and continues to change: the Coptic year 1730 began on 11 September 2013. See above all Bagnall – Worp 2004; concisely but clearly, Cody 1991.

Sometimes the Coptic dating is accompanied, or replaced, by a date according to the Islamic system *anno Hegirae*, which became current in Egypt after the seventh century. More rarely, we find years given according to the Alexandrian 'Era of the World', according to which AM 1 (= 284/285 CE) = year 5777 of the Alexandrian Era of the World.

5.7. Bookbinding (SE)

The earliest surviving Coptic bookbindings, primarily those of most of the NHC from around the end of the fourth century, are well enough preserved for it to be possible to describe them in detail (Robinson [J.] 1975, whence are taken quotations and data; Robinson [J.] 1984, 71–86; instructive drawings in Greenfield 1991, Szirmai 1999, 7–14; for photographs, see: Robinson [J.] 1984, frontispiece; Gabra – Eaton-Krauss 2006, 134–135; Gabra 2014, 94). The covers differ from one another in a number of details (but can be sorted typologically into at least four groups: Robinson [J.] 1984, 80–86). As a general characterization, the spine of each single-quire papyrus codex was attached to the back of a slim leather case (both goat- and sheepskin were used, hair side for the outer surfaces of the binding) by means of two sewing tackets with round leather cord (perhaps flax string in one case). The two ends of each such tacket were knotted either at the centre of the quire, or outside the quire. If the latter, either they were tied at the outside of the cover's back, or at the outside of a strip of leather that was laid against the spine of the quire and then used as a lining along the inside of the cover at its back, thus concealing the knots between this back strip (or: spine strip) and the cover itself. 'At the centre of the quire there are usually two folded oblong pieces of leather ((inner sewing) stays (or: inner sewing guards)) through which the binding thongs pass to prevent them from ripping through the papyrus' sheets of the quire. Most of the covers were cut so as to provide for at least one flap, often more or less triangular in shape, that folded around the codex's fore-edge from left board to right board, with a long leather thong attached for encircling the codex multiple times as a closing slip (or: wrapping band). Typically, additional such closing slips (or: ties) 'emerge from the top and the bottom of the front and back covers at the centre to tie the codex together.' The covers were stiffened with boards that are laminates of sheets of papyrus (often called 'cartonnage' by papyrologists), over which the edges of the cover were turned in and pasted down; where a flap occurs, an edging strip of leather was pasted onto the inner surface of the front cover, later to be turned in over the left board along the length of the flap. Paste-downs were also of papyrus.

Most of the NHC covers were made from a single piece of leather, the largest of which (in terms of area) was at least 362 × 523 mm (to make a cover (with both a head and a fore-edge flap) with closed dimensions *c.*286 × 160 mm), the smallest 320 × 365 mm (closed dimensions *c.*268 × 136 mm); for other covers, several pieces of leather were sewn together. Sometimes the covers were decoratively tooled. For the roughly contemporaneous and typologically similar, but significantly shorter Berlin Gnostic codex (dimensions of the closed cover 145 × 130 mm), the leather binding was cut from either the front or the back cover of an older, decoratively tooled binding, the original dimensions of which have been estimated at 400 × 320 mm (Krutzsch – Poethke 1984).

From the fifth or sixth century there survive two quite well preserved small-size parchment codices with bare wooden boards as covers, which may be taken as typical for parchment codices during the last centuries of Late Antiquity and the early mediaeval period (Codex Glazier: Schenke 1991, 7–15, pls 1–2; Depuydt 1993, 482–483, pls 460–462; Codex Scheide: Schenke 1981, frontispiece, 5–8, 133; for descriptions of these and similar bindings, see Szirmai 1999, 15–31, and for a list, see Petersen 1954b, 52–53 n. 11; for a radiometric dating of Codex Glazier, see Sharpe 1996, 383 n. 13). The binding struc-

Fig. 1.5.5 New Haven, Yale University, Beinecke Rare Book and Manuscript Library, American Oriental Society Th / F84, *c.* seventeenth century, Coptic paper codex with leather binding, 170 × 125 × 50 mm. Above: left board (damaged), spine, final two quires (incomplete); below: final two quires (incomplete), right board; photograph by SE.

ture entails unsupported link-stitch sewing of the quires, to which the boards were attached both by means of pasting onto the spine a full-length leather back strip that joined the two boards, and also by using the first leaf and the last leaf of the text block as paste-downs. To support and strengthen the board attachment, four (Codex Scheide) or five (Codex Glazier) narrow bands of leather were passed through the back strip for a distance corresponding to the thickness of the text block so that they would lie between the back strip and the book's spine. The ends of each of these hinging slips were then fed through pairs of tunnels drilled obliquely from the outermost corner of the spine edge of each board to the insides of the boards and there pasted down. The extensions of the back strip were then pasted onto the inner faces of the boards, perhaps partly on top of the ends of the hinging slips where they emerge from their tunnels. The paste-downs then covered the extensions of the back strip as well as the ends of the hinging spine slips. Slips attached in the same way to the other edges of the boards (except the fore-edge of the right board) served for tying the book shut. Both codices are *c.*121 × 105 mm in size, while Codex Glazier is *c.*35 mm thick when shut, Codex Scheide *c.*56 mm, the boards being on average *c.*7.5 mm thick.

The larger, mediaeval parchment codices from the Fayyum were bound using papyrus laminates as boards covered in leather, with leaves of older parchment codices re-used as paste-downs or flyleaves. For many details about the binding of these 'late Coptic codices', see Szirmai 1999, 32–44; for concise descriptions of three such bindings, as well as some photographs, see Depuydt 1993, 26, 207, 256, pls 447–459; see also Cockerell 1932, and Hobson 1938, 202–233, who proposed the following classification for the 'extraordinary variety' of the decoration found on Coptic bindings: painted, worked, pierced, tooled, embroidered (Hobson 1938, 209–212; additional illustrations, including several wooden Bible caskets covered with elaborately decorated silver with gilding: Petersen 1954b, 51–64; Rutschowscaya et al. 2000, 66–70; Gabra – Eaton-Krauss 2006, 186–187, 212–213). We do not know that any late mediaeval or early modern Coptic bindings have ever been thoroughly examined and described (but for a description of a partly damaged Coptic binding of relatively late date, see Emmel 1990, 157–160, see fig. 1.5.5).

We may also note the occasional use of a leather tab at or near the middle of the fore-edge of a leaf as a kind of book marker to mark the occurrence of a text boundary, already in early papyrus codices (for example, NHC III, pp. 119/120, and also at the three other text boundaries in the codex, where one can see that a tab has been removed), as well as in somewhat later and mediaeval parchment codices (for example Lamacraft 1940, 218 etc.; Rutschowscaya et al. 2000, 72; Boud'hors 2013, 16–17, 581–582, 691–692,

747–748), occasionally with an ornate pattern cut out from the leather (Amélineau 1907–1914, II, pl. 1; Buzi 2009, 171).

Because Coptic sewing and binding techniques—meaning especially the use of link-stitch sewing to bind together the bifolia of a quire and to bind the quires to one another—as well as techniques of decoration and decorative motifs found on the leather covers of Coptic codices are found later in most other book cultures of the Near East and also in Europe, historians of bookbinding have long accepted that Coptic Egypt was their original common source. Nevertheless, this view might only reflect the fact that nearly all the oldest surviving codices, or parts of codices, come from Egypt.

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Amélineau 1907–1914; Atalla 2000; Babinger 1931; Bagnall 2009; Bagnall – Worp 2004; Bloom 2001; Bober 1967; Bosson – Aufrère 1999; Boud'hors 1999a, 2000, 2004, 2008, 2011, 2013; Buchthal – Kurz 1942; Budge 1912; Buzi 2005, 2009, 2011a; Buzi – Proverbio 2012; Camplani 1999; Cockerell 1932; Coquin 1991, 2001; Coupry 2004, 2007; Cramer 1964a, 1964c; Crum 1905a, 1905b, 1926; Depuydt 1993; Diebner – Kasser 1989; Emmel 1984, 1990, 1996, 1998, 2003, 2004, 2005, 2007; Evelyn-White 1926; von Falck et al. 1996; Franzmann – Gardner 1996; Friedman et al. 1989; Froschauer – Römer 2008; Funk 1990, 2012; Gabra 2014; Gabra – Eaton-Krauss 2006; Gardner 2007; Goehring 1990; Greenfield 1991; Grob 2010; van Haelst 1989; Hasznos 2006–2007; Hebbelynck 1900–1901; Heurtel 2007; Hobson 1938; Humbert 1999; Johnson 1993, 2004, 2009; Kasser 1960; Khouzam 1999; Kotsifou 2007, 2011; Krause 1981; Krutzsch – Poethke 1984; Lacau 1911, 1946; Lalou 1992; Lamacraft 1940; van Lantschoot 1929; Layton 1987; Leroy [Julien] 1974; Leroy [Jules] 1976; Lucas 1922, 1962; Lucchesi 1981; MacArthur 1995; Maravela-Solbakk 2008; Muzerelle 1999; Nagel 1994; Orlandi [T.] 1974, 1991, 1995; Petersen 1954a, 1954b; Petrucci 1986a, 2005; Pietersma – Comstock 2011; Plumley 1975; Proverbio 2012a; Quecke 1975; Rabin et al. 2012; Richter 1998, 2005; Robinson [J.] 1975, 1978, 1984, 1990a, 1990b, 1990–1991; Robinson [J.] et al. 1972; Rutschowscaya et al. 2000; Schenke 1981, 1991; Schmidt [C.] – Schubart 1936; Sharpe 1996; Sirat 1989; Szirmai 1999; Thompson 1908; Till 1931, 1958; Turner 1977; Vergote – Parássoglou 1974; Whitfield et al. 2010; Winlock – Crum 1926; Worp 2012; Worrell 1923; Wurst 1996; Young 2001; Zanetti 1986a, 1986b, 1998.

6. Ethiopic codicology (EBW–ABa–CBT–DN)

6.1. Materials and tools

6.1.1. Papyrus

Whereas tropical Africa is the probable area of origin of papyrus (*Cyperus papyrus*), which is also found around Lake Ṭānā in Ethiopia (Soldati 2014), we have no evidence for its use as a writing support in Ethiopian manuscripts. Interestingly, however, on the inside of the back cover of one of the three Abbā Garimā Four Gospels books (Abbā Garimā 1, see Ch. 1 § 6.2.3) there are the remains of a deteriorated papyrus board (discovered during a recent restoration: Capon 2008, 7; Mercier – Daniel Seifemichael 2009, 112; Bausi 2011a), a use comparable to that attested by Late Antique Egyptian codices, where papyrus was used to stiffen the leather cover.

6.1.2. Parchment

Positive evidence testifies instead that Ethiopian Christian manuscripts were written on parchment: this is the case of the same Four Gospels books of Abbā Garimā (fig. 1.6.8) and of almost all extant Ethiopian books to the present. Recent archaeological evidence suggests that production of parchment in Ethiopia dates back to the pre-Aksumite period in the first millennium BCE (Phillipson 2013). Yet the Ethiopic term later attested for parchment (*berānnā*—from Latin *membrana*, through Greek *membranē*; Bausi 2008a, 522; Bausi 2014, 42—as literary and documentary texts clearly attest; see also Zaborski 1995, 540 and 542 on a possible connexion between Eth. *ṗarq*^{w}*ama* ‘to write’ and Lat. *pergamena*) hints at a probable Late Antique origin. Further evidence might restrict the meaning of *berānnā* to ‘parchment leaf’ (note on MS Ethio-SPaRe MY-004).

Among animal skins, goatskin is the most widely used, liked for its solidity and thickness, even if sheepskin is lighter in colour and weight. It is maintained by Ethiopian scholars, but not proved, that sometimes large books were written on the skin of cows—or even horses and antelopes, usually considered as unclean—in specific conditions (Assefa Liban 1958, 10; Godet 1980–1982, 203; Sergew Hable-Selassie 1981, 9; Bausi 2008a, 531–532). The most typical book-type of the *Mazmura Dāwit* ‘Psalter of David’ (hereafter: Psalter), requires twenty to thirty goatskins, a Gospel thirty to fifty. Wild types of animals (like hyena) are reported to be sometimes used for magical scrolls (see Mercier 1979, 15).

Goatskins of young and slim animals are deemed to be the best, because they are possibly without scars or marks of whiplash, the traces of which do not disappear. The skins were usually purchased on the market or were left over after the animal was consumed; there is evidence for skin storage in a suitable tent in royal camps in pre-modern times (Kropp 1988, 53, 79). At the end of the nineteenth century, the scribes of the imperial scriptorium newly established by Menilek II—a case-study that provides useful hints, yet an exception of limited importance for the understanding of the Ethiopian manuscript culture in its historical development—received the number of animals needed for the copy of a given book, sharing the meat with the neighbours who helped them to make the parchment, while after 1919 an imperial decree created a new specialized profession devoted to parchment making (Haile Gabriel Dagne 1989). Present-day ethnographical observation indicates that the scribes themselves prepare the parchment, but this need not always have been so, especially in the case of luxury scribal production: the colophon of the fifteenth-century manuscript Pistoia, Biblioteca Forteguerriana, Martini etiop. 5, f. 195rb, demonstrates that the ‘parchment makers’ (*sarāḥta berānnā*) were distinct from the copyists (Fiaccadori 1993, 162–163; Bausi 2014, 42–43; Getatchew Haile 2011, II, 14).

The preparation of parchment, a skill that students of traditional church schools might also practice and learn as a part of their education, is not a despised activity like tanning or other crafts (Bausi 2008a, 527). Parchment is prepared when required, but it could also be bought (for example, in exchange for bars of salt, see London, BL, Or. 622, f. 2v; Wright 1877, 41, no. lxii). The main lines of the process for preparing the parchment, as they have been noted by ethnographical observation and described by the scribes themselves in the twentieth century (Assefa Liban 1958, 10; Godet 1980–1982, 230; Sergew Hable-Selassie 1981; Bausi 2008a, 532ff.; Faqāda Śellāsē Tafarrā 2010), are as follows (the fifteenth-century *testimonium* provided in Getatchew Haile 2011, II, 29 also agrees). The skin should be worked as soon as it has been stripped from the animal’s carcase, usually after being washed and soaked to make it softer. The skin is stretched over a special wooden frame (*mawaṭṭaryā*/*mawwāṭaryā*, or *qambar*/*qanbar*).

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Fig. 1.6.1 Ethiopia, Tegrāy, Dabra Zayt, DZ-005, accordion book, fifteenth/sixteenth century, photograph Ethio-SPaRe.

First the flesh side is worked, alternately with a pumice stone (*marrāmamiyā*) and a large curved knife, to deflesh it and to scrape it clean. When the skin has been dried, the hairs are shaved with a short adze (*mafāqiyā* or *maṭrabiyā*). The skin is then scraped again and washed on both sides. If the parchment develops a hole during the manufacturing process, the strings attaching the skin to the stretching frame are loosened and the hole is sewn together with sinews. The skin is stretched again to give it its final shape, wetted once more and finally dried. It is then squared off according to the size of the intended book, in so far as this can be foreseen without any folding being undertaken. Model sheets can be used too. To be stored, the parchment is folded up, hair side against hair side. Before writing, the scribe pounced it on both sides with a special type of clay (*madmaṣ/madmaṭ*; difficult to find nowadays; at present, pieces of china are used but considered to be inferior) to enable the ink to adhere to the parchment. The skin could also be whitened, following a recipe that differs for each scribe or parchment maker. Ethiopian parchments are always quite thick and light in colour, but rarely white. It should be noted that no chemical treatment was undertaken (for further technical terms related to the production of parchment, see Bausi 2008a, 532–541; Mersha Alehegne 2011).

The quality of parchment for use in making scrolls (henceforth always in the sense of 'vertical scrolls') differs—some pieces are well prepared, thin and whitened but most of them are very coarse, actually a by-product of the production of parchment for codices. The parchment pieces of good quality, sewn together and folded, are used to produce so-called 'accordion-books' (*sensul*, literally 'chained [book]'; fig. 1.6.1).

An analysis of the parchment used for eleven scrolls from the collection of the Musée du quai Branly in Paris, executed with the X-ray fluorescence method (XRF), showed on the surface of the examined pieces significant quantities of calcium (Richardin et al. 2006, 2–3; see also Nosnitsin et al. 2014). The parchment of a scroll belonging to Warsaw University Library, MS 3649, analysed with SEM-EDS (Liszewska 2012), exhibited on both sides a large amount of kaolin. In both cases, the substances discovered confirm recorded observations of the procedure applied during the preparation of the parchment surface for writing and painting.

Palimpsest manuscripts exist, but they are rare. Texts were sometimes washed off or erased in case of either censorship or invalidation of legal acts, and then the cleaned parchment might be re-used (Bausi 2008a, 542–543).

6.1.3. Paper

With the exception of Islamic manuscripts (see Ch. 4 § 2.1.1.2), which are (almost) exclusively on paper (a confirmation of the culturally determined character of manuscript production), this material was not used to any extent in Ethiopia before the twentieth century. The usage of paper is limited to specific contexts, namely in manuscripts produced in Ethiopian communities abroad, especially in Egypt and Rome,

or in manuscripts copied by and for European scholars especially in the nineteenth and early twentieth centuries. More recently, it appears that paper is being used in monasteries for school manuscripts (traditional *andemtā*-commentaries are often written in exercise books).

6.1.4. Inks

Inks, particularly the black ones, are still produced according to traditional methods, thus the whole procedure has been followed and recorded several times in ethnographical observations. The most extensive work dealing with the subject was written by Tournerie (1986). It contains testimonia excerpted from the accounts of travellers, recipes collected from Ethiopian scribes and detailed data on the plants and minerals used for the preparations of dyes and pigments. Smaller-scale research was undertaken by Sergew Hable-Selassie (1981) and Godet (1980–82).

For black ink Tournerie collected nineteen recipes and Sergew Hable-Selassie collected six. The composition of vegetal ingredients differs slightly (some fifty plant species can be listed) but the process of production is similar. The basic ingredient is always carbon in the form of powdered charcoal or soot, usually collected from cooking vessels or lamps. The choice of burning material is important and there are different opinions about what gives the best result. The carbonic powder is mixed with a binder, a fermented infusion containing roasted or boiled grains of maize or barley, leaves or bark cut into small pieces or ground to a powder, and insecticidal liquid, usually juice of the fruits of *Solanum* or *Ricinus*. The ingredients are stirred in a pot and left exposed to sunlight. This procedure is repeated everyday for a period of from three to six months. The film which forms on the top of the mixture is skimmed off and dried, formed into cakes or boles, and in this form can be stored for many years. In order to make the material fluid, a small amount of this product is mixed with water and left to stay at least two days for dispersing. The ingredients are not exactly measured and the right balance between them is the secret of the producer. It was thought that there was no evidence for the use of iron-gall inks in Ethiopia (Bausi 2008a, 523–524), but ongoing analyses seem to confirm the use of iron-gall ink along with soot ink in the twelfth and thirteenth centuries (Nosnitsin et al. 2014).

For the production of red ink a mixture based on vegetable ingredients, some roots, bark and petals of red flowers is recorded. The ingredients were pounded and soaked in water for about ten hours, mixed with a binder made of acacia gum or egg yolk and eventually sun dried. One recipe mentions red pepper and volcanic red earth grilled with sugar and the gum of juniper. The full procedure took about three months and often the result was unsatisfactory, mostly because the proportions between the ingredients were wrongly composed (Godet 1980–1982, 216). From the eighteenth and nineteenth centuries onward, scribes gradually started to use imported commercially produced pinkish dyes thickened by a binder.

Detailed recipes for coloured inks that were used only exceptionally are not available, but we do have some general information about the basic ingredients. Yellow ink was made from ground petals of yellow flowers, blue from ‘blue earth’ mixed with blue flowers and green from the juice of leaves—all mixed with a binder made of acacia gum or egg yolk (Mercier 1979, 16). Although several sources mention manuscripts written or decorated with gold, we may surmise that these are literary commonplaces rather than real descriptions. In fact, among the oldest manuscripts the use of gold ink has been noted only once, in the book of *Taʾāmmera Māryām* ‘Miracles of Mary’ of Ambā Gešēn, produced for King Dāwit (1382–1411; Spencer 1967, 103; Mercier 2004, 12, 35, 37; the Ethiopian tradition remembers not only the fame of this manuscript, but also the name of its scribe, Marqorēwos; Strelcyn 1976, 89). In the nineteenth and twentieth centuries, imported golden paints mixed with a binder were used as ink.

Rubrication and coloured inks can be used on the one hand to mark specific parts of texts and paratexts (*rubra* for *incipit*s, marks for liturgical readings, pericopes, *nomina sacra*, saintly names, figures, and some elements of punctuation marks; Guidi 1901, 404), on the other for a decorative purpose. Sometimes the text of the Eusebian concordance may be written in red, the name of the owner or the book’s donor, captions on miniatures and the various numbers (of quires, listed chapters, canons, dates). There is no religious manuscript written entirely with red ink but in some rare cases coloured inks were used throughout the entire text.

In King Dāwit’s ‘Miracles of Mary’, golden characters outlined in red are very sparingly applied to Mary’s name in the captions to the miniatures and on the opening pages. The scribe was most probably inspired by the stories recounted in the text but composed outside Ethiopia telling about a scribe who wrote

Mary's name in gold and about a painter who used gold to ornament her portrait (Budge 1923, 10–13; Cerulli 1943, 89–90).

It should be noted that in Ethiopia inks can be used as paints and colours as inks. For lack of appropriate analyses, it is difficult to establish if there is any difference in the components. Possibly the addition of gum in a certain quantity makes the colours more suitable for writing than for painting.

6.1.5. Pigments and dyes

There is no evidence that any particular symbolism was connected to the colours used for decorating codices and their consistent application was ruled only by tradition. Until the beginning of the seventeenth century, only four basic colours appear in all Ethiopian paintings: yellow, dark blue (rarely a pale azure or celurean blue), green and red/brownish red. For white, the colour of the parchment itself had to serve; black, rarely applied on larger surfaces, was prepared in the same way as black inks. The miniatures of the old Four Gospels of Abbā Garimā display a much broader palette of colours (for example, light green, purple, pink, brick red). In the so-called Gunda Gundē school that flourished at the turn of the fifteenth century, the basic range of colours was enriched by a widely used intense light blue, possibly based on ultramarine. Gold has been observed in the nimbi and ornamentation of the clothes of Mary in the royal 'Miracles of Mary' and in the form of grainy powder in the fourteenth century Kebrān Four Gospels (Bosc-Tiessé 2008, 34, 37); in the Paris Psalter, BnF, Éthiopien d'Abbadie 105, produced in the second half of the fifteenth century (Balicka-Witakowska 1983) and in the 'Miracles of Mary' of King Fāsiladās, London, BL, Or. 641, from the middle of the seventeenth century.

In the seventeenth century, white, pink, orange and nuances of red were added to the Ethiopian colour palette. At the end of the nineteenth century, industrial products were introduced to Ethiopia; considered to be superior, they gradually replaced the local paints.

There are no old written recipes concerning the compositions of colours, pigments and their binders. In rare cases we find the enumeration of colours (for example, in a register of materials for a church construction: Bosc-Tiessé 2008, 140), but at present we are not able to relate them precisely to the orally transmitted recipes that have been collected by scholars. In addition to the data gathered by Tournerie (1986), some information about the old techniques was provided by Taye Wolde Medhin (1980–1982), who described methods for obtaining black, red, purple, pink and brown inks, which he learned in a traditional church school, attending the higher level of education (*qenē bēt*).

Raman spectrography, which makes it possible to identify the components of the paints, has been applied twice to Ethiopian paintings. The first analysis (I) was applied to the set of seventeenth- and eighteenth-century miniatures illustrating the 'Miracles of Mary' in MS Paris, BnF, Éthiopien d'Abbadie 114 (Wion 2004), while the second one (II) was carried out on a late fifteenth-century miniature that found its way into a manuscript of the 'Miracles of Mary' that is two hundred years younger, belonging to the Mikāʾēl Māywayni church (Tegrāy; Tomaszewski et al. forthcoming). The two analyses provided partially matching results: for red, cinnabar (I and II) or vermilion (I) was used, also applied (I) to rubricate the names and legends of the miniatures; for yellow, orpiment, natural or artificial (I) versus crocin (II); for blue, indigo (I, in both the seventeenth and eighteenth-century miniatures, and II), and calcium carbonate (II); for green, an organic, vegetable colourant impossible to identify with Raman (I), or indigo and orpiment (II); for black, only carbon (I) or soot and calcium carbonate (II); white was not applied, as the painter used the colour of the parchment as white, while to get pinkish flesh he shaded the natural parchment colour with red (II).

In terms of quality, inks and colours used for writing, drawing and painting magical scrolls are basically the same as for the other types of manuscripts. Since, however, such scrolls are treated as magical and healing remedies, their inks are mixed with several additional substances that are determined in the meeting between the customer and the talisman maker (Griaule 1930). In that context the mixture called 'the seven colours' (*sabāttu qalamāt*) is sometimes mentioned, a concoction containing the juices of medical plants and several other components which are believed to provide therapeutic and supernatural effects (for example, MS EMML no. 790, f. 1r, see Macomber 1978, 105). It is also common that red inks, much more extensively used in scrolls, are enriched with drops of blood from sacrificial animals, the same animals from which the parchment for the scroll is obtained. Scrolls entirely written with red ink, such as Paris, BnF, Éthiopien d'Abbadie 192, are considered to be particularly effective. Generally, however, only introductory formulas are written in red, *nomina sacra* (God, Mary, but also angels, saints etc.), 'power-

ful' words, sentences providing spells, special blessings, and obligatorily the name of the owner. While in the codices the alternation between black and red in the text is one of the means of decorating a page, in the scrolls it conveys the opposition of good and evil, benediction versus malediction etc. There are also strict prescriptions concerning use of colours in the magic pictures, but they are kept secret as are many other details related to the production of the scrolls—it is generally understood that white symbolizes light, black cursing and enchantment, yet in a positive sense also the water of Baptism; red symbolizes fire, flames, the Sun, the Trinity and also Christ's blood (Mercier 1992, 150).

Eleven scrolls with paintings kept in Paris, Musée du quai Branly, were examined by X-ray fluorescence (Richardin et al. 2006). The findings suggested the use of vermilion (cinnabar), chrome orange, iron-based pigment (haematite) for red, violet and orange; smalt and organic substances for blue; *terre verte*, copper-based pigments and occasionally orpiment and organics for green; organic components and in some cases orpiment, chrome yellow for yellow; haematite and organics for brown. An analysis done with Raman stereoscopy of the scrolls of Warsaw University Library revealed cinnabar for red and a mixture of carbon with iron particles for black (Liszewska 2012, 388–389).

6.1.6. Writing instruments

Ethnographic observations indicate that the scribe worked outside, during daylight. Sitting on the floor or on a stool, he did not use any table but he put the parchment quire or leaf on his knee, possibly using a board or a piece of hard parchment as a support. There is scarce evidence for the use of quills in the past, while he definitely used, and still uses, pens only made out of reeds, such as *maqā*, *šambeqo* and *qastančā* (cf. Faqāda Śellāsē Tafarrā 2010, 168–169). Before writing, he prepared (as appears from ethnographical observation) several pens in advance. He cut them short, no more than a dozen centimetres long, scraped them on only one side and cut the nibs straight or a little bit slanted according to his preferences. He then split the nib and sharpened it again when needed. He used two pens, one for black and one for red ink. Inkhorns are made mainly from goat's horn, but also from those of cows or antelopes. The horns were buried in mud for several days in order to make them softer and easier to cut and shape. They are stuck directly into the ground or into an inkstand made of wood or clay (*ya-qalam qandoč*). The scribe could then begin writing, sometimes putting a cloth on the freshly written parchment on his knee, a place to let his hand rest while reading the text to be copied from the model, in order to prevent ink spotting.

6.2. Book forms

6.2.1. Miscellaneous forms

The accordion-book (traditionally called *sensul* 'chained [book]') is known in Ethiopia at least since the late fifteenth century. It is made of one or several strips of parchment folded together, often—but not always—put between wooden or leather covers. The manuscript typically contains a progressive series of devotional pictures, each fold usually reserved for one figure or scene, in some cases with a related text; accordion books are attested with well over ten pictures. Remarkably, most of the known examples represent high-quality production (for example Barbieri – Fiaccadori 2009, 58–59, 182; Balicka-Witakowska 2010a). Today, however, accordion books of small size (kept in a small leather box and carried on the body) appear to be used predominantly only for certain 'protective' texts, in particular in connexion with burial rituals.

Also a small number of bifolia, folded and held together in whatever way, without boards, as well as single unbound parchment leaves, have been used for transmitting texts. Even today, it is possible to find short texts (hagiographical compositions, hymns, non-literary texts) written in a single small quire being circulated and used in this way, and single large size parchment leaves are still occasionally used for writing texts, for instance a large leaf with a short version of the Vita of Yemreḥanna Krestos and a hymn is attached at the main entrance to the church dedicated to the saint.

6.2.2. The roll (scroll) and the rotulus

There is no evidence in Ethiopia for a passage from roll (scroll) to codex, nor that the scroll existed prior to the codex, the two book forms being used for completely different types of texts. The presence and fairly widespread use of parchment scrolls as protecting and healing amulets (*ketāb, ṭalsam*), containing the appropriate protective and curative texts and pictures, has been attested in Ethiopia for a few centuries (Chernetsov 2007). Two types of 'magical scrolls' exist: a small type, for private and personal use as a

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portable amulet, only occasionally unrolled, is commonly made of three parchment strips, with an average width of approximately 80 mm, its length depending on how many texts and pictures it contains, and on the height of the owner; the second type is somewhat wider, up to 500 mm wide and *c*.1 m or more long, made for being displayed unrolled on the wall of a house, and thus usually designated as a 'wall-amulet' (Balicka-Witakowska 2006). With very rare exceptions, the scrolls are written and painted on the parchment's flesh side, leaving the hair side empty. The oldest preserved examples of the scrolls can be dated to the eighteenth century but indirect evidence points to their use as early as the fourteenth/fifteenth centuries (Mercier 1979, 10), and the tradition may be much older.

6.2.3. The codex

The oldest surviving Ethiopian handwritten books suggest that the codex was the book form already in use before the eleventh/twelfth centuries. While it might still be maintained that it is impossible today to define the exact time when the codex was first introduced to Ethiopia, the two so-called Abbā Garimā Four Gospels codices, which appear to be the oldest of all surviving Ethiopian manuscripts, despite being somewhat problematic witnesses (cf. Bausi 2011a), have recently been dated by the radiocarbon method to the Late Antique period (around fourth/fifth to sixth/seventh centuries, Mercier 2000; further analyses carried out in 2012 have confirmed this dating). The earliest dated examples from the thirteenth century (Four Gospels book of Lālibalā Madḫanē ʿĀlam church, Four Gospels book from Dabra Ḥayq) provide information warranting the assumption that the codex was in use continuously in Ethiopia since the Christianization of the country in the mid-fourth century. The earliest surviving codices are fully developed, with the usual gatherings of folded parchment bifolia, which were sewn together and bound between two boards. Since Late Antiquity the codex (*maṣḥaf*) has dominated the Ethiopian manuscript culture throughout its history until the present time.

The support for codices has always been parchment. 'Mixed codices' in parchment and paper do exist, but they are extremely rare (there is only one example in the Ethio-SPaRe database).

6.3. The making of the codex

6.3.1. The making of the quires

The required size of a new manuscript is estimated before the parchment is cut into sheets. A model manuscript might serve for that purpose, but templates are also widely used, as present-day observations indicate. The cut sheet is folded in the middle only once, thus making a bifolium (*naṭalā qeṭel*). Any single folia cut from the remaining pieces of parchment are adjusted to the required quire (*ṭerāz*) size. Similar practices are also applied to the extremely rare cases of paper manuscripts.

6.3.2. The composition of the quires

An entire manuscript is seldom composed exclusively of bifolia, this arrangement most often appearing in the *de luxe* codices, as indicated by the examples of the collection of King Tēwodros II (d.1868), better known as the Magdala (Maqdalā) Collection, presently kept in the British Library (Wright 1877; Pankhurst [Rita] 1973, 1990). In most cases, bifolia alternate with singletons joined to form a bifolium ('balanced quire' in the terminology adopted by Delamarter – Demeke Berhane 2007; Getatchew Haile et al. 2009; Tomaszewski – Gervers 2015, 68–72). In order to make a quire stable, the first and last leaves, as well as the central ones, normally belong to a bifolium. Each assembled quire is stabilized by means of tackets (fig. 1.6.2). The leaves are usually arranged according to Gregory's Rule. A preliminary codicological analysis conducted of the codex of the so-called 'Aksumite Collection' (Bausi – Camplani 2013; see Ch. 3 § 3.3.2), probably the most

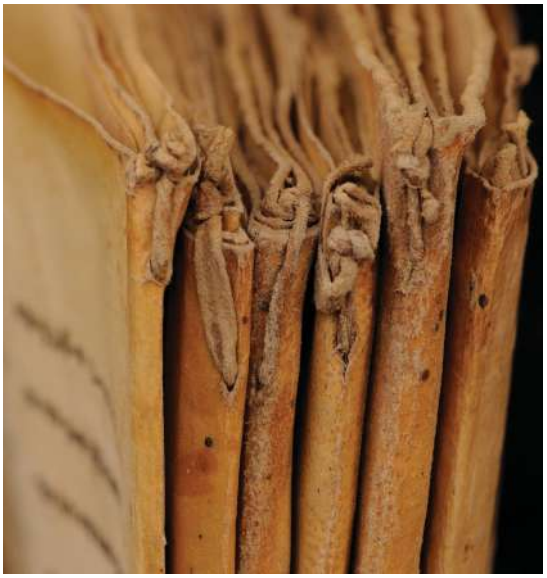

Fig. 1.6.2 Ethiopia, Tegrāy, Alʿāsā Mikāʾēl, AMMG-017, unfinished hymnary manuscript, nineteenth/twentieth century, photograph Ethio-SPaRe.

ancient non-biblical Ethiopian manuscript (*ante* thirteenth century), shows that even in this case Gregory's Rule was followed, not consistently, but in the majority of the quires.

A quire is usually composed of five or four bifolia (or single coupled folia), so as to have ten leaves (a quinion) and/or eight leaves (a quaternion), respectively. The quaternion occurs very often in the older manuscripts, of the thirteenth and fourteenth centuries. Smaller quires, with six leaves, and larger ones with twelve leaves also occur, as well as quires with an irregular number of leaves. The latter are typical of the manuscripts for which the layout seems not to have been carefully planned, and the scribe needed to add some extra leaves at the end of one or more quires, particularly at the end of the book.

A few statistical data are available from catalogues and recent research. In the collection of ninety-one manuscripts from the sixteenth to the twentieth centuries preserved in the Mikāʾēl Māywayni church, 57% codices have divergent quires, and 33% have quires of a single type (British Library Endangered Archives Programme, Project 340). Delamarter – Demeke Berhane (2007), on the basis of 241 quires (out of a total of 277 quires in twenty-three codices), indicate that 104 (43%) are 'balanced' quaternions; 55 (23%) are 'balanced' quinions; 10 (4%) are 'balanced' senions; 12 (5%) are 'balanced' ternions; while 16 are '5/4 adjusted balanced' quires, 5 are 6/5, 4 are 6/4 or 4/3 or 5/3, for a total of 25 'adjusted balanced' quires; 22 quires are 'unbalanced'. Getatchew Haile et al. (2009, xxviii-xxx) state that quinions (49.7%) and quaternions (33%) are by far the most common quire types, and that they are not equally distributed across time, as quaternions seem to prevail in earlier manuscripts. Matching data can be obtained from the analysis of a historical collection of primary importance such as the collection of the Biblioteca Apostolica Vaticana, with manuscripts uniformly distributed from the fourteenth/fifteenth to the nineteenth/twentieth centuries (see Grébaut – Tisserant 1935, 1936), plus data from other Italian libraries (Marrassini 1987–1988; Bozzacchi 2000; Proverbio 2000; Proverbio – Fiaccadori 2004; Lusini 2002, 2006): the prevailing quire type is definitely the quaternion until the sixteenth/seventeenth centuries. Note that the only prevailing quinion type in a very ancient manuscript, namely the famous *Psalterium pentaglottum*, Vatican City, BAV, Barb. or. 2, in Ethiopic, Syriac, Bohairic Coptic, Arabic and Armenian, which also happens to be a paper manuscript, was produced in Egypt (Proverbio 2012a).

Obviously the production plan for each manuscript also took its size into consideration. The most common item, namely the (usually portable) Psalter, consists of *c.*180–240 leaves gathered in eighteen to twenty-four quires. In the Mikāʾēl Māywayni collection, 63% of the codices have between seven and fifteen quires. Larger or luxury volumes, generally made of fine and thin parchment, may have somewhere between thirty and sixty quires. Text blocks of more than 250 leaves gathered in thirty to thirty-five quires (Four Gospels, collections of the 'Acts of the Martyrs' (*Gadla samāʿtāt*) or 'Miracles of Mary' of special types, and some other works) were far from rare, too. The largest manuscript known so far has 601 leaves and over 70 quires; noteworthy also are the monumental manuscripts from Dabra Bizan, Eritrea, with recorded evidence of a codex containing over 570 leaves.

6.3.3. Pricking and ruling

Pricks (*weg*) are clearly visible in most Ethiopian manuscripts (figs. 1.6.3, 1.6.4). Prick holes are mostly round, but other types also occur (note the slits in fig. 1.6.4); the typical tool for pricking is the locally produced awl (*wasfē*).

a) *Primary pricks* (or vertical pricks) are located in the upper and bottom margins of the folia and serve for making the vertical bounding lines which delimit the text columns, two pricks for one column of text. Primary pricks were pierced first.

b) *Text pricks* (or horizontal pricks) serving to guide the horizontal ruling are almost always located in the outer margins of the leaves, only very rarely at mid-page. Usually well preserved and easy to see, the text pricks are normally located at the distance of *c*. ten to thirty mm or more from the edge of the leaf, although in very old codices the worn leaves and crumbled edges make assessment difficult.

Pricking patterns of old manuscripts show some peculiarities. The Abbā Garimā Four Gospels book has the primary pricks located at the top and bottom ruled lines. The manuscript containing the 'Aksumite Collection' (fig. 1.6.4) has the text pricks placed at the outer vertical bounding lines. Even in a microfilm (EMML no. 6907) in which details are not easy to discern, one can see a similar pattern in the Four Gospels book of Lālibalā Madḫanē ʿĀlam datable to the thirteenth century: primary pricks located at the top and bottom ruled lines, text pricks located close to the outer vertical bounding line (for example ff. 177v–178r, 187v–188r, 193v–194r).

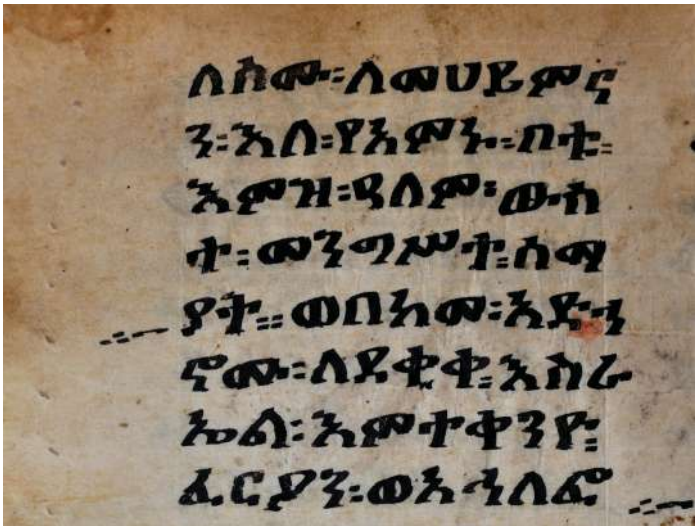

Fig. 1.6.3 Ethiopia, Tegrāy, Dabra Māʿṣo Yoḥannes, MY-002, Homiliary, time of King Dāwit II, *c.*1380–1412, f. 81v, detail, photograph Ethio-SPaRe.

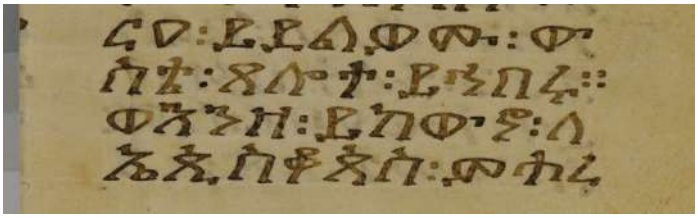

Fig. 1.6.4 Ethiopia, Tegrāy, ʿUrā Qirqos, UM-39, ʻAksumite Collection', twelfth/thirteenth century, f. 76rb, detail, photograph Ethio-SPaRe.

Fig. 1.6.5 Ethiopia, Tegrāy, Muḵāʿ Qeddus Mikāʾēl, BMQM-006, Four Gospels, eighteenth century, f. 15r, detail, photograph Ethio-SPaRe.

In most Ethiopian manuscripts the pricking pattern appears as slightly zigzag vertical lines of small holes. In present-day practice, the use of a ruler to facilitate pricking is self-evident and well documented, and in many recent manuscripts the lines of pricks are nearly straight. Yet traditionally a different, elegant and effective, though time-consuming, method was applied. It has been described (Faqāda Śellāsē Tafarrā 2010, 132–135) and it may be summarized as follows. First the manuscript maker takes a small rectangular piece of parchment and pierces two holes in it, the distance between them being the desired distance between two ruled lines delimiting one line of text. Next he takes a parchment bifolium, fixes the small piece of parchment in the margin on its flesh side with a first awl, and makes a prick through the second hole with the second awl. Then leaving the second awl in the hole that he has just made, he removes the first awl and rotates the piece of parchment 180 degrees. He then pierces another prick through the first hole. This operation is repeated until the desired number of pricks has been reached. The result is a vertical line of pricks, not perfectly straight, but with the distance between the pricks remarkably constant.

The use of two awls and a piece of parchment fixing the distance between the pricks recalls the so-called 'in-and-out' method of 'compass pricking' (Jones 1941, 392).

After one outer margin has been pricked, the bifolium is folded and pricks on the opposite outer margin are pierced through the pricks that have already been made, i.e. one half of the bifolium is used as a guide for pricking the other half, with all slight imperfections repeated. The neatly and carefully pricked bifolium (still unruled) is used as a template (*malakkiyā*). This template is laid upon one or more further bifolia, which then receive pricks all at once through the pricks in the template, usually from the flesh side (Faqāda Śellāsē Tafarrā 2010, 134). At this stage, in order to facilitate the pricking, the bifolia of the quires are tacketed with short threads made of twisted parchment strips (*sir*; fig. 1.6.2). Every experienced scribe is said to have templates prepared for different types of books, and, if necessary, is able easily to produce a new template from a model manuscript.

It is impossible to say how old the pricking method just described might be. Apparently, the Ethiopian manuscript makers (at least in Christian Ethiopia) did not use any sophisticated devices like pricking wheels, rakes or *miṣṭara*. There are only a few cases in which pricking patterns might have required

different techniques: for example, for outlining the decorative bands and frames that are visible in some Gunda Gundē manuscripts. In a few older manuscripts, small black dots can be seen which were possibly used to guide the ruling along with the pricks, for example to outline the Eusebian Canon Tables in the Four Gospels.

Nearly all Ethiopian codices are ruled; also in accordion-books the parts meant to receive text might be both pricked and ruled; in 'magical scrolls', pricking and ruling are very rare but they do appear in carefully designed pieces (see, for example, MS London, BL, Or. 12859, eighteenth century, produced for a nobleman; Strelcyn 1978, 124–127, no. 80). Ethiopian manuscript makers use only a dry-point technique for ruling, using an awl with a dull point. The ruled lines are usually very straight. It is not quite clear which auxiliary means were used in the past to facilitate ruling (Sergew Hable-Selassie 1981, 12, refers to a 'reed ruler'); at least since the late nineteenth century 'modern' industrially produced devices (such as a metal ruler) have been in wide use. Usually, each bifolium is ruled separately (Faqāda Śellāsē Tafarrā 2010, 136). After the bifolia have been pricked, apparently, there are two possibilities (if Gregory's Rule is to be followed): (1) the template and the tackets are removed and each separate bifolium is ruled on the flesh side, after which the bifolia are reassembled in quires and tacketed again (this is what is reported in Faqāda Śellāsē Tafarrā 2010, 136); (2) after the template has been removed, the quire is reassembled and tacketed again, at which point the flesh sides facing each other at every second opening are ruled. The results of both practices seem to be observable in the manuscripts. In the first case, the ruled text lines of the opposite flesh sides do not necessarily coincide at an opening, while they do necessarily coincide in the second case.

The ruled lines are invariably impressed on the flesh side; yet Bozzacchi (2000) noted that in 10.9% of their corpus ruling was done on both sides, a percentage that was represented only by eighteenth- and nineteenth-century manuscripts. The following stages in the process of ruling can be discerned: (1) first, vertical bounding lines are ruled, joining the primary pricks; they can stop before the primary pricks or go beyond them towards the edges of the bifolium; (2) then, the text lines are ruled; they stop exactly at the bounding rules, or occasionally go a bit beyond them toward the text pricks. The inter-column and inner margins are usually ruled. The evidence of the ancient manuscript with the 'Aksumite Collection' (fig. 1.6.4) suggests that in the early practice the pricking and ruling could be done in alternating steps: a frame of horizontal and vertical bounding lines was impressed first; then one proceeded with the text pricks, locating them exactly at the vertical lines, and only then were the text lines ruled.

6.3.4. Ordering systems

In most Ethiopian manuscripts quire signatures appear as a guide-line for binding, but they are not consistently used. Catchwords are used occasionally (for example in the MS Uppsala, University Library, O. Etiop. 41, eighteenth century). The quire signature is usually placed on the first page of each quire, at the top of the inner margin, and sometimes it is written a second time in the middle of the top margin, and again at the top of the outer margin. It can also be repeated on the inner margin of the last page (Grébaut – Tisserant 1935, 778, on MS Vatican City, BAV, Borg. aeth. 2, ante 1441/1442 CE). The quire signatures are frequently decorated, with numbers encircled by black and red dots and strokes, often arranged in the form of a cross (fig. 1.6.5).

6.3.5. The codex as a complex object

In the traditional environment many codices did not remain unchanged, but were modified to accommodate additional texts or images. There is rich philological and codicological evidence that this process was not actually an exceptional one and was a powerful impetus for the development of Ethiopian written culture (in general, Bausi forthcoming a). A significant number of Ethiopian codices show a multi-layer structure. If necessary, the 'core' text block of a codex could easily be enlarged by one or more additional quires, constituting different 'production units', or by single leaves. For example, quires with poetic compositions were sometimes added to the 'Acts' of a saint (fig. 1.6.6); quires with the so-called 'Rule of al-Muʿallaqah' and poetic compositions were frequently added to the 'Miracles of Mary'; as elsewhere in the Christian manuscript cultures, in some Gospel books, the quires with the Canon Tables and/or other prefatory materials and miniatures were produced separately and added to the already manufactured Four Gospels (see Ch. 1 § 6.5.1). In some cases, additions were meant to substitute for a portion of the original text which had been lost.

The additional elements could be newly manufactured, but could also originate from a different codex. This was frequently the case when a quire of the 'core' text block was enriched with a few additional leaves (fig. 1.6.7), or especially when images survived from an older (lost) book.

6.4. The layout of the page

Regularities and changes in size of Ethiopic manuscripts (for both outer dimensions and dimensions of the written area), or relationship between size and types of texts, have not been studied yet. Some tendencies have been highlighted (Uhlig 1988, 86–87, 194–195, 316–317, 442–447, 558–562, 782–783; Uhlig 1989), but mostly in connexion with palaeographic features. We may tentatively assume the existence of three main manuscript sizes: (1) the most common mid-size, with height 170–380 mm; (2) small size, with a height less than 170 mm; and (3) large size, with height around or more than 380 mm (this characteristic can be complemented by layout-types, on which see below). For the moment, trends can be observed only for some texts, and the pre-sixteenth-century period is difficult to assess. For example, the full Octateuch is usually contained in large-size manuscripts. Such a common work as the Synaxarion is mostly found in codices 300–450 mm in height. The manuscripts containing the work *Haymānota abaw* 'Faith of the Fathers' usually range 250–400 mm in height. The Psalters show at least three patterns during the best-attested post-sixteenth-century period. The regular, most common Psalter manuscripts range in height 170–300 mm; smaller Psalters (less than 170 mm in height) might have started circulating from about the eighteenth century. A very few large Psalter manuscripts are also attested (more than 300 mm in height). Out of *c.*620 manuscripts surveyed by the project Ethio-SPaRe (mostly in small, rural collections), *c.*10% are of the small size, while the percentage of the large-size codices is insignificant.

It is possible to follow the evolution of the Four Gospels manuscripts in more detail (around 100 have been evaluated by the Ethio-SPaRe project, to which a number from other collections can be added). In the mid-thirteenth to mid-fifteenth centuries the preferred height of the Four Gospels manuscripts appears to have been *c.*250–350 mm, the width being at least *c.*150/160–250/260 mm, i.e. 90–100 mm less than the height. By the late fifteenth century, the height tends to remain within those limits, and the width increases a little bit, in all cases the gap between them mostly ranging 30–50 mm. In the nineteenth century, the preferred height of the Four Gospels codices remains 290–350 mm and surpasses the upper limit only in rare cases (cf. Uhlig 1989).

Ethiopian manuscripts have a limited variety of layout types. Layouts are not designed for hierarchical organization of the written space (like text/commentary or text/musical notation: for the latter case, in *Degg*^{w}*ā* and similar manuscripts, the musical notation is simply accommodated in a larger space between the lines, with a smaller script for the text). However, types of layouts are interrelated with the typologies of the texts they have to accommodate. The basic layouts of texts in Ethiopian manuscripts are three: one-column; two-column; and three-column. Four-column layout does exist, but occurs very rarely.

Obviously, the shape of the written area is related also to the formats of the codices, which are mainly three: (1) rectangular (with the width being less than the height of the codex, but with the proportion width/height between 0.5 and 1.0); (2) square (the proportion width/height *c.*1.0); (3) tall (the proportion width/height less than 0.5). At the same time, this relationship is not always direct, since a rectangular codex can have a square written area, and vice versa. For the moment no statistical study on the relationship between size and layout has been carried out and all estimations are very approximate.

Books with one-column layout encompass a sizeable part of the Ethiopian manuscripts, at least 15%. The most frequent book of this category is the Psalter. Irrespective of the size and format of the Psalter codex, the Psalms of David, the Odes of Solomon and the Song of Songs have always been written in one column, each versicle starting at a new line (exceptions to this layout are found in some very rare comprehensive biblical manuscripts containing the entire canon). Two texts that follow the Song of Songs in the Psalter manuscripts (*Anqaṣa berhān*, *Weddāsē Māryām*) are always laid out in two columns.

Besides the Psalter, one-column layout tends to be used in small-size codices, or, less commonly, in mid-size codices. All of these are manuscripts for personal use, study, devotion, or else they are various multiple-text manuscripts of the so-called 'service literature', composed of collections of litanies or daily prayers. An important category, as yet insufficiently surveyed, is represented by older hymnody manuscripts, which sometimes also include portions of liturgy and Daily Office Prayers or poetic compositions. Also codices with 'protective' texts were frequently laid out in one column (in some of them, for example,

Mafteḥē śerāy, the writing is frequently interrupted by numerous talismanic pictures). Also the Gospel of John and the Revelation, if copied separately from the Four Gospels, were frequently laid out in one column.

The trend toward the wider use of one-column layout (in small-size, portable codices) started at least in the eighteenth century, and it became more conspicuous in the nineteenth century. Apparently, it emerged in the area of the Gondarine culture, with increasing number of certain types of (non-liturgical) books intended for private use, which were required by church teachers, high-ranking ecclesiastics, *dabtarā*, healers, monks, and zealous noble believers.

Two-column layout is the most common and dominant type used in mid-size codices, but also occasionally in small- and large-size codices. It is applied to the widest range of texts constituting the bulk of Ethiopic literature. Two-column layout was also used from time to time for most of the texts mentioned above under 'one-column layout'. The most ancient Ethiopic manuscripts have exclusively a two-column layout (Four Gospels of Abbā Garimā, etc.; the manuscript of the 'Aksumite collection' has a few cases of one-column layout for sections with *tituli*, 'tables of contents').

Three-column layout was also regularly used, but applied for a more limited range of texts, mostly those of significant length, copied into mid- or large-size manuscripts. The texts most commonly laid out in three columns include the Synaxarion, the *Gebra ḥemāmāt* 'Lectionary for Holy Week', some theological treatises like *Haymānota abaw*, *Terg*^{w}*āmē Ṗāwlos* ('Commentary of John Chrysostom on the Epistles of Paul'), and the like. Especially in the post seventeenth-century period, some texts appear to be laid out predominantly in three columns, such as the Octateuch, Minor Prophets, Proverbs and Kings, sometimes also the Four Gospels, big hymnody collections encompassing more than one of the five main hymnody works, some works of canon law like *Fetḥa nagaśt* ('Law of the Kings'), and others.

Different layout types in the same codex for single sections of the work are regularly applied for the Psalter and the Four Gospels. In general, it appears that the use of three-column layout expanded starting from the sixteenth century, and in particular in the eighteenth to nineteenth centuries, and that it partially replaced the two-column layout (Bausi 2008a, 538). Quite a number of text and manuscript types are attested in more than one layout. But a systematic study of a large number of manuscripts is necessary for defining more exactly when and why the change of layout took place, if there was any link between the history of the text and its use and the layout transformation, and if other factors (readability of the text, economic reasons, pictorial cycles etc.) exerted any influence.

It should be noted that there is clear evidence for the change over the course of time from a two-column to a prevailing three-column layout in the case of long works that are attested from early on (fourteenth century onwards). The biblical Octateuch, laid out in two columns in several pre-seventeenth-century codices of large size, some of them containing more than 230 leaves, was copied only rarely in later centuries, but then always in a three-column layout, with a larger written area than in two-column format and fewer than 200 leaves. Ethiopic Synaxarion manuscripts of the later recensions are written in three columns, practically without exception; but the older version of the Synaxarion attested in a very small number of pre-seventeenth-century manuscripts appears in two columns; the same is true for the big collection of 'Acts of the Martyrs', and for the canon-law collection of the *Sinodos*. Large late-eighteenth- or nineteenth-century copies of the collection of the 'Miracles of Mary', containing some three hundred narratives, are laid out in three columns. Starting from the late eighteenth century, hymnody manuscripts of large size could encompass several or even all five books of the set (*Ṣoma degg*^{w}*ā* and *Degg*^{w}*ā*, *Me*^{ʿ}*erāf*, *Zemmārē*, *Mawāse*^{ʿ}*t*) with a three-column layout, in small script, with musical notation of even smaller size inserted interlinearly.

The most complex change of layout took place over the centuries in the introductory texts to the Four Gospels (*Maqdema wangēl*). Originally characterized by a special layout intended for the richly ornamented Canon Tables and series of miniatures, they were later laid out like the regular text pages of the Four Gospels, although a smaller script was frequently used.

It might be said provisionally that in many older (pre-sixteenth-century?) manuscripts, the first written line of the regular text pages was placed below the uppermost ruled line (fig. 1.6.3) which was sometimes used to guide notes indicating the occasions and appointed readings (or the so-called *tituli* in the Four Gospels); in the post-fifteenth-century manuscripts the first written line was placed invariably above the uppermost ruled line. In the accordion books and in the narrow scrolls the text is always written in one column. In the wall-amulets and particularly elaborate larger scrolls the text may be divided into two or even three columns but the pictures always occupy the full width of the strip.

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Fig. 1.6.6 Ethiopia, Tegrāy, ʿAddiqaḥārsi Makāna Ḥeywat Ṗarāqliṭos, AP-046, *Vita and Miracles of the Martyrs of Ṗarāqliṭos*, 1523 CE, ff. 10v–11r, photograph Ethio-SPaRe.

It cannot be excluded that layout recipes were used in the past, but today their existence is difficult to ascertain. The contemporary scribes say that in their work they simply follow the layout of model manuscripts, and stress the usage of the templates.

The Ethiopian scribes adapted to what was needed and exercised flexibility in shaping the written area, basing their work on the unsophisticated layouts of the main types. If the scribe envisaged an ornamental headpiece for the *incipit* page, he left a few ruled upper lines blank (fig. 1.6.6 recto). In some texts, the written lines of a heading run across the entire page, exceeding the ruling for columns (hymnody manuscripts, Four Gospels, fig. 1.6.5). Additional texts could be written in the margins, on end-leaves, or on added leaves. Skilled scribes entered glosses and commentaries—usually not subject to written transmission, but written *ad hoc*—in the margins and between the written lines, or wherever there was some spare space. The upper ruled lines were used for accommodating quire signatures, headings, titles, and other elements placed around the written area (fig. 1.6.5).

6.5. Text structure and readability

6.5.1. Writing and decoration

The Ethiopian script does not oppose capital to non-capital letters (it has only one capital-like 'uncial' set), and therefore has no ornamented initials. The ends of the text units are not decorated but only marked by series of repeated diacritical signs or dashes and dots, sometimes drawn with red and black inks. The colophons are rarely presented in decorative frames. In comparison with, for instance, Syriac or Coptic manuscripts, pen-work decoration in Ethiopian books is rather poor (cf. Ch. 1 § 6.1.5; Ch. 2 § 5).

The miniatures are always put within the text frame, and margins are reserved for aniconic ornamentation (typically paragraph marks marking pericopes, *cruces ansatae*, etc.). Three main categories of decoration can be distinguished: (1) the decorative script, in two forms: (a) rubrication and (b) coloured script; (2) aniconic decoration, mostly used in the text headings; and (3) miniatures or drawings.

(1) If applied for the purpose of decoration, rubrication is not meant for hierarchically organizing the written page, but rather for making it aesthetically appealing. Such an effect may be created by lines of text alternately written in red and black, or sometimes even in several colours. The alternation of the colours is sometimes used to create figures, crosses, roundels or stars. The colouristic division is usually applied throughout all text columns, thus creating a horizontal visual entity. Such an arrangement is common in the introductory pages, but is also applied to poetic texts, litanies, repeated expressions or words, various kinds of tables and computational drawings (cf. Ch. 1 § 6.1.5).

(2) The aniconic decoration typically appears, starting from fourteenth-century manuscripts, in the form of bands filled with coloured interlace composed of various motifs. The composition is called in Ethiopic *ḫarag* 'tendril, twig' (Balicka-Witakowska 2005b). Such a decoration is used to mark the headings, primarily the headings of the initial pages, either of a work, or of a chapter, or of a section etc., the importance of which might determine in turn its size and degree of elaboration (the introduction to a large text unit often turning into an ornamental frontispiece). A heading decoration is quite often not kept

within the space reserved for the text, but extends to the margins. Ornamental bands may run along the whole width of the written area or through only one of the columns, or an unbroken border supplied with perpendicular bands may also descend vertically into the inter-columnar space. The vertical ornamental bands may be very short, or as long as the text columns. The heading decoration often extends into the upper margin; the lateral pendants may be short, but sometimes they descend towards the bottom margin. In some cases, the ornamental bands build a frame enclosing the whole written area, or only a part of it (figs. 1.6.6, 1.6.9). Figural elements added to the *ḥarag* compositions (as in the *Gebra ḥemāmāt* MS London, BL, Or. 597, fifteenth century) are exceptional. The colours and composition of *ḥarag* ornamentations often point to a particular epoch and even to a particular scriptorium.

Fig. 1.6.7 Ethiopia, Tegrāy, Mengāś Māryām, MQMA-010, *Miracles of Mary*, nineteenth century, with infixed ff. 9v–10r of an earlier time, seventeenth century?, photograph Ethio-SPaRe.

In the old Four Gospels manuscripts, the Eusebian Canon Tables are laid out and also decorated according to rules developed in Late Antiquity outside Ethiopia (Palestine, and probably Egypt, for the tables at least, but definitely not in Syria; Bausi 2011a). The oldest Abbā Garimā Four Gospels display two distinct typologies, both going back to Byzantine models: three pages of Eusebian prologue plus seven pages of architectural frames with tables (fig. 1.6.8); or two pages of Eusebian prologue plus eight pages of architectural frames with tables (Heldman 2003; Bausi 2004b). In both cases the series is closed by the 'Tempietto' or the 'Fountain of Life'. The later mediaeval Ethiopian Canon Tables tradition can be sufficiently explained on this basis. This ancient system was enriched with the large repertory of aniconic elements created by the Ethiopian pictorial tradition (Leroy [Jules] 1962; Bausi 2004b).

The figural decorations appear as miniatures or drawings, which may or may not be coloured. Their place, size and arrangement within the codex are determined by several factors, the most important being their illustrative or non-illustrative character.

The non-illustrative pictures, also called 'iconic', display the most venerated holy figures, such as St Mary, the archangel Michael, St George, and other important saints. Commonly, they occupy a full page, are portrait-like and seldom narrative. This kind of miniature is to be found from the fourteenth century on. In the more recent manuscripts, they are often not contemporary with the text but either added much later or transferred from older, damaged books. Since the presence of miniatures raises the price of a manuscript on the tourist market, the books presently circulating are supplied with recently added secondary pictures.

The miniatures are almost always presented within simple, rarely decorated frames. Drawings in the old manuscripts are exceptional, mostly sketches for unfinished miniatures. Up to the sixteenth century, the story told by a text was never directly illustrated. The miniatures, even the narrative ones, were either gathered at the beginning of the manuscript or inserted into it as a frontispiece for particular parts of the text. This rule concerns even the narrative texts *par excellence*, for instance the Four Gospels or the Lives of saints. Another general rule was that one subject deserves one full-page miniature, but in the old Four

Gospels, for instance, the Entry into Jerusalem and the Miracle at Cana are customarily displayed on two facing pages, while the Nativity is represented together with the Adoration of the Shepherds.

The illustration of the early Four Gospels books made use of two types, both originating from outside Ethiopia. The older one, called the Palestinian, introduced—directly after the decorated Eusebian Canon Tables—three miniatures illustrating Jesus' passion and resurrection (the Crucifixion, the Holy Women at the Tomb, and the Ascension). The second type, called the Byzantine, introduced at the same place a long Christological cycle, the most developed presently known containing nineteen miniatures (Lepage 1987; Balicka-Witakowska 1997; Lepage – Mercier 2011–2012). In these sets there are miniatures that have two subjects on one page, or one subject extending over two pages (cf. above). In both types, the text of each Gospel is preceded by a portrait of the evangelist (fig. 1.6.9). Placed on a verso, it faces the beginning of the Gospel text on the recto.

A hagiographical text was usually introduced by the full-page portrait of the saint placed on a verso, facing the *incipit* page on the recto. In the collections of the 'Acts of the Martyrs' only selected saints are depicted (the selection criteria are the subject of current research; in MS EMML no. 7602, fourteenth/fifteenth century, almost all saints are portrayed). In such collections, the portrait of the saint is painted on a verso, while the text begins on the facing recto. Sometimes an empty space left at the end of the text is also used for this purpose. In collections from the early fourteenth to fifteenth centuries, narrative miniatures are very rare (for example, the Beheading of John the Baptist in the 'Acts of the Martyrs' from Meslē, Ṭānā, fourteenth/fifteenth century). More common from the sixteenth century onward, they are always limited to one or two episodes.

The old Psalters are decorated with full-page miniatures serving as frontispieces for the sections of the book, representing the figures connected with these sections—a practice which derives from the Greek so-called 'aristocratic Psalters' (Weitzman 1960). Consequently, a miniature of David always appears before the Psalms, Solomon before the Song of Songs, Moses before his canticle and Mary before the 'Prayers of Mary' (Balicka-Witakowska 1983, 1984–1986). From the sixteenth century on, with few exceptions the Psalters keep only the frontispiece representing King David.

The texts listed above are practically the only ones that were decorated with miniatures in the period before the end of the sixteenth century. Exceptions are rare (for example, the fifteenth-century 'Lectionary for Holy Week', kept in the monastery of Marʿāwi Krestos Endā Śellāse, Tegrāy) and concern mainly the first collections of the 'Miracles of Mary' and the books of the Old Testament (for example, Vatican City, BAV, Borg. aeth. 3, or the Old Testament copy from the Bētleḥēm church near Dabra Tābor).

During the sixteenth century and the first half of the seventeenth, major changes occurred in the layout of the decorated and illustrated manuscripts. The painted pages are no longer gathered at the beginning of the codex or placed only as frontispieces before major text sections. Rather, the frontispieces are kept, but the miniatures are distributed all through the book, inserted within the written area in frames. The most ancient manuscript with this new kind of layout is a copy of the 'Miracles of Mary', adorned with pictures drawn with coloured ink in the Italianate style during King Lebna Dengel's reign (1508–1540) kept in the church of Tadbāba Māryām (unfortunately, only partial documentation is available for study); in comparison with the seventeenth-century manuscripts following this tradition, this manuscript is quite innovative and must have been painted by a foreign artist. The collection itself evolved with the addition of new miracles, up to more than three hundred in some codices of the eighteenth century. In the seventeenth century, the texts to be illustrated is fixed at thirty-three miracles, with a set of miniatures (filling an entire page or added separately in a column when there are blank spaces to fill in) placed at the beginning or at the end of the relevant text. In addition, at the beginning or at the end, we find full-page paintings that we can qualify as iconic (for example, a Virgin with Child). None of the manuscripts of the 'Miracles of Mary' from the seventeenth century resemble each other exactly. Even if they depict the same subject, the execution and the layout are always different (Annequin 1972; Balicka-Witakowska 2010a).

In the seventeenth century, the Jesuits must have brought to Ethiopia the *Evangelium arabicum*, an Arabic Gospels book printed in Rome in 1590–1591 for the evangelization missions in the Near East, with engravings by Antonio Tempesta modelled on the Small Passion woodcuts by Albrecht Dürer. Several Ethiopic Four Gospels books were illustrated in the 1660s–1680s, following this model. Each includes more than a hundred miniatures, although the distinct illustrations are actually fewer, as the illustrations to the Gospel of Matthew are repeated in the other Gospels (Leroy [Jules] 1961; Heldman 1993, 240–241; Bosc-Tiessé 2008, 103–105).

Fig. 1.6.8 Ethiopia, Tegrāy, Endā Abbā Garimā, Abbā Garimā 2, Four Gospels, *c*. fourth–sixth century, photograph by EBW.

Further changes occurred from the end of the seventeenth and especially during the first half of the eighteenth century. In general, the number of subjects represented increased, new iconographical cycles were created and the existing ones were expanded. After the Four Gospels and the 'Miracles of Mary', one of the first texts for which an iconographic cycle was invented is the 'Life and Miracles of St George', as evidenced by a manuscript at Lake Ṭānā, Ṭānāsee 17 (= Kebrān Gabreʾēl 17; Hammerschmidt 1973), which contains 55 miniatures. Someone (the scribe and/or the painter, the scholar or the client who ordered the manuscript to be illustrated) must have thought very carefully about the project—selecting the episodes, the mode of representation, location—and acted as an innovative designer. Some episodes are represented twice: the first time at the end of the column where a text ends, and then on the following page with a full-page representation. The insertion of a painting into a column makes it possible to juxtapose immediately image and text and allows for numerous illustrations without the need for overly complex coordination among scribe, painter and binder (Bosc-Tiessé 2008, 145–169). Following the same process, other texts were illustrated, especially the *Dersāna Mikāʾēl* 'Homiliary for the archangel Michael'. The illustrations of the *Ṭabiba ṭabibān* 'Wisest amongst the Wise', a hymnological composition, are laid out in a slightly different way: the paintings usually occupy the entire width of the page, between a few lines at the top and at the bottom of the page, divided into two columns (Heldman 1993; Mercier 2001, 174–177).

Whereas the paintings of the seventeenth century were painted in an unruled frame, in the course of the eighteenth century, later as a rule, they were accommodated within ruling lines, which were also utilized to apply coloured background. Moreover, during the eighteenth century, many new texts were illustrated: the Revelation of St John (McEwan 2006), the *Nagara Māryām* 'Story of Mary' (Balicka-Witakowska 2014), new lives and miracles of saints, and so on (Heldman 1993, 196). In each book, narrative miniatures were multiplied, but became also increasingly repetitive. Generally, the number of images was more concentrated in the initial part of the manuscript. Besides, iconic images depicting saints, the Virgin or the Crucifixion, tend often to be inserted into prayer books.

6.6. The scribe and the painter at work

6.6.1. Persons, places and methods

The scribal profession could be learnt in monastic centres and as an auxiliary ability during the traditional church education. For a good scribe, a certain level of education was necessary, but the scribal work in itself was not an intellectual preoccupation. Hagiographical texts depict monks or priests, praised for their ability in writing, who were also scribes and recognized as saints. In most cases, however, they are writers (authors) at the same time, and their calligraphic work was not distinctly separated from their literary achievements, but only added to their fame. The fact that training took place mostly within the framework of church education, however, does not mean that all scribes were necessarily monks or priests, especially in more recent periods.

During the twentieth century, training to become a scribe or a painter took place after finishing the elementary church school, when students were supposed to have acquired a good knowledge of Geʿez. Yet most of the time they did it after completing another course, for example in church music, at the moment when they needed to copy out a book in order to become a qualified teacher. In this case, they were not necessarily going to become a professional scribe, but sometimes they made writing a second source of income. Some places are well known for the training of scribes, at least for the end of the nineteenth century and in the twentieth century, such as Andabēt in South Bagēmder (Sergew Hable-Selassie 1981, 27–31), where the apprentices learnt calligraphy as well as how to prepare inks, make parchment, paint, bind and decorate leather covers (Mellors – Parsons 2002b).

At the end of the nineteenth century and in the first half of the twentieth, those who managed to join the newly established imperial scriptorium enjoyed benefits and a better social status than others, sometimes becoming a dignitary with the title of *alaqā*, and also with the distinguished title of *qum ṣaḥāfī* ('calligrapher'). Other scribes could perform scribal work for governors or noblemen, receiving similar benefits and privileges (Haile Gabriel Dagne 1989).

The so-called *dabtarā*s, on the other hand, still represent a continuity with past tradition: self-employed, wandering from one church to another, and sometimes also ordained priests, they are copyists-on-demand (especially for 'magical scrolls') and earn a living from their traditional knowledge, selling the manuscripts they manufacture. These scribes are ambiguously regarded by society, as they are believed to be also sorcerers. A text of the sixteenth century that singled out ten social classes put the scribes (*ṣaḥaft*) in the class of the craftsmen (*ṭabibān*), together with very much despised blacksmiths, tailors and carpenters (Guidi 1907, 229–230 (text), 205–206 (translation)).

There is no special term for scriptorium until the end of the nineteenth century, and the questions of where Ethiopic manuscripts were copied, and how the work of copying and production was organized, are open ones. There are few monasteries in Ethiopia for which we can think that a scriptorium as an institutionalized workshop was settled with an administration organizing the work, wherever the work was really done. We have evidence that in these places, not only manufacture and/or copying was carried out, but also translators and authors of original works were active. Among such centres are monasteries and related networks founded in the fourteenth and fifteenth centuries by the followers of the monks Ēwosṭātēwos (for example, Dabra Māryām, in Eritrea, following the old traditions of manuscript painting having their roots in Palaeo-Christian and Byzantine art; Heldman 1989; Lusini 2004) and Esṭifānos (Gunda Gundē, in eastern Tegrāy, characterized by the introduction of several technical and iconographical innovations: an enlarged range of colours, extensive use of *ḥarag*, reduction of the narrative scenes and addition of purely iconic pictures to the decoration programme; Heldman 1989; Balicka-Witakowska 2005a), and also the monastery of Dabra Ḥayq (Bausi 2006a; Heldman 2007; Bosc-Tiessé 2010b).

An analysis of colophons written down in the 1660s–1760s in the Lāstā region, around Lālibalā, reveals the relationships between the different actors. It appears that different authorities, either political or religious, could hire a scribe, ordering manuscripts to be copied for different churches. Scribes worked independently, not being attached to the service of one patron, who in turn could have different scribes working for him. In this context, a scribe was not settled in a particular church (Bosc-Tiessé 2009).

Under the regency of Queen Mentewwāb (1730–1769) and during Menilek II's reign (1889–1913), we have evidence of a more developed hierarchy, with a chief organizing the work of the scribes. During the regency of Mentewwāb, a chief supervised the copyists working for the queen and her son. During the reigns of Menilek II and Ḫayla Śellasē, this function was put under the office of the *ṣaḥāfē teʾezāz*, that is the official chronicler and chancellor of the King (Haile Gabriel Dagne 1989; Bosc-Tiessé 2008; 2010a). Yet already in the fourteenth and the fifteenth centuries, the kings are known to have organized the copying and distribution of manuscripts at home and abroad (Balicka-Witakowska 1997; Derat 2005; Bausi 2013b).

The scribe first writes the main text with black ink, and later adds the rubrics in red after changing the reed; but the rubricator might be another person. The twentieth century pictures of scribes show them working alone. However, there is enough evidence to indicate that the work could be divided among several scribes.

The scribe seems to have been theoretically trained to work also as a painter. In most cases it was the scribe who, if not painted the miniatures, at least sketched the ornamentation (*ḥarag*). The name of the painter does not appear in the colophon, but sometimes the miniatures are signed and thus we can see that in some cases painter and scribe were the same (Bausi 2014, on Fiaccadori 1993, 162–168; Wright 1877,

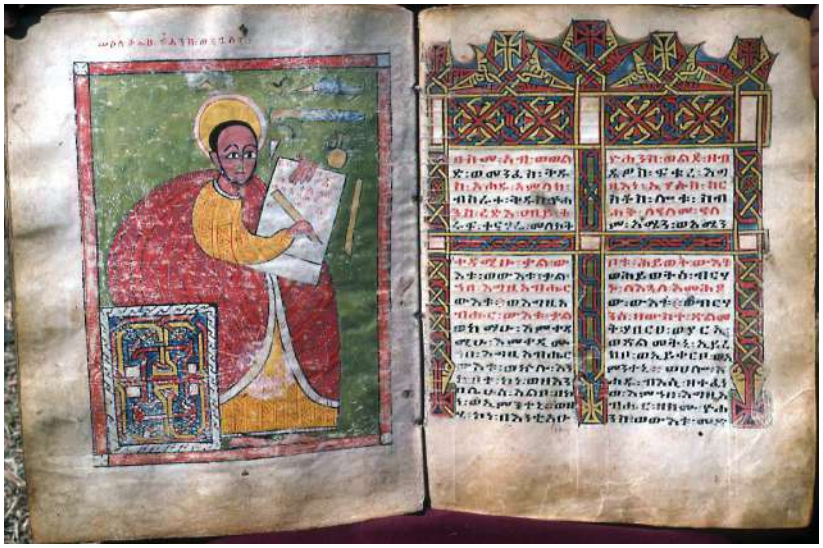

Fig. 1.6.9 Ethiopia, Tegrāy, Dabra Madhināt, Abuna ʿAbiya Egziʾ, Four Gospels, sixteenth century, ff. 161v–162r: St John and the *incipit* of the Gospel of John, photograph by Michael Gervers.

Fig. 1.6.10 Ethiopia, Lālibalā, Bēta Māryām, *Nagara Māryām* (Story of Mary), eighteenth century, ff. 10v–11r, photograph by Michael Gervers.

34, no. lii). Different scenarios might have occurred especially when the amount of work would make a division of labour necessary. For the period up to the fifteenth and early sixteenth centuries, the quires with pictures (with the exception of the frontispieces) and the quires with text were independently produced, while afterwards the painter worked on the same quires as did the copyist, and he had to wait until the scribe had finished before he could start his work.

In several manuscripts of the beginning of the eighteenth century, we have the name of the painter on the preparatory sketch (Pankhurst [Rich.] 1984), yet never in relation to finished paintings, suggesting that the name was intended to disappear under the painted layer and that the manuscript was circulating between different persons working on it. The signature was probably used to remind someone that the work on this specific page was done or had to be continued by a certain person. Painters could have worked to some extent with manuals and iconographic repertories (for some examples, Fiaccadori 2001, 280b–285b, on the manuscript Parma, Biblioteca Palatina, 3853 and further examples).

The scribe who makes the scrolls has to act in a relatively clandestine way because the Orthodox Church formally disapproves of such practices. The scroll-makers claim that their esoteric knowledge is a result of revelation and needs to be protected by deep secrecy. At least a part of this ‘hidden wisdom’, however, is written down and appears in books of divination and of the medical and/or magical-religious genre, with related pictures (Mercier 1992, 95–121). When ready, the scroll is given to the owner together with a prescription telling him or her how to carry it and when and how to use it in order to make it most effective. The texts in the scrolls mention neither the name of their scribes, nor the dates.

Books have been mostly written at someone’s request or on behalf of someone, and they have also been sold and bought (the book market of Aksum has been particularly important). The price is sometimes mentioned in the manuscript.

6.6.2. Colophons

Colophons were definitely an optional element, and there is no colophon, for example, in the most ancient Four Gospels books of Abbā Garimā. The most ancient Ethiopic colophon might be in the MS EMML no. 1832, a Four Gospels manuscript from Dabra Ḥayq Esṭifānos, written down by order of the abbot and saint

Iyasus Moʾa in 1280/1281 CE (f. 24v; Taddesse Tamrat 1970; but cf. also Bosc-Tiessé 2010b). An increasing number of colophons can be noted in the fourteenth and fifteenth centuries (in particular in the age of Zarʾa Yāʿqob, 1434–1468, cf. also Bausi forthcoming b).

A peculiar phenomenon attested mostly for the communities of the followers of Ēwosṭātēwos (Dabra Māryām, Qoḥayn, and Dabra Bizan, Ḥamāsēn, now Eritrea) is the narrative expansion of the colophons, which in some fifteenth-century manuscripts tend to become small chronographical and hagiographical works in and of themselves (Bausi 1994, 1995a, 1997; Lusini 1996).

6.6.3. Dating systems

Chronological indications in colophons refer to the regnal year of the reigning king, but officers in charge and church dignitaries might also be mentioned, whether the book was written for them or not. Dating can also alternatively or additionally be given according to the common calendrical systems in use in written texts, which mostly derive from Christian Egypt, with all its apparatus (cycle of the evangelists, epact, *ṭenteyon*, etc.). Several eras are used: Era of the World (*ʿamata ʿālam* 'year of the world'), also called 'year after the creation' (*ʿāmat emfeṭrat*) beginning in 5493 BCE; Era of Diocletian (*ʿamata samāʿtāt* 'year of martyrs'), beginning 5,776 years after creation, in 284/285 CE; Era of Grace (*ʿamata meḥrat* 'year of mercy'), beginning 5,852 years after the creation, in 359/360 CE; Era of the Incarnation (of Christ) (*ʿamata śeggāwē*), beginning 5,500 years after creation, in 7/8 CE. The Era of Grace and the Era of Diocletian are connected to the five-hundred-thirty-two-year cycle of the eastern computus that combines the nineteen-year lunar cycle with the biblical/Jewish seven-day week (and the four-year leap-year cycle) and often give rise to uncertainties that can be cleared up only by the context and cross-dating (Uhlig 2003).

6.6.4. Duration of copying

Apart from a regulation of the imperial scriptorium issued in June 1919, detailing how much time was needed for copying various books (for example, five months for a Psalter, eight months for the Four Gospels, etc.), only colophons and notes in the manuscripts provide any indications concerning duration of copying, and such indications have not yet been systematically collected. For example, the colophon of a large-size Octateuch manuscript in Pistoia, Biblioteca Forteguerriana, Martini 5, consisting of 195 folia, dating to 1437/1438 CE, indicates that the manuscript was copied by two scribes (one of them also acting as painter) from February to August of a single year, i.e. in the space of six to seven months circa, while the colophon states also that the parchment was produced by specialized craftsmen (Bausi 2014, on Fiaccadori 1993, 162–163).

Antoine d'Abbadie, an erudite individual well placed in the Ethiopian society of the first half of the nineteenth century, had manuscripts copied for him when he could not get possession of the original. In Gondar, capital city of the kingdom at that time, he paid the scribe per page or even per character, counting that an efficient copyist should write around 10,000 characters per day (MS Paris, BnF, Éthiopien d'Abbadie 172, f. 88; Bosc-Tiessé – Wion 2010, 87–88).

6.7. Bookbinding

Ethiopian tradition claims that the main shape of the Ethiopian codex has remained unchanged since many centuries, and the Ethiopian binding method is very old. Some modification, however, did take place, even though there was no complete transformation of the binding structure and techniques.

The main type of binding of the Ethiopian codex, on two boards, is simple (Szirmai 1999, 45–50). The left and right cover boards are commonly made of wood, *Cordia africana* (*wānzā*), *Olea africana* (*wayrā*), or cedar, though other kinds of wood are also used. The boards are cut roughly with an adze; usually they have the same size as the text block, or sometimes they exceed it by just a few mm.

Leather boards made of thick, stiff (ox) leather do occur, but even if cheaper, they are far less usual than the wooden ones. They were normally manufactured for codices of small size. If a codex contains only a small number of leaves (gathered in one quire), one single folded rectangular piece of leather (or even parchment) embracing the text block can be utilized ('limp-binding'). However, some inherent problems (greater vulnerability of the sewing, concave distortion of the spine) rendered leather bindings impractical, and their use remained limited.

Many Ethiopian codices bound on wooden boards are covered with leather. This practice is documented from the fifteenth century at the latest, and is very widespread also today. For this purpose,

slightly tanned sheep skin, or better goat skin, is used (just as for a number of household items). Tambēn, a region in Northern Ethiopia, is particularly known for the production of high quality leather (also called *tambēn*). Rarely, also imported Morocco leather (*bāhra ʿarab*) was used. The leather cover is glued onto the outer faces of the boards (at least in some cases, the adhesive was also brought unto the spine-folds of the quires); then protruding edges of the cover are folded as turn-ins and glued onto the inner surface of the boards. The remaining open surface in the middle can be covered with textile inlays; in older codices, it was covered by parchment paste-downs.

While most of the codices commonly have a full leather cover, quite a number have a 'quarter cover', and very few a 'half cover'. A fully leather-covered volume may later receive a leather overback, to strengthen the spine area or to repair damage. For very big codices, the leather cover could be made of two pieces of leather, sewn along the middle of the spine.

In very few cases, the codex could receive a luxurious furnishing made of metal plaques (usually bearing tooled decorations) attached to the boards. The material could be copper or (gilded) silver or gold-like metal. Such an expensive embellishment was usually reserved for the main Four Gospels manuscript of the institution (but some other books decorated in this way do occur, see fig. 1.6.11). Traditionally, the term 'golden gospel' (*wangēla warq*) refers to a Four Gospels manuscript which contains the most significant notes regarding the owning institution (usually a monastery or a church) or the region (Bausi 2010d, see also Balicka-Witakowska forthcoming a), not to a Gospel book with a golden or gilt cover.

The codex is often kept in a special two-part slip case (*māḫdar* and *defāt*), made of crude stiff leather, although high quality examples made of fine leather and furnished with elaborating fastenings also occur. The cases are used to hang the books (in the storage rooms) on a peg inserted in the wall, or from a beam. The big and heavy volumes could be stored on improvized shelves or on a traditional leather thong bed (*algā*), or, in the church, in a special piece of furniture (*manbara tābot*) for the altar tablet (*tābot*). Many codices received a secondary textile cover, or are kept and transported wrapped in textile or brocade. Extremely poor preservation conditions—which started only recently to be slowly improved—have resulted in the great percentage of old bindings being lost or badly damaged. Many manuscripts have been rebound, often unprofessionally.

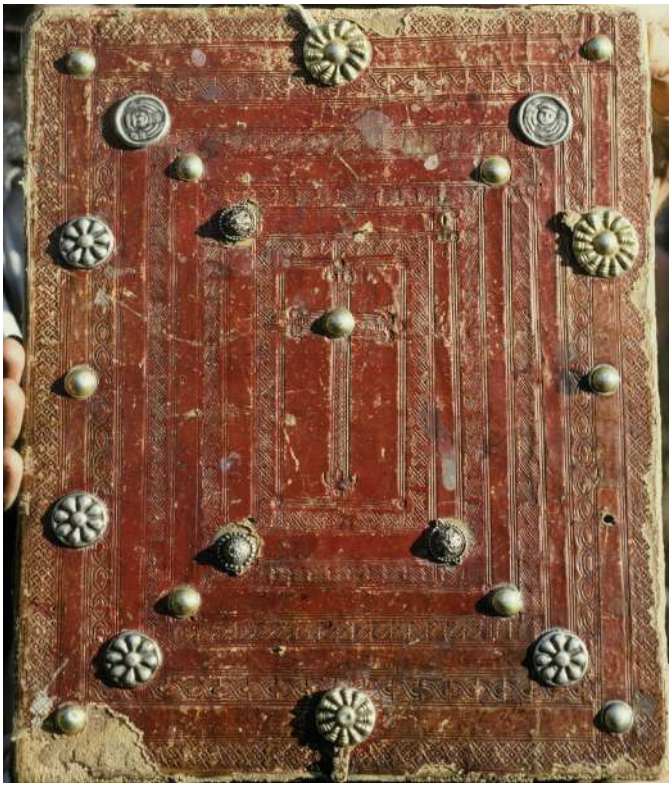

Fig. 1.6.11 Ethiopia, Amhārā, Saqotā Mikāʾēl Gabreʾēl, *Taʾāmmera Iyasus* (Miracles of Jesus), eighteenth century, front board, photograph by Michael Gervers

Text blocks frequently include end-leaf quires protecting the first and last pages of the text from direct contact with the wooden boards. Such quires usually include a smaller number of leaves (two to six) than usual, which remain unwritten and can be used for additional texts, notes, paintings or drawings of different kinds. The end-leaf quires were an unstable part of the text block and were frequently taken out or modified (Tomaszewski – Gervers 2014, 73–74).

Another important feature which can be observed in older (pre-mid-sixteenth century) codices is the use of the first and the last leaf of, respectively, the left and right end-leaf quires as paste-downs. The leaf was glued to the board surface with an adhesive, and the turn-ins of the leather cover were glued onto it. With time the adhesive (possibly of wheat origin) tends to lose its strength, so that the paste-downs become detached from the wooden surface, and in many cases they were later cut off. However, in a few cases the former function of those leaves can still be surmised thanks to typical discolourations that occur on end-leaves.

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Ethiopian manuscript-makers occasionally trimmed text blocks, but only rarely; this practice is attested for a few manuscripts, among others, through the 'cues' for the rubricator in the margins (numbers, titles, instructions), which have partly been cut together with the edges of the leaves.

Threads used for sewing the codex can be of animal or vegetable origin. As to threads of animal origin, they were probably 'sinews', according to recent observations, instead of 'guts', as sometimes reported (cf. Sergew Hable-Selassie 1981, 24; Faqāda Śellāse Tafarrā 2010, 208–209). The vegetable threads are made from different sorts of linen or cotton string or twine. The use of long and narrow twisted strips of parchment has also been observed, although it is a marginal practice. Today, synthetic threads are also widely used.

Depending on the size of the manuscript, the boards receive one, or (most commonly) two, or three pairs of sewing stations (up to six; sewing on three stations has also been attested). For this sewing, channels are made at appropriate places on the boards, where the threads are to be anchored, and they are matched by the holes made in the centrefolds of the quires. The sewing is executed without any sewing supports. Ethiopian chain-stitch sewing has been described in detail (Szirmai 1997, 46–48); it is sometimes referred to as an ancient feature of Ethiopian book production and compared to the Coptic multiple-quire manuscript sewing (for example, Shailor 1988, 55). For each pair of sewing stations, one single thread and two needles are used. The same thread is used for attaching the boards to the text block.

Most of the leather-covered codices have endbands or at least traces of their remains. The core of the endband (*totān*, cf. Faqāda Śellāsē Tafarrā 2010, 222–224) is usually slit-braid (sometimes made of two leather thongs of different colours). Two cores are sewn to the protruding tip of the spine at the top and bottom (making 'headband' and 'tailband', respectively). The threads used for them are led through the centrefolds of the quires, then between the board and text block, and knotted (Szirmai 1999, 49). It appears that in very many cases the holes left by the tackets have been re-utilized for endband sewing (Faqāda Śellāsē Tafarrā 2010, 133–134). The endband structures (especially stitching) are quite fragile and can be observed intact only in a relatively small number of codices.

The accordion book could have a limp binding, or its front and end folds could receive light wooden or leather boards and laces (fig. 1.6.1). Often it is also supplied with a leather case in which the book is carried as an amulet, with a channel for a cord. The scroll is kept rolled in a cylindrical case made in two parts of tinted red leather or of a hollowed piece of bamboo covered with leather. The case has a channel for lacing a cord, to which may be attached shells, beads, dried beneficial plants closed in small cases and additional charms. In rare cases, the case is made of metal, usually silvered alloy, and decorated with filigree and chased (for example, London, BL, Or. 12859).

Leather covering the wooden boards is dyed brown or reddish brown. Different conditions of preservation, exposure to light and humidity produce the whole gamut of these basic colours. Recently executed examples, tinted with industrial products, are pinkish red. Leather is usually blind-tooled with small finishing tools (*degg*^{w}*es*), each having a special name recalling its form (Mellors – Parsons 2002a, 17; Mersha Alehegne 2011; Tomaszewski – Gervers 2014, 80–84). Sometimes the decorative pattern is incised or punched. The blind panel design is very simple and repetitive, but it would be difficult to find two identical examples even if they were produced in the same workshop. Usually the ornamentation includes a cross, sometimes flanked by a schematically drawn church building, always framed or encircled by multi-linear borders. The cross appears in innumerable variants. The design of the front cover is repeated on the back cover. The turn-ins, the spine, and the edges of the cover are also sometimes tooled with the same patterns as those on the external covers. The centre of the inside cover is filled with a textile inlay, of varying quality—from cheap Indian chintz to fine silk (Pankhurst [Rich.] 1980, 1981, 1983–1984, 1984, 1985–1986). A leaf with a drawing or even with a miniature may also be pasted in place of the textile. In the centre of some upper boards there is a square cavity which originally housed a piece of locally produced mirror.

The elaborate examples of leather covers may be supplied with metal furnishings. The bosses or studs, usually in the form of rosettes, were executed by means of different techniques, some made of two pieces of solid metal. Quite often a metal appliqué decoration was introduced, arranged into various compositions. The fastening catches and clasps may have ornamented metal parts. For production of all these elements, most often silver or silvered alloy are used, but other metals may occur (Pankhurst [Rich.] 1999); very fine examples are two manuscripts donated by King Nāʾod (1494–1508) to the church of

Marṭula Māryām, Acts of the Apostles and Catholic Epistles, and a two-volume Synaxarion belonging to the church of Māryām Dengelāt, Tegrāy.

Books entirely covered with metal are rare and of recent date, mostly from the eighteenth to early twentieth centuries (a well-known example is MS London, BL, Or. 728, a binding 'in metal covers of copper gilt', Wright 1877, 196, no. 304; also Pankhurst [Rich.] 1983–1984, 249). Made of a cheap silver or alloy, they are fastened by means of metal pegs and usually decorated with engravings representing figural and aniconic motifs. Three among the most ancient Four Gospels books have metal covers dating to a much earlier period: two Four Gospels from Endā Abbā Garimā (with three bronze pieces, plus one fragmentarily preserved, repoussé ornamented, and one possibly gilt), and the Four Gospels book of Dabra Libānos, Ham (now Eritrea), that is also a 'golden gospel'. In the former case, the decorative motifs, the cross encircled by stylized foliage, are similar in all three examples, but not identical (Leroy [Jules] 1960). The latter case from Dabra Libānos (Bausi 1994, 1995a, 1997) has not yet been more closely examined, but the cover has a votive inscription mentioning the name of its commissioner donor (Conti Rossini 1901, 181; Derat 2010, 20; Fiaccadori 2011 [2012]).

Some wooden boards are coated with textile, usually a kind of velvet or thick cotton, providing support for the metal appliqué. The covering textile goes over the boards. Buckram-like textiles, usually cheap ones, are also used to protect the leather covers and the edges of the text block.

Several manuscripts are furnished with bookmarks made of coloured threads or pieces of leather fastened to the outer margin of a leaf some 50 mm from its upper corner. In the *de luxe* manuscripts it is a small, colourful bunch of silk threads. In some manuscripts, the miniatures may be protected by a tipped-in curtain of thin cotton or other textile, but seldom is the whole set protected.

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Annequin 1972; Assefa Liban 1958; Balicka-Witakowska 1983, 1986, 1997, 2005a, 2005b, 2006, 2010a, 2010b, 2014, forthcoming a; Barbieri – Fiaccadori 2009; Bausi 1994, 1995a, 1997, 2004b, 2006a, 2008a, 2010d, 2011a, 2013b, 2014, forthcoming a, forthcoming b; Bausi – Camplani 2013; Bosc-Tiessé 2008, 2009, 2010a, 2010b; Bosc-Tiessé – Wion 2010; Bozzacchi 2000; Budge 1923; Capon 2008; Cerulli 1943; Chernetsov 2007; Conti Rossini 1901; Delamarter – Demeke Berhane 2007; Derat 2005, 2010; EAE; EMML; Endangered Archives Programme Project 340; Faqāda Śellāsē Tafarrā 2010; Fiaccadori 1993, 2001, 2011 [2012]; Getatchew Haile 2011; Getatchew Haile et al. 2009; Godet 1980–1982; Grébaut – Tisserant 1935, 1936; Griaule 1930; Guidi 1901, 1907; Haile Gabriel Dagne 1989; Hammerschmidt 1973; Heldman 1989, 1993, 2003, 2007; Jones 1941; Kropp 1988; Lepage 1987; Lepage – Mercier 2011–2012; Leroy [Jules] 1961, 1962; Liszewska 2012; Lusini 1996, 2002, 2004, 2006; Macomber 1978; Marrassini 1987–1988; McEwan 2006; Mercier 1979, 1992, 2000, 2001, 2004; Mercier – Daniel Seifemichael 2009; Mellors – Parsons 2002a, 2002b; Mersha Alehegne 2011; Nosnitsin 2012a; Nosnitsin et al. 2014; Pankhurst [Rich.] 1980, 1981, 1983–1984, 1984, 1985–1986, 1999; Pankhurst [Rita] 1973, 1990; Phillipson 2013; Proverbio 2000, 2012a; Proverbio – Fiaccadori 2004; Richardin et al. 2006; Sergew Hable-Selassie 1981; Shailor 1988; Soldati 2014; Spencer 1967; Strelcyn 1976, 1978; Szirmai 1999; Taddesse Tamrat 1970; Taye Wolde Medhin 1980–1982; Tomaszewski et al. forthcoming; Tomaszewski – Gervers 2015; Tournerie 1986; Uhlig 1988, 1989, 2003; Weitzmann 1960; Wion 2004; Wright 1877; Zaborski 1995.

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7. Georgian codicology (JG)

7.1. Materials and tools

As in other book traditions of the Christian Near East, Georgian manuscript books (usually styled *çigni* 'book' in Old Georgian, vs. *nusxa* 'manuscript, document'; Modern Georgian *xelnaçeri* 'handwritten') are written on papyrus, parchment or paper. As a matter of fact, the history of the different writing supports used for Georgian manuscripts is poorly understood until today, for lack of extensive investigations into the matter, but also because of the lack of explicit dates in all too many manuscripts, as well as their dispersion over all too many repositories throughout the world. To overcome this problem, it would be desirable to establish a relative chronology based upon palaeography as well as external features (ink types, layout etc.), with manuscripts that contain explicit indications of their date and provenance representing the core. An important prerequisite for this undertaking would be the availability of digitized images, not only from western collections. Another prerequisite would consist in the application of scientific methods of analysis, which has not yet even begun.

7.1.1. Papyrus

Even though there were outstanding centres of Georgian manuscript production in the eastern Mediterranean (Jerusalem, Palestine and Mount Sinai), papyrus (Georgian *č̣ili*) was always exceptional as a writing support for Georgian codices even of Levantine provenance. The most prominent papyrus codex is MS 98 of the (old) Georgian collection of St Catherine's Monastery, parts of a psalter written in *nusxuri* minuscules in about the tenth century. Unfortunately, the codex was badly damaged and has remained practically inaccessible for investigation in the monastery library, so that but little information as to its structure can be given.

Another prominent item to be mentioned here is manuscript 2123 of the H collection of Tbilisi, a hymnary codex of about the tenth century comprising about one half each of parchment and papyrus leaves (the so-called *č̣il-eṭraṭis iadgari* 'hymnary of papyrus [and] parchment'; Šaniʒe – Marṭirosovi 1977; Ḳaranaʒe et al. 2010, 25 and 139; cf. the coloured reproductions of one papyrus and one parchment page each in Cagareli 1888a between pp. 157 and 158), put together in quinions with three papyrus bifolia between outer and central bifolia of parchment to support them (Šaniʒe – Marṭirosovi 1977, 214–215; Meṭreveli et al. 1978, 229–239). Why, when and by whom the codex was conceived in the given form has remained unknown.

The papyrus used in these two codices originated presumably from Egypt; however, nothing is known about the exact provenance or the manufacture of the bifolia as no colophons survive. From the only photograph available of Sinai, St Catherine, georg. 98 (fig. 1.7.1 showing Ps. 64.11–65.11, photograph kindly provided by the librarian of St Catherine's Monastery, Father Justin, in May 2009; the coloured reproduction of a fragment containing Ps. 118.68–75 printed in Cagareli 1888b between pp. 192 and 193 is not a photograph), it seems that the writing is only across the vertical fibres (recto or verso?), while the other side with horizontal fibres is blank. It was stated in 1888 that the papyrus of H-2123 (then still manuscript 29 of the Georgian monastery of the Holy Cross in Jerusalem) was 'better', 'thinner' and 'smoother' than that of the Sinai Psalter but, at the same time, more 'yellow-brownish' and 'dark coloured' (Cagareli 1888a, 159; my translations); today, the leaves of the Psalter too appear extremely tanned.

7.1.2. Parchment

Parchment was the basic support material of manuscript codices throughout the period of Old Georgian, up to the thirteenth century, and at all the production centres, both in the Caucasus and elsewhere; except for the few papyrus codices from Palestine and Mount Sinai, all manuscript books of that period, including rolls, are made from parchment. The same is true for the small set of noteworthy legal and other documents that have come down to us from that time. During the twelfth and thirteenth centuries, parchment began gradually to be superseded by paper, and its use seems to have ceased by the end of the fourteenth century (if we ignore the reuse of parchment leaves as flyleaves in bindings).

Although the number of Old Georgian parchment manuscripts is very large, little is known so far about the material used, its provenance and its manufacture (a relevant thesis on writing materials, Gogašvili 2004, has remained unpublished, but see Gogašvili 2003 and 2006). Given that the structure of parchment codices is by and large compliant with Greek usage, we may safely assume that the Georgian practices of

preparing animals' skin for parchment are derived from Greek practices, most probably those prevalent in Palestine. This assumption is corroborated by the fact that the Georgian word for 'parchment', *eṭraṭi*, likely reflects Greek *tetradion*, 'quaternion', thus indicating that quaternions made of parchment were the normal type of codex units Georgians met with when they commenced the production of manuscripts in their own right.

Fig. 1.7.1 Sinai, St Catherine, georg. 98, page containing Ps. 64.11–65.11, photograph by Father Justin, May 2009.

There has been no investigation yet into the different types of parchment used in Georgian codices and their distribution across chronological or geographical extents (but see Nanobašvili 1973 for popular methods of the treatment of animal hides in Georgia). As a matter of fact, Georgian manuscript books are likely to have been an object of transportation between several centres of production throughout the Middle Ages, and as all too many codices lack any information regarding their origin, we cannot even be sure that they originated from the location where they were first taken notice of. For studying the history of Georgian manuscript production, it would therefore be worthwhile to devise scientific means to distinguish different types of parchment, especially with a view to determining the number of pre-ninth-century manuscripts that were produced in Georgia proper.

Different from other early Christian traditions, Georgians seem not to have used coloured parchment in the production of codices. However, given the quantity of manuscripts that must have been destroyed in the Caucasus during the time of the Mongol invasions and other wars, we cannot be sure that this assumption is not due to a mere gap of preservation.

7.1.3. Parchment palimpsests

Nearly all Georgian manuscripts antedating the ninth century survive only in palimpsest form, overwritten in either (later) Georgian or other languages. Palimpsest codices, such as Vienna, ÖNB, Cod.Vind.georg. 2, often contain parts of more than one original manuscript (in the latter case, fourteen hands extending over approximately six centuries have been distinguished, and another part of one of the originals used has been detected in a palimpsest in Tbilisi, see Kaǯaia 1974, 491; Gippert et al. 2007a, 6-1). On the other hand, Georgian overwriting was also applied to codices of non-Georgian provenance such as, for example, Palestinian Aramaic, Syriac, Armenian, or the only manuscript remnants of the language of the Caucasian Albanians, detected as the first text in two Georgian palimpsests of the 'New Finds' of Mount Sinai (Gippert et al. 2009). Until today, only a few of the relevant palimpsest codices have been studied in much detail (*c.*4,000 palimpsest pages have been counted among the holdings of the National Centre of Manuscripts, Tbilisi; see <http://www.manuscript.ge/index.php?m=73&ln=eng>, last access 29 November 2014); by consequence, questions of (relative) chronology and provenance of the overwritten originals have only partly been investigated.

7.1.4. Paper

Leaving aside a few specimens datable to the tenth and eleventh centuries, evidence for the use of paper as the support material for Georgian manuscript codices begins in the twelfth century, one of the most promi-

nent early codices being the 'Bible with Catenes' (*ḳaṭenebiani biblia*) written in the academy of Gelati in West Georgia (Tbilisi, National Centre of Manuscripts, A-1108). Another remarkably ancient paper codex is the Tbilisi MS A-65 which contains, among other texts, a Georgian translation of an Arabic astrological treatise (with illustrations) and which is datable to 1188–1210 (Ḳaranaʒe et al. 2010, 39). Secular codices proper, i.e. manuscripts containing epics, romances and the like, are all paper codices; this is hardly surprising, as none of those that have come down to us antedates the sixteenth century, due to the fact that many codices of this type were destroyed, if not during the Mongol invasions, by clerical fanatics in the eighteenth century (Ṭimote 1852, 154; Rayfield 2010, 79; Gippert – Tandaschwili 2014, 6–7).

For the majority of Georgian paper codices we may assume that it was oriental paper that was used; but there has been no detailed investigation into this question. The same is true for questions concerning the provenance, the composition, and the manufacture of the paper, and possible differences between paper used in Georgia proper and elsewhere (but cf. Ṗaṭariʒe 1965a for the treatment of paper, and Ṗaṭariʒe 1968 for the use of Persian paper in Georgia). Western paper is likely to have been introduced only in the eighteenth century, via Russia, where the first Georgian book was printed (the 'Bakar Bible' of 1743); however, there are no detailed studies available for this topic either (but see Ṗaṭariʒe 1965b on watermarks in Georgian manuscripts of the fourteenth and fifteenth centuries).

7.1.5. Other writing surfaces

There can be no doubt that wooden tablets (Georgian *picari*) were used as writing supports throughout the time of Georgian literacy, even though we do not have any ancient examples at our disposal; however, there is no indication that they ever bore large amounts of text in the sense of 'books'. The same is true for *ostraca* and other non-flexible writing supports (including stone inscriptions).

7.1.6. Inks

The typology and distribution of the inks used in Georgian manuscripts has not been studied in detail. From multispectral analyses undertaken in connexion with the editing of palimpsests, we may safely state that the main ink used in the early centuries, on parchment, was an iron-gall ink with a brownish (Georgian *ġavisperi* 'coffee-coloured') to blackish (Georgian *šavi* 'black') colour. The same type of ink was still used in later centuries when the palimpsests were overwritten, and probably also in paper codices as well as the few papyrus manuscripts. Nothing is known so far about the distribution of special types of ink among the different centres of Georgian manuscript production.

There are no original Georgian texts known that describe the production of inks for manuscript use. It is highly probable that 'black' ink was introduced to Georgia from the Greek-speaking world, given that the Georgian term for 'ink', *melani*, is clearly a borrowing from Greek *melan*, 'black'. In contrast to this, the word for 'red ink', *singuri*, cannot be traced to Greek, but must have a different origin (Syriac *siriqōn*?); it is important in this context that *singuri* seems not to be attested before the eleventh century, the plain adjective for 'red', *ċiteli*, being used earlier (for example, in manuscripts containing the Euthalian apparatus to the Pauline Epistles; Gippert 2010a, I-1–5).

7.1.7. Pigments and dyes

Rubrics can be proven to have been common everywhere in religious manuscripts since the very beginning of Georgian literacy, with several clear-cut purposes that range from delimitation (in the form of ornamental headpieces and the like separating parts of larger texts) via decoration (such as in crosses added at the end of Gospels) to highlighting (of titles, initials of paragraphs, proper names and the like, as on the title page of the synaxary MS Tbilisi, National Centre of Manuscripts, H-2211, *c*. eleventh century, see fig. 1.7.2, or in the hymnary MS Tbilisi, S-425, written by Mikael Modreḳili in *c*.978-988, which also exhibits neumes in red, see fig. 1.7.3; cf. Gippert 2010b for a preliminary typology). The use of other colours in the same types of codices is rather rare; for example, we find green ink used for liturgical glosses added to the twelfth-century Gospel manuscript Vienna, ÖNB, Cod.Vind.georg. 1, or blue colour used (alongside red and gold) to fill in the initial letters in the tenth-century Gospel codex Tbilisi, National Centre of Manuscripts, S-592, or in the twelfth-century ǯruči Gospels, MS Tbilisi, H-1667, see fig. 1.7.4. Other types of ornamentation involving extensive use of colours can be found in Gospel (and other) codices which exhibit portal-like frames (headpieces) indicating the beginnings of chapters (Georgian *ḳari* 'gate')

as in the Gospel codices from Tbilisi, National Centre of Manuscripts, A-484 (the Alaverdi Gospels, dated 1054), Q-908 (1054, see fig. 1.7.5) or A-1335 (the Vani Gospels, twelfth to thirteenth centuries; see Ch. 2 § 6 fig. 2.6.2), or the codices S-134 (dated 1031) and S-3683 (dated 1708, on paper) containing elements of (ecclesiastical) law.

In the secular codices containing mediaeval epics, romances and the like, rubrics can be found with highlighting functions as in the Tbilisi manuscripts H-84 (dated 1680, containing Shota Rustaveli's *Vepxisṭqaosani* 'Knight in the Panther's Skin') or S-1594 (dated 1647, containing a Georgian derivate of the Persian *Šāhnāma* epic); however, red is often replaced by gold in the same types of manuscript as in H-2074 (sixteenth/seventeenth century, another manuscript containing Rustaveli's epic).

A wider range of colours was used throughout the time of Georgian manuscript production in miniatures and illuminations.

7.1.8. Writing instruments

The main writing instrument used in the production of Georgian manuscripts was the calamus, obviously introduced to Georgia from Greece as its name shows (*ḳalami* < Greek *kalamos*); the word is still used today for any kind of pen. Nothing is known about the source material used in the production of the calamus in the centres of ancient Georgian manuscript tradition; however, it is likely that either quills or reed pens (or both) were used, as in other traditions of the Christian Near East.

7.2. Book forms

The principal form of the Georgian handwritten book was the codex made of quires of parchment (note again the term *eṭraṭi* denoting 'parchment', from Greek *tetradion* 'quaternion') or paper, with but little variation concerning the number of bifolia constituting a quire and other aspects of codex and quire structure. As a concurrent form, parchment rolls appeared during the Middle Ages; they always played a minor role, however, their use being restricted to certain specific purposes.

7.2.2. The roll and the rotulus

Rolls made from parchment sheets have mostly been found at Mount Sinai. As there have been no special investigations devoted to the manu-

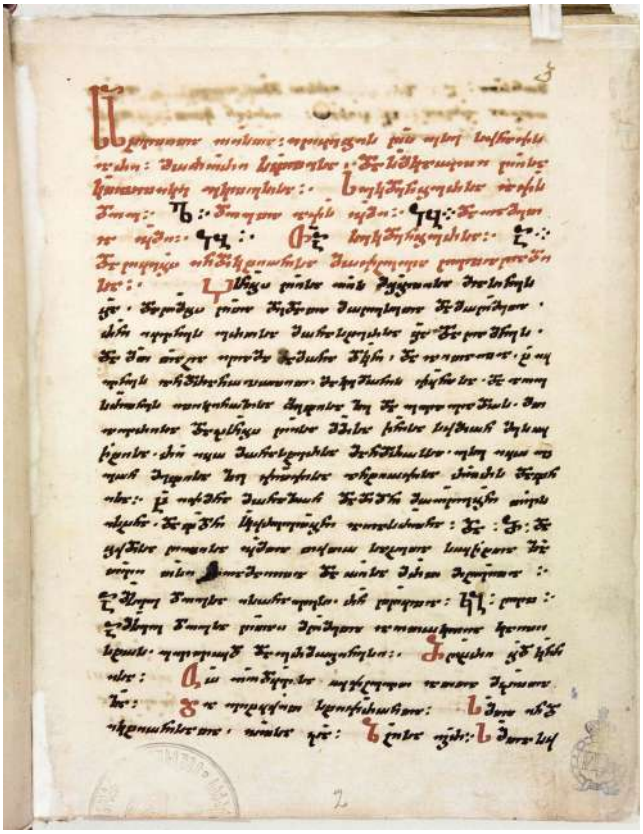

Fig. 1.7.2 Tbilisi, National Centre of Manuscripts, H-2211, *c.* eleventh century, f. 2r; this and the following six photographs courtesy of the National Centre of Manuscripts.

Fig. 1.7.3 Tbilisi, National Centre of Manuscripts, S-425, *c.*978/988, f. 24v.

facture and structure of Georgian rolls (*gragnili* 'rolled up'), only a few remarks can be made here. From the specimens mentioned above, it is clear that a roll consists of a series of parchment sheets that were sewn together along the shorter edges and inscribed on both sides parallel to the short edge, which implies that they were unrolled vertically when read and so are to be identified as rotuli. The leaves bound together in rolls usually have a smaller ratio of width to height than those used in codices; cf., for example, MS Tbilisi, National Centre of Manuscripts, A-922 with a ratio of less than 0.3 (Ḳaranaʒe et al. 2010, 80). Typically the Georgian rotuli contain liturgical texts, such as the liturgy of St John Chrysostom, which is contained in MS Graz, UBG, 2058/5 (of Sinaitic provenance; Imnaišvili 2004, 300–313; Gippert – Imnaišvili 2009a). A parchment rotulus containing a king's decree (written in *mxedruli*) is MS 608 of the Kutaisi Historico-ethnographical Museum, from about the eleventh century.

Fig. 1.7.4 Tbilisi, National Centre of Manuscripts, H-1667 (Ǯruči Gospels), twelfth century, f. 14v (Mt. 3.9–16).

Fig. 1.7.5 Tbilisi, National Centre of Manuscripts, Q-908, 1054, f. 88r: the beginning of the Gospel of Mark.

7.2.3. The codex

There is no indication whatsoever that the production of rolls antedated that of codices in the Georgian tradition. As a matter of fact, all manuscripts from the early centuries of Georgian literacy (*c*. fifth to ninth centuries) that have come down to us are parchment codices (or fragments thereof), and parchment remained the basic material in the production of codices up to the thirteenth century, when it was superseded by paper. Except for the use of papyrus, which was clearly restricted to the eastern Mediterranean coastlands (Sinai and Palestine), there seems to be no geographical preference discernible in the distribution of codex types. Leaving aside the 'Hymnary of papyrus [and] parchment' from Jerusalem mentioned above (MS Tbilisi, National Centre of Manuscripts, H-2123), mixed codices of parchment and paper all seem to be the result of a later substitution, in paper form, of lost or missing parts of an older parchment codex, as in the case of the 'Ṗarxali' Gospel manuscript (MS Tbilisi, National Centre of Manuscripts, A-1453) of 973, twenty-two leaves of which were rewritten on paper in the eighteenth century (cf. Ḳaranaʒe et al. 2010, 33).

7.3. The making of the codex

There has been no thorough investigation into the manufacture of Georgian codices yet. The following remarks, which are based on the analysis of a small number of parchment manuscripts from Georgia, Jerusalem, and Mount Sinai, are therefore tentative.

7.3.1. The making of the quires

Nothing is known about the making of quires in ancient Georgia as there are no sources describing it. Whether or not the bifolia put together in a quire were derived (by folding and/or cutting) from contiguous pieces of parchment, and whether there was the habit of beginning a quire with the flesh side as in older Greek codices, must still be investigated, as must be possible geographical and chronological divergences in manufacturing practices.

7.3.2. The composition of the quires

If the general Georgian term for parchment was indeed borrowed from the Greek word for 'quaternion' (as already noted above), this can be taken to indicate that quires consisting of four bifolia were the standard quire structure in Georgia, as in Byzantine parchment books of all epochs. Nevertheless, as in Late Antique Greek codices, quaternions co-occurred with other quire structures (quinions, ternions, rarely others; cf. Gippert 2013, 85–90 concerning the quire structure of the Kurashi Gospel manuscript).

When parchment leaves were re-used as palimpsests, new bifolia were normally derived from single leaves of the original codex, the underwriting being rotated 90°; by consequence, the resulting codices were usually smaller than the underlying source manuscripts. Nevertheless, the new quires were again mostly conceived as quaternions (cf. Gippert et al. 2007a, xviii for the quire structure of the palimpsest Vienna, ÖNB, Cod.Vind.georg. 2).

7.3.3. Pricking and ruling

Georgian parchment leaves to be used in codices were prepared for being written upon by applying hints concerning the page layout with both pricking and ruling. Palimpsests preserving the oldest stock of Georgian literacy, such as the *xanmeṭi* Gospel manuscript overwritten in Vienna, ÖNB, Cod.Vind.georg. 2 (*c*. sixth/seventh century), prove that these techniques were used right from the beginning. On the other hand, new ruling could also be done for the overwriting in a palimpsest, as in the case of the Graz Psalter (MS Graz, UBG, 2058/2), a palimpsest with an Armenian undertext (Gippert – Imnaišvili 2009b; Renhart 2009). For lack of more detailed studies, we cannot tell anything about the geographical and chronological distribution of the methods in question, and not very much about the techniques and characteristics; it may be sufficient here to state that pricking was usually positioned in the outer margin of a given leaf and that ruling was more often applied for layouts with columns (but was not necessarily restricted to this layout).

7.3.4. Ordering systems

Leaving aside lection indexes to Gospels and other such textual systems, Georgian codices are rather poor with respect to the reference systems they contain. What we do find generally in parchment codices is numberings placed at the top of the first page of a quire and repeated at the bottom of the last page of the quire (with the first quire sometimes omitted in counting), usually in a centred position (more rarely in the right margin), even when the manuscript is written in columns. The sequence of 'end number' and 'start number' thus achieved guaranteed the correct arrangement of quires in a codex (cf. Gippert forthcoming, § 2.1.2 for the quire signatures proving that the fragmentary Georgian MS Sinai, St Catherine, New Finds, georg. N89, pertains, as part of its quire 11, to the *mravaltavi* codex 32-57-33 of the 'Old Collection'). The tradition can be shown to be quite old, as it is even met with in *xanmeṭi* palimpsests (see, for example, Gippert et al. 2007a, 6-1 on quire signatures of the hagiographical manuscript re-used in MS Vienna, ÖNB, Cod.Vind.georg. 2). It is not always certain, however, that the quire signatures are of the same date as the textual contents of a codex; that quire numberings could be added later (for example, when preparing a new binding) is proven by the co-occurrence of Greek and Georgian signatures in the codex Sinai, St. Catherine, georg. 6 (with the numbering starting to diverge by error with quire 12, f. 201r, bearing Georgian $\overline{ḳv}$ = 26 and Greek $\overline{\kappa\varepsilon}$ = 25), or by Georgian signatures being applied to Greek codices as in the Sinai manuscripts graec. 215, 230, 231 (evangeliaries), 566, 582, 622, 632 (menologia), 795, 829 (*oktōēchoi*), 928 (kondakarion), and 1097 (typicon).

Numberings other than quire signatures (foliation, pagination, or even column numberings) seem not to have been wide-spread within the Georgian tradition proper (leaving paginations applied by 'modern' librarians aside). The same is true for catchwords, which seem to occur only late in the Georgian manuscript tradition. They are found, for example, in the Tbilisi paper codex S-3702 from the year 1729 con-

taining the *Visramiani* romance (cf. Ḳaranaʒe et al. 2010, 107 showing a page of the manuscript with a two-item catchword, *uqmna laškarni*).

7.3.5. The codex as a complex object

As in many other manuscript traditions, Georgian codices exhibit a strong interrelationship between their contents and their outer appearance, and by far the majority of the oldest specimens we have show that they were prepared for exactly one purpose and for one purpose only. Among the majority of codices we may count evangeliaries and lectionaries, both characterized by considerably enlarged letters arranged in columns for better readability during divine services, while codices containing historiographical or philosophical texts were conceived much less for being read aloud (being of much smaller size and written in one column and in minuscules). This implies that the Georgian tradition does not abound in codices comprising multiple texts that have no inherent thematic linkage; even the so-called *mravaltavi* (lit. 'multi-headed') codices can be proved to be clearly designed according to thematic principles (cf. Gippert forthcoming). Cases of codices that consist of several individual parts without any contentual or productional interrelationship are rare.

7.4. The layout of the page

Georgian parchment codices exhibit quite the same range of sizes and proportions as we find in the Greek tradition, which implies, first of all, that the page is oriented vertically, oblong codices being practically unknown. Books measuring less than 100 mm in height are as rare as books whose height extends beyond 500 mm, which seems to speak in favour of the same preference for *sexto* rather than *quarto* skin division as in the Byzantine book manufacture (see Ch. 1 § 8). As to quire structure, Georgian shows a preference for the quaternion type, in agreement with the fact that the Georgian word for parchment very likely reflects the Greek for 'quaternion'. Similar observations can be made with regard to the ratio of width to height, which proportion usually lies between 0.7 and 0.8; however, little can be said with respect to the early centuries, as nearly all specimens that have come down to us were considerably reshaped when they were prepared for being re-used as palimpsests. A more nearly square proportion (*c.*0.9) is visible in the mixed 'Hymnary of papyrus and parchment' (MS Tbilisi, National Centre of Manuscripts, H-2123; cf. the image in Ḳaranaʒe et al. 2010, 25), possibly also in the papyrus Psalter of Mount Sinai (Sin. georg. 98), which, however, has been damaged too badly for it to be possible to establish the original dimensions. With the introduction of paper codices, especially those containing non-religious texts, the proportion tends to decrease down to 0.6 due to a narrowing of the width, while heights remained within the former range.

7.5. Text structure and readability

7.5.1. Writing

For lack of detailed investigations, but also due to the fact that most manuscript codices were reduced in size by trimming (in the process of binding, sometimes repeatedly, or, in the case of palimpsests, through re-use), we cannot give a clear picture of the 'occupancy rate' of written vs. blank portions on a given page; it seems, however, that a ratio of about 1:1 was usual in parchment codices, while paper codices may show a higher ratio. At all times, the ratio may be different when miniatures and ornamentation are present or, as in the case of non-religious codices such as Tbilisi, National Centre of Manuscripts, H-54 and H-2074 (both containing Shota Rustaveli's epic), the text is bordered with decoration (see the images in Ḳaranaʒe et al. 2010, 92–95).

For the most part, writing is arranged in two columns in parchment codices written in majuscules, including most of the palimpsests. However, a one-column layout is found as early as in the seventh/eighth-century 'Sinai Lectionary' in Graz (MS Graz, UBG, 2058/1, Gippert et al. 2007b), and it prevails in later times, especially in books of small size, but also in rotuli and in the few extant papyrus codices. In paper manuscripts, a two-column layout remains rather exceptional (an example is the liturgical manuscript Tbilisi, National Centre of Manuscripts, A-30 written in 1681; cf. Ḳaranaʒe et al. 2010, 90). In the secular paper manuscripts containing epics and the like, we sometimes find a column-like alignment of the rhyming elements of verses, as in the two codices H-54 and H-2074 already mentioned above.

In the Georgian tradition, no layout prescriptions have been preserved. Nevertheless, it is clear that the decision for a one- or two-column layout often depended, if not merely on the size of the support ma-

terial, on considerations concerning readability, especially in the case of religious texts. There can be no doubt that a two-column layout was typical for evangeliaries and lectionaries that were meant to be used in religious services, while theological treatises and the like deserved no special attention as to their utility for being read aloud, and therefore they could be written in rather long and narrow lines.

Fig. 1.7.6 Tbilisi, National Centre of Manuscripts, S-391 (the Marṭvili Gospels), 1050, f. 187v, Gospel of John 19.19–24.

Special layouts were required, from the oldest times on, for the purpose of integrating additional information as in the case of the Eusebian apparatus, which was usually placed in a peculiar table-like arrangement at the bottom of a given page in both two- and one-column Gospel manuscripts; it was usually arranged columnwise, as in the so-called Adiši Gospels of 897 (Taqaišvili 1916; Gippert et al. 2009, I-32). A peculiar layout was also required, for obvious reasons, for the Eusebian Canon Tables that are found at the beginning of many Gospel manuscripts, as in the Alaverdi (MS Tbilisi, National Centre of Manuscripts, A-484, of 1054) or the Ç̣q̇arostavi Gospels (MS Tbilisi, National Centre of Manuscripts, A-98, tenth century; Ḳaranaʒe et al. 2010, 55 and 35), as well as the Ammonian section numbers that were usually arranged, with more or less decoration, together with ekthetic initials to the left of a given column or line, as in the Gospel manuscript Tbilisi, National Centre of Manuscripts, S-962 of 1054 (Ḳaranaʒe et al. 2010, 42), H-1667 (the Ǯruc̣i Gospels, twelfth century, see fig. 1.7.4), or S-391 (the Marṭvili Gospels of 1050, see fig. 1.7.6). In Gospel codices, the column containing the last verses of a given Gospel is sometimes shaped tapering off towards the bottom, as in the Ṗarxali Gospels of 973 (MS Tbilisi, National Centre of Manuscripts, A-1453; Ḳaranaʒe et al. 2010, 33).

Other special layouts that were required by special contents were, for example, the ‘frame-like’ arrangement of catenae around the biblical text they refer to, as in the so-called Gelati Bible (MS Tbilisi, National Centre of Manuscripts, A-1108, twelfth century; Ḳaranaʒe et al. 2010, 36–37); a similar arrangement of commentaries to a philosophical text, with an iconographic shaping of individual passages, as in the manuscripts A-110 and A-24 (both of the twelfth century; Doborǯginiʒe 2011, 231–244); or the snake-like shaped ‘column’ that appears in manuscript H-1669 (twelfth or thirteenth century) containing the Georgian translation of John Climacus (Ḳaranaʒe et al. 2010, 72–73). Tables and other special arrangements are found in scientific codices, for example, the circle-shaped description of the lunar phases in the astrological manuscript A-65 (1188–1210; Ḳaranaʒe et al. 2010, 128).

7.5.2. Decoration

Special layouts are further met with, from relatively early times on, in the case of a mixture of text with ornamentation or miniatures on a given page. Depending on a miniature’s size, it may extend over the width of two columns as in the Ǯruc̣i (MS Tbilisi, National Centre of Manuscripts, H-1667, twelfth century, see fig. 1.7.7), Vani (MS Tbilisi, National Centre of Manuscripts, A-1335, twelfth/thirteenth century), and Alaverdi Gospels (MS Tbilisi, A-484, 1054; Ḳaranaʒe et al. 2010, 43–57), or be inserted into one column as in the Gelati Gospels (MS Tbilisi, Q-908, twelfth century; Ḳaranaʒe et al. 2010, 64–67), or the synaxary MS Tbilisi, A-648, 1030 (see fig. 1.7.8); in other cases, the miniature was sized to fit the column layout as in the case of the Varʒia (MS Tbilisi, Q-899, twelfth/thirteenth century) or Mokvi Gospels (MS Tbilisi, Q-902, 1300; Ḳaranaʒe et al. 2010, 75–79). An insertion of miniatures into the text of a given page is

also found in non-religious manuscripts, such as the astrological codex Tbilisi, A-65 (cf. Ḳaranaʒe et al. 2010, 39).

Georgian manuscripts of all times and types exhibit a rich inventory of decorative elements, illuminations and miniatures (examples from religious codices are collected in Burčʻulaʒe 2012, 191–231; see also fig. 2.6.2), with the exception only of the palimpsests of the early centuries. It is true that the manuscripts that were written on Mount Sinai are poorer than others with respect to the addition of pictorial content, but even here we find typical means such as red-coloured crosses or braids used to demarcate sections of texts (for example, the individual Gospels in evangeliaries) or to divide colophons and other additional materials from the main text (Gippert 2010b, 2–4). Manuscript Sinai, St Catherine, georg. 30 is the only Georgian Gospel manuscript from Mount Sinai that contains miniatures of the evangelists (Matthew, Mark, Luke; John is missing, as the codex is defective), but they are much less elaborate than is usual in other manuscripts, with no colours applied.

Fig. 1.7.7 Tbilisi, National Centre of Manuscripts, H-1667 (Ǯruči Gospels), twelfth century, f. 112r (Mk. 13.35).

The use of red ink is the basic means of decoration to be met with in Georgian manuscripts from the beginning of literacy onwards; even in *xanmeṭi* palimpsests, where the pigments of red ink have vanished totally, there are clear indications that rubrics were used for the titles of individual texts (for example, in a hagiographical collection; Gippert et al. 2007a, 6-1 and 6-89, n. 62). Initial letters of texts or major text sections are usually enlarged and project into the left margin, often in combination with the use of red ink or other colours as well; in minuscule manuscripts, the initials are usually majuscules (see figs. 1.7.2, 1.7.4). Titles, whether at the top of a page or within the running text (as in lectionaries, for example), are usually written in majuscules and also in combination with red ink. In some cases, majuscule rubrics seem to have been used in a way similar to the use of capital letters in modern Latin orthographies to denote proper names (Gippert 2010b, 6).

Fig. 1.7.8 Tbilisi, National Centre of Manuscripts, A-648, 1030, f. 2r, with the image of John Nesteutes.

The clear distinction of religious (Christian) and non-religious manuscripts manifests itself in two distinct traditions of decoration and illumination, the one reflecting Greek and the other, Persian models. This is true not only for miniatures such as that of St Matthew in the Alaverdi Gospels (see above), which bears the evangelist's name in Greek (Ḳaranaʒe et al. 2010, 56), or that of

John Nesteutes in MS Tbilisi, National Centre of Manuscripts, A-648, of 1030 (see fig. 1.7.8) but also for 'characteristic' decorations such as the portal-like arrangement of the Eusebian Canon Tables in the Ç̣q̇arostavi Gospels (MS A-98, tenth century; Ḳaranaʒe et al. 2012, 35) or the ekthetic arrangement (mostly in rubrics) of Ammonian section numbers in nearly all evangeliaries (Gippert 2010b, 6–8). A peculiar decoration of codices containing epic texts is the gold-coloured frame designed as a jungle with plants and animals which surrounds the written area in manuscript H-54 (of 1680; Ḳaranaʒe et al. 2010, 92), or the frame with dark green background showing human figures among plants in manuscript H-2074 (sixteenth/seventeenth century; Ḳaranaʒe et al. 2010, 95). A strange cultural crossover is met with in the Psalter A-38 (*c*. tenth/eleventh century) to which was added, below a table on f. 246v, a row containing (from right to left) the Arabic digits from 1 to 9 in red ink (Ḳaranaʒe et al. 2010, 22; the assumption that we might have a 'stylized' part of the 'Albanian alphabet' here is untenable).

7.6. The scribe, the painter and the illuminator at work

7.6.1. Persons, places and methods

As far as we can tell from the limited information we gain from colophons and historiographical sources, nearly all manuscript books of the Old Georgian period were written in monasteries and other places devoted to the Christian religion, either in the Caucasus or in centres abroad. There is no indication of any kind of commercial production; however, in some cases we learn that a manuscript was commissioned by a donor for the sake of his own salvation or the like. This is true, for example, for the oldest dated Georgian manuscript, the Sinai *Mravaltavi* (Sin. georg. 32-57-33+N89) of 863/864 (Šaniʒe 1959), which was, according to its principal colophon, commissioned in the Laura of St Sabas before it was further donated to St Catherine's Monastery (Gippert forthcoming, § 2.2). Among historiographical sources that are relevant here, we may mention the vitae of the founder of the Iviron monastery on Mount Athos, Eptwme, and his son Giorgi (Abulaʒe 1967, 38–207; Latin translation in Peeters 1917–1919, 5–159), which summarize the production of books (mostly texts translated from Greek) in detail, but with no clear indication of methods and means of producing the manuscripts.

7.6.2. Colophons

For lack of a detailed study of Georgian colophons throughout the centuries of manuscript production, only a few characteristics can be outlined here. In general, Georgian codices are much less frequently provided with colophons than are codices of comparable traditions. In many cases, this may be due to damage and loss, especially in codices of the early centuries, most of which have survived only in fragmentary form; as a matter of fact, none of the palimpsest codices that have been analysed so far contains any colophon in its undertext. On the other hand, colophons that have been preserved often indicate that Georgian manuscripts were moved from one place to another, as in the case of the Sinai *Mravaltavi*, which was donated from St Sabas' Laura to St Catherine's Monastery, or in the case of the Adiši Gospels (897), which was removed, together with other codices, from the monastery of Šaṭberdi in Ṭao-Ḳlarǯeti (eastern Anatolia) to Guria in Georgia, as a secondary note tells us (f. 378r; Gippert forthcoming, § 2.3). As in the latter case, much of the knowledge available for the reconstruction of a manuscript's provenance and history can be gained only from information recorded by later hands, rather than a scribe's (or donor's) colophon. A special case is the binder's colophons provided in some codices of the Sinai collection by a certain Ioane Zosime, a Georgian who lived in St Catherine's Monastery in the second half of the tenth century and worked both as a scribe and as a bookbinder (Gippert forthcoming, § 2.2). Another special type of colophon contains the indication of the date of the origin of the individual Gospels appearing in several evangeliaries, with a dating after the Lord's Ascension (for example, Sinai, St. Catherine, georg. 19 f. 199v, for Luke, and f. 262r, for John); this type of 'text colophon' is likely to reflect a tradition going back to Eusebius of Caesarea.

Colophons may be written in the same style as the main text to which they pertain, or differently, for example by employing minuscules instead of majuscules, as in the case of the Gospel manuscripts Sinai, St Catherine, georg. 19 (of 1074) and 30 (of 979), or, rarely, vice versa as in the case of the evangeliary Sinai, St Catherine, georg. 15 (of 978), written by the scribe and bookbinder Ioane Zosime, or the Marṭvili Gospels, MS Tbilisi, National Centre of Manuscripts, S-391 (see fig. 1.7.6). In the Sinai *Mravaltavi* of 863/864, the layout and script of the donor's colophon is exactly the same as that of the main text, whereas the scribe's colophon following it is in minuscules. Colophons typically contain formulae such as *krisṭe*

šeiçq̇ale ‘Christ, have mercy’ uttered in favour of the writer or donor; detailed information on the persons involved remains rare, however.

7.6.3. Dating systems

The Old Georgian tradition possessed a time-reckoning system (hereafter: AG) based upon calculation from Creation onwards, which differed from the Greek system (the Byzantine Era, BE) by 96 years, the first year of our era (1 CE) falling together with the year 5604/5605, not 5508/5509 as in the BE. Reference to this system is made by counting the total number of years since Creation, or the year within a given lunisolar cycle (Georgian *kroniḳoni* < Greek *chronikon*) of 532 (19 × 28) years. Whenever Old Georgian codices contain a dating, one or the other of these methods, or both, are applied, as in the colophons of the Sinai *Mravaltavi*, the completion of which is dated to 6468 AG and the year 84 of the (12th) lunar cycle, both corresponding to 863/864 CE (because the year began on 1 September, as in the Greek calendar). In the same way, Ioane Zosime dated his (third) binding of the same codex in the year 6585 AG and in the *kroniḳon* 201, which is 980/981 CE (Gippert forthcoming, § 2.2.1).

The Georgian system of time-reckoning was continuously used up to the eighteenth century, when it was finally superseded by the Julian calendar (as prevailing in Russia then). Much earlier than this, the Georgians had given up their inherited month names and replaced them with the Latin ones, but the original system can be restored reliably on the basis of attestations mostly in hagiographical manuscripts (see Gippert 1988 for details). More exact datings (mentioning individual days) are extremely rare.

7.6.4. Duration of copying

The time it took a scribe to copy a codex can only rarely be determined on the basis of indications in colophons and secondary notes. The picture we arrive at is similar to that of the Greek tradition. While many scribes have left information about themselves in colophons, practically nothing is known about the artists who added decorations to a codex. The miniature of St Luke in MS Sinai, St Catherine, georg. 30 (f. 122v) is preserved only in the form of a (pencilled?) sketch, which indicates that the illuminator’s work was done after the completion of the written text. The same is true for many cases where large initials were sketched for being coloured, but remained unfinished.

7.7. Bookbinding

In the course of an extensive study devoted to the subject, Maia Ḳaranaʒe has drawn up three ‘conjectural stages’ in the history of Georgian bookbinding (Georgian *q̇da* ‘cover’), namely an ‘early’ stage extending from the tenth to the sixteenth century, a ‘transitional’ stage in the seventeenth century, and a ‘late’ stage in the eighteenth and nineteenth centuries (Ḳaranaʒe 2002, 75). This reflects the fact that the oldest bindings of Georgian codices which have come down to us date to the second half of the tenth century, all produced by Ioane Zosime in St Catherine’s Monastery on Mount Sinai (Ḳaranaʒe 2002, 75). However, the art of bookbinding must have been known in the Georgian world before this, given that Ioane Zosime himself tells us (in his colophon) that his binding of the Sinai *Mravaltavi* (undertaken in 980/981) was already the third binding of this codex, which had been written 116 years before (in 863/864; Gippert forthcoming, 2.2.1).

Fig. 1.7.9 Sinai, St Catherine, georg. 15, dated 978, back cover of a later binding, photograph by JG.

The specimens of early book binding we have at hand at Mount Sinai clearly show that the basic material of the covers was wooden boards which were bound in leather (Ioane Zosime explicitly mentions *ṭq̇avi zroxisay* ‘cow’s skin’ in his colophon to the *Mravaltavi*) and which were attached to the text block by a thread that was pulled through a series of holes in the boards. Even at Mount Sinai we can observe several types of sewing used in these cases, with a zigzag-like twining (see images in Ḳaranaʒe 2002, I-1, 4d) as in the Gospel manuscripts Sinai, St Catherine, georg. 15 and 16 (codices of 978 and 992, bindings

later; fig. 1.7.9), or with a rectangular twining (see images in Ḳaranaʒe 2002, I-4, 15) as in Sinai, St Catherine, georg. 30-38 (of 979) and 29 (*c*. tenth century, bindings later). Another rectangular type (images in Ḳaranaʒe 2002, I-2, 5) is regarded as more typical for the Georgian tradition, which is why it has been styled 'Georgian sewing' (see Ḳaranaʒe et al. 2010, 152–154). The grain of the wooden board is usually horizontal, as in Sinai, St Catherine, georg. 29; however, a vertical orientation of the grain does also appear, as in Sinai, St Catherine, georg. 15 (fig. 1.7.9). On their inner sides, the boards are usually covered by flyleaves, sometimes stemming from other (parchment) codices. For example, the flyleaves of the Sinai *Mravaltavi* were taken from a Christian Palestinian Aramaic Gospel manuscript (Lewis 1894, 118–120). In rare cases, the inner side of the board remained uncovered and could therefore be used for colophon-like additions directly written upon it, as in the case of Sinai, St Catherine, georg. 29.


Fig. 1.7.10 Tbilisi, National Centre of Manuscripts, Q-907 (Ṩq̇arostavi Gospels), 1195, front cover.

From the earliest times on, leather covers were decorated externally by stamped-in crosses and other ornaments, of either geometrical or other shapes (Ḳaranaʒe 2002 lists, besides crosses, 'rhombic', flower-shaped and band-shaped stamps: II-14, II-4, II-6, II-11). In addition, we find (metal) crosses and other ornaments attached to the cover with rivets or nails, as in the case of Sinai, St Catherine, georg. 19 (of 1074, binding later), or consisting of a decoratively arranged series of nails, as in the Gospel manuscript H-1660 (of 936, binding *c*. sixteenth/seventeenth century; Ḳaranaʒe et al. 2010, 175). In later bindings, we find stylized ornaments stamped into the leather, as in the Gospel manuscript Q-883 (*c*. twelfth or thirteenth century, binding of *c*.1760), where the decoration also has a special (golden) colour (Ḳaranaʒe et al. 2010, 181).

Apart from metal crosses used as decorations, Georgian Gospel codices often bear much more elaborate metal ornamentation, especially in bindings that are later than the fifteenth century. The illustrative material gathered in Ḳaranaʒe et al. 2010, 158–185, shows several specimens of book covers with a total or partial overlay of brasswork illustrating the Crucifixion etc. Additionally, precious stones can be found inlaid into the metalwork, as in the binding of the Ṩq̇arostavi Gospels (Tbilisi, National Centre of Manuscripts, Q-907, of 1195, fig. 1.7.10; Ḳaranaʒe et al. 2010, 160–161), or in the Alaverdi Gospels (Tbilisi, National Centre of Manuscripts, A-484, of 1054, binding *c*. seventeenth century; Ḳaranaʒe et al. 2010, 177).

In the 'late' phase of Georgian manuscript production, 'European' types of bookbindings and decoration entered the Georgian tradition, including cardboard-based and coloured covers; see Ḳaranaʒe et al. 2010, 182–185 for examples.

References

Abulaʒe 1967; Burčʮlaʒe 2012; Cagareli 1886, 1888a, 1888b; Doborǯginiʒe 2011; Gippert 1988, 2010a, 2010b, 2013, forthcoming; Gippert et al. 2007a, 2009; Gippert – Tandaschwili 2014; Gogašvili 2003, 2004, 2006; Imnaišvili 2004; Ḳaranaʒe 2002; Ḳaranaʒe et al. 2010; Kaǯaia 1974; Meṭreveli et al. 1978; Lewis 1894; Nanobašvili 1973; Ṗaṭariʒe 1965a, 1965b, 1968; Peeters 1917–1919; Rayfield 2010; Renhart 2009; Šaniʒe 1959; Šaniʒe – Marṭirosovi 1977; Taq̇aišvili 1916; Ṭimote 1852. Web sources: Gippert et al. 2007b; Gippert – Imnaišvili 2009a, 2009b; Tbilisi, National Centre of Manuscripts, <http://www.manuscript.ge/index.php?m=73&ln=eng>, last access 29 November 2014.

8. Greek codicology (MMa)

8.1. Materials and tools

In the course of Antiquity (and well into the Middle Ages) Greek was written on a wide range of hard and soft materials (rock and marble, metals, wood, clay, plaster, or papyrus, parchment, and paper), the soft support reserved for texts intended for transmission and reproduction.

8.1.1. Papyrus

Papyrus was the most widely used writing material in the Graeco-Roman world: it was employed for writing both books and documents at least since the fifth century BCE, first in roll form and later also in codex form. Even after the diffusion of parchment, papyrus continued to be used in Roman and Byzantine Egypt for the manufacture of both books (rolls and codices) and, especially, documents, until the Arab conquest.

The first important modern discovery of Greek papyri was that of Herculaneum, near Naples, where a whole library of carbonized rolls (approximately 1,800 fragments) was found in 1752 in the ruins of a philosopher's house which had been destroyed and buried by the eruption of Mount Vesuvius in 79 CE. After being brought sporadically from Egypt to Europe since the beginning of the nineteenth century, Greek papyri began to emerge in large quantities from archaeological excavations carried out in the Fayyum region toward the end of same century and were later found also in other areas of the Near East: they represent altogether by far the most significant portion of the surviving finds. Despite the efforts made to prevent their illegal traffic, papyri have continued to find their way into the hands of native dealers, and thence into English, Continental, and American collections. Among the most recent finds, worthy of special mention is a partially charred Orphic papyrus of the second half of the fourth century BCE, discovered in 1962 in a tomb near present-day Thessaloniki, which numbers among the most ancient surviving examples of a Greek literary book (see Ch. 1 § 8.2.2 and Ch. 2 § 7).

The overwhelming majority of the extant papyri are documentary (letters, accounts, wills, deeds, contracts, receipts, petitions, notices, invitations, etc.). Literary papyri contain both classical texts and religious (biblical and theological) writings (Turner 1980, 1984; Bagnall 2009).

8.1.2. Parchment

The oldest preserved specimen of Greek parchment (*P.Dura* 15, 225 × 52 mm) is a small portion of a Hellenistic contract dating from the early second century BCE and originating from the colony of Dura Europos in eastern Syria. However, already in the fifth century BCE Greek historians such as Ctesias (Diodorus Siculus, II, 32, 4; *FGrHist* 688 F 5) and Herodotus (V, 58) remind us that Persians and Greeks wrote on leather, while Pliny the Elder (*Naturalis historia* XIII, 21 [70]) attributes the 'invention' of parchment to the scholars of the Hellenistic library of Pergamum, as a reaction to a disruption in the supply of papyrus, which was allegedly ordered by the Ptolemies with an view to fostering the rival library of Alexandria (in fact, the word *pergamēnē*, instead of *diphthera*, appears for the first time, in the form of an adjective, in the Diocletian edict *de pretiis rerum venalium*, 301 CE). During Late Antiquity, parchment gradually prevailed as the preferred writing material for Greek books. For a long time, however, both for sacred and for profane literature the choice between papyrus and parchment was strongly dependent on the books' function, their geographical origin, and the social status of their patrons and owners: according to the Hellenistic-Roman tradition, secular texts (the only exception being Demosthenes) were mainly copied on papyrus at least until the late seventh century (over 50% of the extant witnesses); on the other hand, complete Bibles (among which some prestigious copies in canonical scripts) were the only sacred books clearly associated with parchment, whereas smaller and less ambitious Gospel codices and Psalters were often copied on the cheaper material papyrus, at least until the end of the seventh century. As early as the fourth century CE the manufacturing techniques had reached high levels of professionalism, as is shown by the excellent quality of some surviving examples: among these are some of the most ancient and solemn Late Antique copies of the Bible, such as the *Codex Vaticanus* (Vatican City, BAV, Vat. gr. 1209) and the *Codex Sinaiticus* (London, BL, Add. 43725 plus fragments in Sinai, St Catherine's Monastery, Leipzig, UB, Cod. gr. 1, and St Petersburg, RNB, gr. 2, gr. 259, gr. 843, OLDP.O.156).

Greek codices were usually written on parchment made from goatskin or sheepskin; the use of calfskin, widespread in northwestern Europe (and recently proposed for the *Codex Sinaiticus*), is not documented. Occasional mentions of pony, rabbit, deer, antelope or even snake skins (the latter used for a Ho-

meric roll, according to the eleventh-century historian Geōrgios Kedrēnos, *Hist. Comp.* I, p. 616 Bekker), are doubtful and anyway not confirmed by archaeological evidence.

Information concerning places and contexts of manufacture of Greek parchment is very scarce: the monastery of Stoudios had its own *membranarion*, were parchment was prepared by monks, but the profession of parchment-maker does not appear in the commercial manual known as the *Book of the Eparch*. Late Byzantine sources refer to the difficulty of finding parchment of adequate quality, especially in winter.

Almost nothing is known of the methods employed for the manufacture of parchment in the Greek and Byzantine world. A Byzantine origin (unprovable, if not improbable) has been postulated for a series of seven Armenian prescriptive texts (most of which are quite repetitive), attested in manuscripts apparently dating from the fifteenth to the eighteenth century and published in a German version based on a Russian translation (Schreiner 1983; see Ch. 1 § 3). Some of these late sources refer to a treatment of the (bigger and harder) skins with pigeon droppings (rich in fat-degrading enzymes), following (not replacing) their soaking in one or more hydrated lime baths; two texts of more recent date prescribe bran or barley flour for the same purpose. It remains entirely uncertain whether, and in which proportions, Greek craftsmen ever adopted the oriental practice of enzymatic dehairing and degreasing, not *instead of*, but *combined with* the use of chemical depilation. Certain details of the finishing process are comparatively better known. A famous passage from a letter addressed in 1295 by the theologian, grammarian, and rhetorician, but also bibliophile, collector and book restorer, Maximos Planudēs to the monk Melchisedek Akropolitēs offers—among other interesting information—some insights concerning the finishing touches applied to parchment in order to improve its surface qualities and to make it more suitable for writing. Planudēs, who often complains about the poor quality of the writing material he is forced to settle for, strongly condemns the practice of coating its surface with a layer of egg (*mēd'ōō tautas perikechristhai*), which he blamed for causing letters to fall off the page. Egg white, mixed with linseed, appears in two of the previously cited Armenian texts, and its use seems to be confirmed by recent histochemical and microchemical analysis conducted on a small sample of eleventh- to fourteenth-century Byzantine manuscripts (Kireeva 1999); egg yolk was used rather as a binding medium in Byzantine (as well as in western) illuminated codices.

Parchment quality obviously depended on the natural properties of the raw material, but also on the technical details of the process and on the amount of care invested in its execution. The overall impression (based on colour, surface grain and smoothness, presence of hair residues, streaks, holes or other irregularities) may be one criterion for dating and localizing a given piece of parchment: for instance, codices originating in Byzantine southern Italy are often made of poor-quality skins, while the use of parchment with late western features (greyish in colour and evenly smooth on both sides) may help in recognizing the use of a late Byzantine 'archaistic' writing style, based on the imitation of earlier examples, even if perfectly executed, as in the case of MS Vatican City, BAV, Pal. gr. 186 (Irigoin 1981b). Useful but still too sporadic information is offered by the identification of animal species: the only systematic investigation carried out so far shows a clear predominance of sheepskin parchment in 61 eleventh-century Italo-Greek codices (Bianchi et al. 1993). This result agrees with the information provided by the fourteenth-century Latin inventory of the library of Pope Boniface VIII, which includes thirty-three Greek manuscripts (Bischoff 1993); on the contrary, luxury Renaissance manuscripts in Greek may be made of fine kidskin parchment of Latin manufacture. Goat is the only species clearly detected until now by all the experiments with DNA extraction and analysis—the 'new frontier' of species recognition—carried out on Dead Sea Scroll fragments and on (only three) Byzantine parchment manuscripts (Poulakakis et al. 2007; the reliability of the method has been questioned).

Information about the thickness of Greek parchment is also almost completely lacking, with the single exception of Greek books from eleventh-century southern Italy, whose parchment is usually thicker than that of contemporary Latin ones (*c.*23–24μ vs. 20μ): this detail seems to be in accordance with the unsophisticated character of local Greek book manufacture. Greek craftsmen, as well as Latin ones, knew and applied some specific devices to optimize the distribution of parchment thickness within individual codices: for instance, they tended to produce quires of even thickness and to employ the thickest pieces as outside bifolia, or to reserve them for illuminated pages; they also took care to minimize the visual impact of irregularities (holes, tears, *lisières*), by grouping them towards the end of the codex or by hiding them in the middle of the quire (Maniaci 2000a).

Regardless of its qualitative features, parchment was always a very expensive writing support, and not always easy to find (especially in the Late Byzantine period), as is confirmed by the repeated com-

plaints of monks and scholars (among them John Tzetzes, *Scholia in Aristophanem*, for the twelfth century, or the already mentioned Planudēs, for the thirteenth (ep. 95, in which the parchment he has received is so poor that it is compared to donkey's skin; 100; 106)) and by the high costs of parchment book.

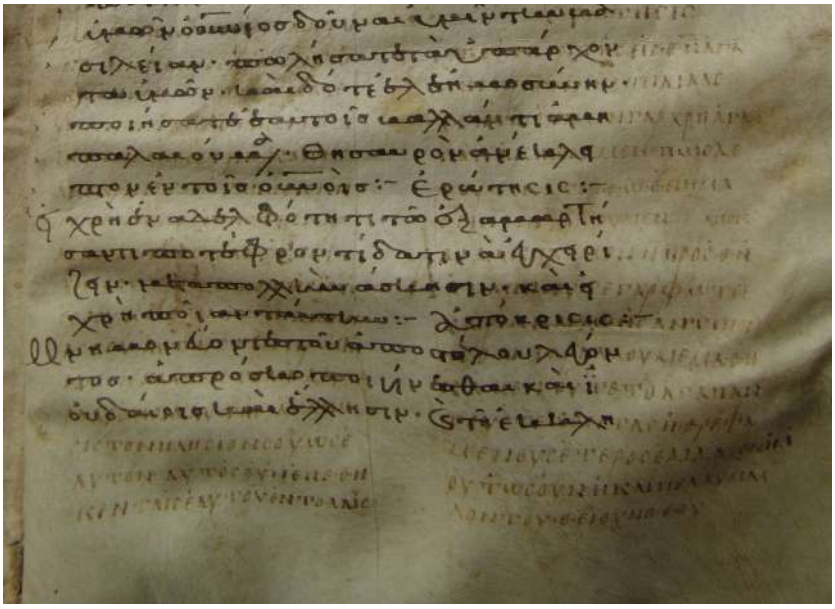

Fig. 1.8.1 Athens, National Library of Greece, 223, palimpsest, lower uncial script (*ogivale inclinata*) in two columns, upper script: 28 April 1195 CE, Basil of Caesarea, *Ascetica*; lower script: eight/ninth century, Basil of Caesarea, Homilies in *Hexaemeron*; *Ascetica*, f. 268r, detail.

Reasons of cost and availability most probably played a role in the definition of dimensional standards for Greek parchment manuscripts (see Ch. 1 § 8.4). The high cost of parchment and/or its shortage certainly explain (at least in part) the production of Greek palimpsests (e.g. fig. 1.8.1, Athens, National Library of Greece, 223) although the economic reasons are not enough to justify the frequency of the phenomenon, which is better understood as part of a more general mediaeval tendency to 'recycle'. The high number of extant Greek palimpsests—only partially identified and studied (with the notable exception of the Grottaferrata collection, on which see Crisci 1990)—mostly come from peripheral areas such as the thirteenth to fourteenth century Apulian Terra d'Otranto, but also from other Italian and oriental provincial regions (such as the Syro-Palestinian area) and even from the capital of the declining Empire, after the end of the twelfth century. The 'Archimedes Palimpsest', a unique copy of an otherwise unknown treatise of the great Sicilian mathematician (the *Method of Mechanical Theorems*), but also of other otherwise unattested works, is only one of the most famous examples; in some Greek palimpsests, the parchment was repeatedly rewritten (as in Vatican City, BAV, Vat. gr. 2306 + Vat. gr. 2061A + Grottaferrata, Abbazia Greca di S. Nilo, Crypt. Z.α.43, a copy of Strabo from the fifth century plus a legal collection from the seventh century and various religious texts from the tenth century). There are also volumes in which the upper and lower texts are written in different languages and belong to different book cultures, as in the case of an unknown comedy by Menander transmitted in a large majuscule codex of the fourth century (if not the end of the third), recently found in one of the two lower layers of a ninth-century Syriac manuscript (Vatican City, BAV, Vat. sir. 623: D'Aiuto 2003), an extraordinary but not unique example of a 'complex linguistic, graphic and textual stratigraphy' that is also found in other oriental examples (containing various associations of Arabic, Syriac, Hebrew, Aramaic, Armenian, Latin and Greek leaves). Although a census of Greek palimpsests in European libraries was launched some years ago and the digital techniques for 'restoring' the underlying texts (see General introduction § 2.3) have progressed significantly in the last few years, we are still far from a global understanding of the historical, technical and cultural significance of manuscript erasing and rewriting.

Late Antique Greek scribes knew the use of writing in silver or gold ink on purple- or indigo-coloured parchment (obtained either by dying or by surface painting). This is first attested in a dozen Greek Biblical manuscripts, including three of the most spectacular decorated Greek codices assigned to the sixth century and tentatively associated (mainly on an art-historical basis) with the Palestinian area (alternatively, Asia Minor): the lavishly illuminated Rossano and Sinope Gospels (Rossano Calabro, Museo dell'Arcivescovado and Paris, BnF, Supplément grec 1286) and the Vienna Genesis (Vienna, ÖNB, Cod.theol.gr. 31). Further examples, even though they contain no illumination, belong to the same book type, such as the Gospels *Codex Petropolitanus purpureus* (codex N, today divided between the Russian National Library in St Petersburg (Gr. 537) and various other libraries, such as the Library of the Mon-

astery of St John the Theologian on Patmos, Biblioteca Apostolica Vaticana, British Library in London, Österreichische Nationalbibliothek in Vienna, the Pierpont Morgan Library in New York, the Byzantine Museum in Athens, the Museum of Byzantine Culture in Thessaloniki, and the private collection of Marquis A. Spinola in Lerma) and the *Codex Beratinus* (Tirana, AQSH, 1) or the Zurich Psalter (Zurich, Zentralbibliothek, RP 1), recently attributed to Constantinople (Crisci et al. 2007); other books (such as the Gospels codex St Petersburg, RNB, Gr. 53, ninth/tenth century) contain only a few dyed or surface-coloured bifolia. In the Greek world, the use of highly symbolic purple parchment for display codices of religious content was abandoned in the course of the ninth century, after the end of the iconoclastic controversy (apart from a few isolated exceptions, such as the lectionary Naples, Biblioteca Nazionale Vittorio Emanuele III, Neap. ex Vind. gr. 2, which may have belonged to the emperor Basil I, and the previously mentioned St Petersburg, RNB, Gr. 53); it persisted until the twelfth century for imperial documents and for the emperor's letters to the Latin popes. Without the help of scientific analysis, it is impossible to distinguish the expensive murex purple (whose use in mediaeval manuscripts is often mentioned, but has never been proved) from its animal or vegetable surrogates (the lichens *Roccella tinctoria* or *Ochrolechia* were recently, and only tentatively, detected in the Zurich Psalter).

8.1.3. Paper

The use of paper (probably of Islamic manufacture) in a Greek book is attested early in a collection of theological texts, Vatican City, BAV, Vat. gr. 2200, produced in the Jerusalem region around the year 800 (Perria 1983–1984), i.e. a few decades before the most ancient dated Arabic example (of 848, now in the Regional Library of Alexandria). The paper employed in Vat. gr. 2200 shows a smooth structure (but with visible lumps and vegetable fibres), considerable irregularity in thickness from one sheet to another, the presence of very dense and curved wire lines of variable thickness and a format which does not correspond precisely to any of the known ones, resulting in a very narrow page proportion. Apart from this isolated occurrence, the new material is known to have been used for Byzantine books about two centuries later (the first dated examples are Sinai, St Catherine, Sin. ar. 116, Greek-Arabic Gospel lectionary from 995/996, and two Athos codices, Iviron 258, 1042/1043 and Lavra Θ 70, 1060). Already in the tenth century there is a reference to a tax called *chartiatika* and to paper makers, *chartopoioi*; paper makers may also have been active in Stoudios at the beginning of the ninth century. Paper became widespread in books between the mid-eleventh century and the end of the twelfth (as is shown by the inventory of the monastery founded by Michaēl Attaliatēs in 1077, which lists parchment and paper books separately, and by that of the library of the monastery of St John of Patmos, dated 1201, in which 20% of the codices—57 out of 301—are on paper).

A local manufacture seems not to have existed in the Byzantine Empire: except perhaps in specific areas such as Jerusalem and Mount Sinai, paper was an imported material, initially sourced in the Middle East, and later (but as early as the tenth century) also from North Africa and Spain. The switch from parchment to paper was a gradual process, whose main steps can be roughly traced through the testimony of dated codices (Prato 1984): during the period of the Latin kingdom of Constantinople (1204–1261), in spite of the serious economic difficulties, sacred books continued to be written on expensive parchment, while primitive Italian paper (and perhaps also Catalan paper, as in Vatican City, BAV, Vat. gr. 207: Canart 1982) made its appearance in the (rare) profane codices; after 1261, in the Palaiologan age, paper became virtually the only material used for secular books, appearing in 80% of the dated witnesses, while parchment still prevailed in 70% of the sacred ones (mainly Gospels and lectionaries). From 1340/1341, paper is practically the only material attested in Greek manuscripts, with very few exceptions, such as the volumes made in Constantinople at the monastery Tōn Hodēgōn (which probably produced its own parchment), a few individual books of aristocratic patronage or the luxury Renaissance products.

The paper used in Greek books may thus be watermarked or not. While watermarked paper has been investigated in depth, the characterization and differentiation of papers without watermarks is much more uncertain. The differences concern various elements whose combination may help in establishing provenance: raw materials and features of the pulp; structure of the mould and methods used; size of the sheets; sizing.

Not only are the chronology and diffusion of the different kinds of paper difficult to define, but we still lack systematic studies on the time and ways of their introduction, and the coexistence of or alterna-

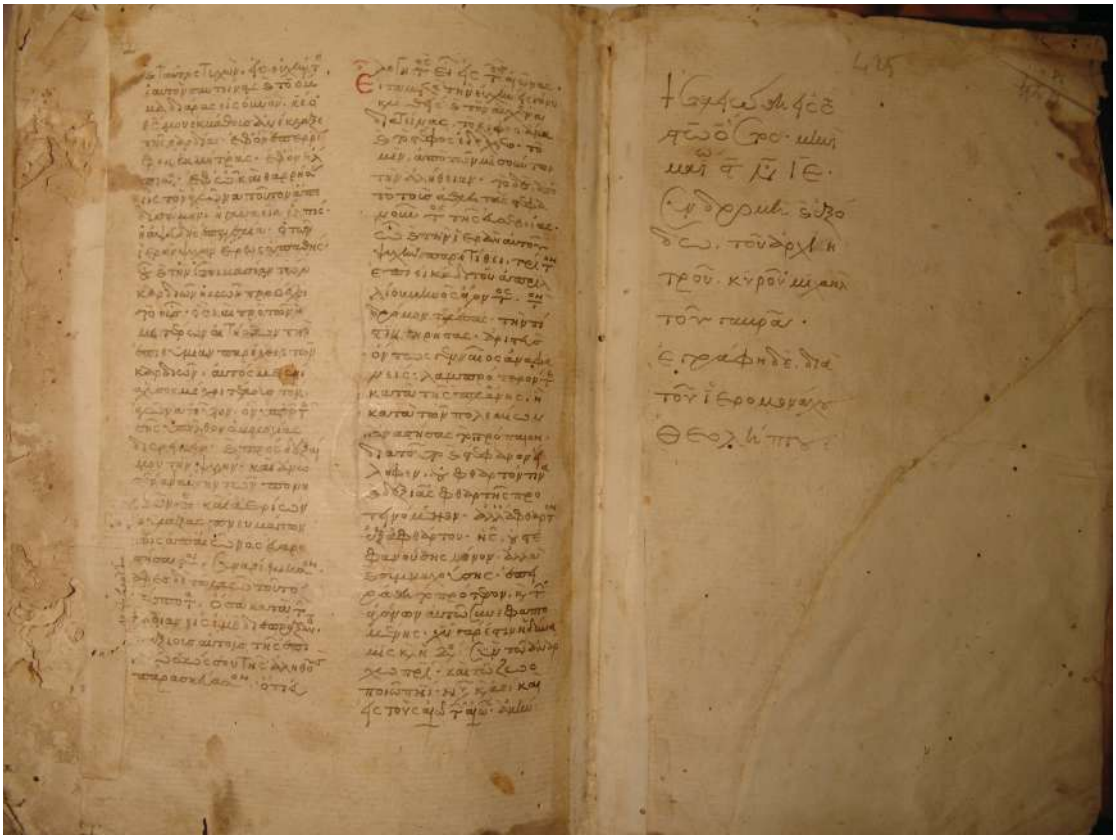

Fig. 1.8.2 Athos, Pantokrator, 84, dated by the colophon 6 May 1362 CE, collection of sermons by various church fathers (*Panegyricon*), ff. 424v–425r.

tion between eastern and western papers: a typology of the use of paper in Greek manuscripts, organized chronologically and by areas of production and book contents, and based on the study of dated—and ideally also provenanced—specimens, is still a desideratum of Greek codicological research. More specific unresolved questions concern the nature and diffusion of paper apparently composed of two splittable layers, and the occasional presence of a zigzag mark that appears with some frequency in Greek manuscripts, but whose function is still unclear, as is the method by which it was created.

Islamic paper was used in southern Italy and Sicily probably as early as in the eleventh century: a bilingual (Greek-Arabic) charter by the Norman Countess Adelaide (today in Palermo, Archivio di Stato di Palermo) dates from 1109; a few Greek codices on Islamic paper (such as Vatican City, BAV, Vat. gr. 469, area of the Strait of Messina) have also survived. The first known Greek codex on non-watermarked Italian paper (produced probably from the 1130s, possibly through the mediation of Genoese and Venetian merchants) is a liturgical book (*oktōēchos*) dating from 1252 (London, BL, Add. 27359), supposed to have originated in Epirus. In Fabriano, paper production probably started by the mid-thirteenth century at the latest, with the introduction of watermarks, which prevailed everywhere (including the Byzantine territories) in the course of the fourteenth and fifteenth centuries. In the fourteenth century, the use of Italian watermarked paper is documented in Crete, Cyprus, Euboea, Mytilene, Lesvos, Rhodes, Macedonia (mainly Thessaloniki) and southern Italy; the oldest example of western watermarked paper in Constantinople dates from 1330/1331; in 1344 it is attested in Asia Minor and subsequently on Mount Athos (see fig. 1.8.2 Athos, Pantokrator, 84: the two-circles western watermark is visible in the centre of f. 424v). In those areas where Byzantine cultural continuity was disrupted before the fall of Constantinople and the Turkish conquest of the last Venetian colonies, the transition from eastern to western paper seems not to have taken place at all: eastern paper was still used in Syria and Palestine in the mid-fifteenth century.

The (somewhat overestimated) contribution of watermarks to the dating of Greek codices explains the early interest shown toward them by historians of western paper. For Greek manuscripts, the general repertoires (Briquet 1907; Piccard 1961–1997 and <http://www.piccard-online.de>, last access October 2014) are complemented by some more specific ones (for example Harlfinger – Harlfinger 1974, 1980;

Sosower 2004), which are most useful for the purpose of dating, although they do not cover all the variety of watermarks attested in Greek manuscripts (not even in dated ones), for which adequate censuses are still lacking.

8.1.4. Inks

Greek manuscript ink (*melan*, *melanion*, *egkauston*) displays a great variety of colours, with shades ranging from pale to bronze brown, dark brown or shiny black. The differences sometimes provide clues to geographical origin (codices from the Palestinian-Cypriot area, for example, often show a very dark, blackish ink); in most cases however colour is not useful for localization purposes. Indeed, naked eye observation does not provide information on the composition of the inks, the knowledge of which developed only recently, through a study of surviving recipes combined with technical examination (Schreiner – Oltrogge 2011).

Ancient and mediaeval recipes concerning the composition of 'soot' ink and 'iron-gall' ink (the use of plant inks has also been detected recently, see Ch. 1 § 1.1.4) are quite numerous, although their frequency grew only from the twelfth century, reaching its climax in the fourteenth/fifteenth century, with the diffusion of real technical literature. Some corpora of Greek technical texts (like the fifteenth-century one due to the learned Cardinal Isidore of Kiev, in Vatican City, BAV, Vat. gr. 914), along with other individual and more or less fragmentary texts, provide a broad overview of the procedures adopted by the scribes (quite similar to those used by their Latin counterparts).

A particularly interesting contribution is offered by four detailed eleventh-century recipes in Milan, Biblioteca Ambrosiana, C 222 inf., which illustrate various combinations of the main ingredients (tannin, metallic sulphate and gum) (Mazzucchi 2005; Schreiner – Oltrogge 2011); another recipe, written by a fourteenth-century hand in an eleventh-century codex, Jerusalem, Church of the Holy Sepulchre, 38 (f. 280r), varies the proportions according to the writing material—parchment or paper. The eighty or so surviving texts, mostly transmitted by a single source (about twenty of which concern the manufacture of iron-gall inks), share a number of features: anonymity, didactic style, lack of information or vagueness about ingredients, quantities, methods of manufacture, and frequent references to other everyday or technical practices and contexts. Most recipes are copied within collections of alchemical or medical texts or are annotations added in originally blank spaces.

The black ink employed for writing was often complemented by a red one, with both an aesthetic and a practical function: to highlight titles and running titles, rubrics, initials, and other 'navigating' devices. The manufacture of cinnabar (mercury sulphide, HgS), also used as background for gilding, is described without significant variations in a number of Greek recipes (including those transmitted by Paris, BnF, Grec 2327; Vatican City, BAV, Pal. gr. 243; Venice, BNM, gr. 299), reflecting the same alchemical processes that are illustrated by various other sources. The colour palette of illuminated manuscripts is much richer, including various shades of blue, green, yellow, pink, purple and white, but Byzantine sources are almost completely silent about their methods of manufacture, with sporadic exceptions.

Texts concerning the manufacture of both gold powder and gold leaf, and of its amalgams (with copper, pyrite or mercury) and surrogates (arsenic sulphide or orpiment), are much more numerous, because of the interest aroused among the alchemists. Other recipes also describe the preparation of binders (gums of various nature, egg white) used to dissolve the gold powder employed for tracing the letters (chrysography), or to increase its brilliance, and of various substances (brazilwood lake, shellac, ochre, vermilion) involved in the preparation of the background. Some texts also refer to hard materials that were used for polishing (quartz, haematite, onyx, along with dog or wolf teeth). Despite the progress that has been made in collecting and analysing the sources, a more accurate classification requires the Greek sources to be compared with those from other book cultures.

8.1.5. Writing instruments

Miniatures of the evangelists sitting in front of a lectern and occasionally copying from a roll into a codex (or vice versa) occur frequently in Byzantine manuscripts. These conventional portraits abound in inconsistencies and anachronisms (cp. General introduction § 1.1.6) and only partially alleviate the shortage of Greek sources concerning the act of writing and the instruments of the scribe. The evangelists are portrayed holding the writing instrument in their hand and are normally surrounded by a variety of other

tools, poised on the lectern, on various kinds of shelves or elsewhere: knives of different shapes, used to sharpen the point of the instrument, inkwells or vials containing brown or coloured inks, rulers and squares, punches, compasses, sponges and other items less easy to identify, of which no archaeological evidence survives (see fig. 1.8.3 showing St John depicted on the page facing the *incipit* of the Gospel of John in the manuscript Tirana, Albanian National Archives, 93). It is also very difficult to connect visual testimonies to the terminology found in Byzantine written sources, which is (as usual) very rare.

Fig. 1.8.3 Tirana, Albanian National Archives, 93, first half of the tenth century, Four Gospels, f. 224v: St John the Evangelist, photograph courtesy of the Centre for the Study of New Testament Manuscripts, <http://www.csntm.org>.

Wax tablets were written with a pointed metal or ivory stylus (*stylos*, *grapheion*), while flexible supports (papyrus, parchment, paper) required the use of the reed or calamus (*kalamos*, *schoinos*). Greek handwriting displays little shading or modulation, supporting the opinion that Greek scribes continued to use the calamus up to the Renaissance, long after the diffusion of the split nib quill pen, which occurred during the Latin Middle Ages, producing thick and thin strokes according to the direction of the stroke. The appearance of some Greek majuscules, showing a more or less marked contrast of heavy and light strokes, suggests, however, that the scribes could choose between instruments of different shapes, either with a pointed or a flat nib, depending on the result they wished to obtain. A recent, but still tentative attempt was made to deduce the characteristics of the Byzantine writing instrument and the way it was used from the fluctuations in the colour of the ink trace, in relation to the points where it was detached from the sheet to be dipped into the inkwell (Benedetti 2010).

Compasses, knives of various forms, sharpeners, pumice stone, and various other objects also appear in the Byzantine portraits of the evangelists; they are often hard to identify and to connect to the names given by Greek sources.

8.2. Book forms

8.2.1. Miscellaneous forms

Ancient Greek writing is found on a variety of media: stone or marble slabs bearing engraved display texts (inscriptions); thin metal (usually lead) sheets on which magic formulas were scratched; canvas or linen strips; clay pottery sherds (*ostraca*) for voting procedures, notes, letters and school exercises; wall plaster; wooden tablets, sometimes filled with a compound of melted coloured wax, written individually or assembled in groups of two or more elements.

8.2.2. The roll and the rotulus

Recent archaeological finds from Daphnē (Athens) make it possible to date the earliest surviving examples of Greek books (among which are fragments of tablets and of a literary roll) at least back to the second half of the fifth century BCE (Pöhlmann – West 2012), which is significantly earlier than either the Orphic 'Derveni papyrus' or a papyrus containing Timotheus' *Persians* (*P.Berol*. inv. 9875), both assigned

to the second half of the fourth century BCE. The ancient papyrus book roll (*biblos*, *biblion*, *chartēs, volumen*), derived from the commercial roll, was normally written only on the inner (front) side, showing the horizontal fibres, although no longer useful documentary rolls were sometimes used to bear literary works on the reverse side (such as Aristotle's *Athenian Constitution*, *P.Lond.* I, 108, written on the back of four rolls containing private agricultural accounts). The opposite case is also well attested, namely, rolls containing literary works on the front side, whose reverse sides were later reused for documents.

In Greek rolls, the sequence of written words is arranged, from left to right, in *scriptio continua* in a series of columns (*selides*) along the roll's length, whose height, width, distance, number and spacing of lines varies from roll to roll, and according to text type. The absence of ruling could result in a gradual leftward shift of the lines as the copyist proceeded towards the bottom of the column ('Maas' law'), although the phenomenon has also been interpreted as a deliberate choice to facilitate the passage of the eye from line to line. Author, title and internal subdivisions were usually mentioned at the end of the roll (but sometimes also at its beginning). Usually, a single sheet (*kollēma*) of unwritten papyrus, sometimes rotated at ninety degrees as compared to the other *kollēmata*, was positioned at each end of the roll (*prōtokollon* and *eschatokollon*). The roll was either wrapped upon itself, or else rolled around a stick made of wood or bone (*omphalos*) that was fixed at the right-hand end of the last *kollēma*; alternatively, two such sticks could be attached, one at each end. The contents of the roll could be written on a small piece of papyrus or parchment (*sillybos*, *pittakion*) which was then fastened to one of the two edges of the roll. Only rarely do such tags survive, but they are mentioned in literary sources and visible in paintings representing book rolls.

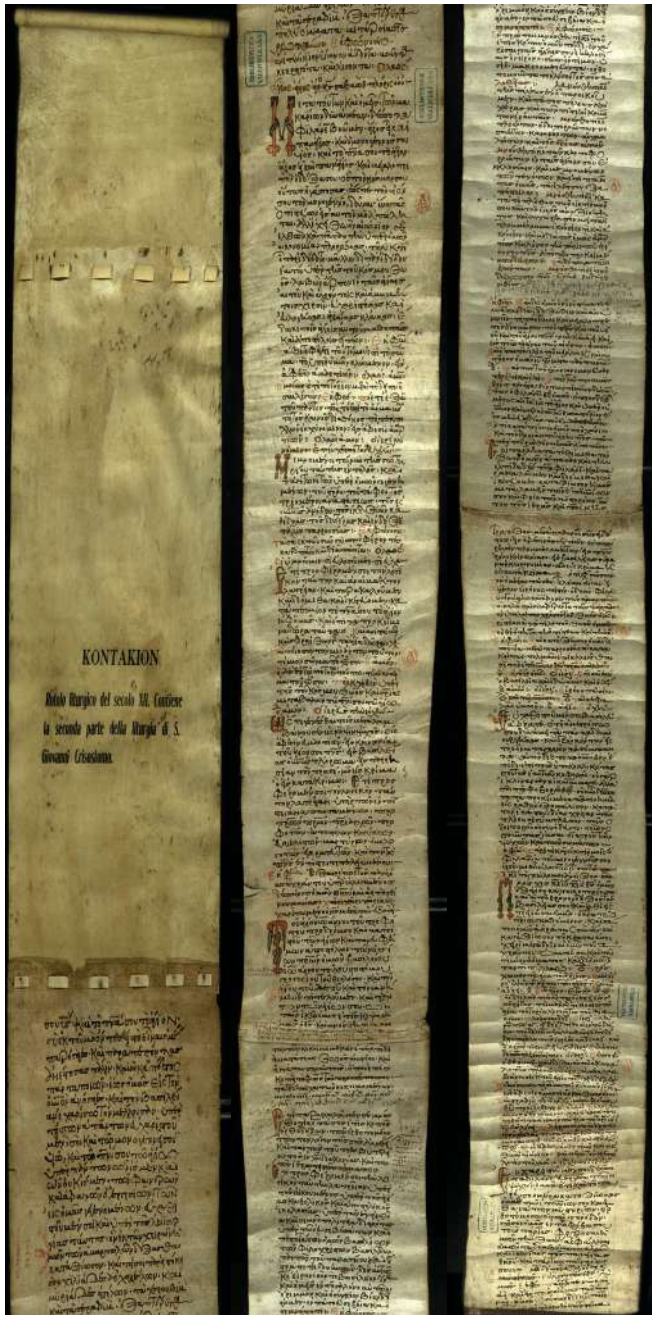

Fig. 1.8.4 Rome, Biblioteca Vallicelliana, G70, end of the twelfth century, the liturgy of St John Chrysostom.

Papyrus book rolls were made either of all or part of a commercially manufactured papyrus roll, or by pasting two or more rolls together. A reconstruction of the conventions relating to their size and contents—probably codified during the Hellenistic period—is severely limited by the fragmentary state of surviving *volumina* and the risk of arbitrarily generalizing the information obtainable from the better-preserved collections of materials, such as those from Oxyrhynchus or Herculaneum. To judge from the surviving evidence, the usual length varied between 3.5 and 11 m, with rare exceptions: a single roll could contain an entire work of limited length (for example a tragedy, a comedy, a speech, a Platonic dialogue) or a section of a larger work that was divided among several rolls. Conversely, texts too short to fill up a roll were transcribed together onto a single roll, to make it fall within the standard range of lengths, for example, series of poems, groups of speeches of one or more orators, or short texts that were part of a single work. Rolls of truly miscellaneous con-

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tents have not survived. As regards the height of a roll, the examples from Herculaneum tend to be shorter (between 19 and 24 cm) than those of Egyptian provenance (between 25 and 33 cm). In both cases, the width of the columns does not seem to have been especially large (between approximately 4 and 7 cm for prose, from 8 to 14 cm for poetry): attempts to connect layout and quality of the rolls have not, thus far, produced sufficiently clear results.

Despite the scarcity of surviving evidence, it is certain that leather and parchment rolls existed since ancient times (see fig. 1.8.4); outside Egypt they might have been more common than we tend to think: note, for instance, the parchment roll of the second century CE containing Xenophon's *Symposium* which was found in Antinoopolis (*P.Ant*. I 26) but may have come from outside Egypt.

8.2.3. The codex

The transition from roll to codex, one of the most momentous changes in the history of the book and the transmission of texts, was a slow and gradual process: in fact, it must be understood against the background of the various materials and objects that were used as ancient writing supports. Among these, a particularly important role was played by the (simply wooden or additionally 'waxed') tablets on which Greeks and Romans wrote everyday accounts, various documents, messages, school exercises, and drafts of literary texts: they could be used individually or grouped in sets of two (diptych), three (triptych) or more units (polyptych), much like real wooden books. Already in post-classical Greek civilization, the use of polyptychs for writing literary texts is sporadically attested, primarily for school use: one of the oldest surviving codices of rhetorical content, transmitting three of Isocrates' speeches, is a wooden book of the third/fourth century CE (*P.Kellis* III 95), which emerged in 1988 from the excavation of the ancient Kellis site, in the Egyptian oasis of Dakhleh (Worp – Rijksbaron 1997). On the other hand, frequent allusions by classical Latin authors (maybe Horace, more clearly Martial, Quintilian) state that books in codex form were certainly already in use at the end of the first century CE, a period to which also the most ancient remains of Latin manuscripts refer; a well-known passage in St Paul (II Tim 4:13), in which he asks his disciple Timothy to bring back some books from Troas, including *malista tas membranas* ('especially the parchments'), probably also points in the same direction. Archaeological evidence and literary sources agree in showing that between the first and second centuries CE the codex was already in use (perhaps first in Rome and later in Greek-speaking regions), although the roll still remained the standard form for literary texts.

Calculations made by Colin Roberts and Theodore Skeat (Roberts – Skeat 1983) on the basis of Greek materials of prevailingly Egyptian origin show that the transition from roll to codex was rather slow and was fully accomplished only between the fourth and fifth centuries, probably later than in the Latin context (where the genesis of the parchment codex must probably be placed).

Two kinds of reasons are frequently evoked to explain the rise of the codex: functional reasons (capacity, manoeuvrability, comfort of reading, ease of reference at every step of the text, possibility to combine more than one work in a single volume and to associate a text with an extensive commentary) and sociological ones (preference of the Christians for a more 'popular' book form, symbolically opposed to the 'pagan' roll). Recently, a more nuanced view has been proposed (Crisci 2008), which emphasizes (also on a statistical basis) the long coexistence of the two types of book, the presence of the same texts on rolls and codices, and—from a technical point of view—the parallel evolution of Christian and pagan codices. The relationship between the transition from roll to codex and that from papyrus to parchment has also been the subject of conflicting hypotheses: the origin of the codex seems likely to belong in connexion with the use of parchment, and the papyrus codex should probably be considered a 'by-product' of the roll, most prevalent in the eastern context, where papyrus was a cheap and abundant material.

After the 'triumph' of the codex, parchment rolls (also called 'scrolls' or 'rotuli', when written vertically in a single series of lines) remained in use during the Greek Middle Ages, particularly (though not exclusively) for liturgical contents. Numerous Byzantine examples survive (eastern and western, on parchment or paper), from the eighth and ninth centuries until the introduction of printing, with a maximum frequency in the twelfth to fifteenth centuries; the majority of them contain the liturgies of Basil and Chrysostom, which are the most frequently celebrated liturgies in the Byzantine tradition. A comprehensive history of Byzantine liturgical scrolls has not yet been written: they are usually made up of a long (up to 13 m) and mostly quite narrow (13–25 cm) strip, very soberly laid out (apart from some richly decorated specimens,

such as Jerusalem, Monastery of the Holy Cross, 109); writing often appears also on the verso side of the roll, continuing the text on the recto or adding a new (contemporary or later) one (Maniaci – Orofino 2012).

8.3. The making of the codex

8.3.1. The making of the quires

Quires of Greek parchment codices are most frequently quaternions, made by superposing four bifolia obtained by folding a rectangular sheet into two equal parts parallel to its short side; 'coupled leaves' or 'artificial bifolia' could also be used in place of 'natural' bifolia. While assembling bifolia, Greek craftsmen regularly followed 'Gregory's Rule' (already witnessed by *P.Ryl.* I 53, *Odyssey*, third/fourth century CE), requiring the matching of two homogeneous sides at each quire opening. The ancient habit of beginning the quire with a flesh side was maintained in Greek codices until the end of the Middle Ages: the few exceptions (mostly Italo-Greek or Latin-Greek bilingual manuscripts from the tenth to thirteenth centuries) were probably influenced by western practices, although a few eastern examples are also known (among others, the earliest codices copied by Theophanes, an Iviron monk working at the beginning of the eleventh century, or three centuries later those by the Cretan scribe Michaēl Loulloudēs).

Depending on the size of the skins, their quality, and the size of the bifolia the craftsman wanted to obtain, different methods were employed for making the quires, in accordance with the natural desire to get the most out of a single skin. The systematic observation of the thin and porous areas surrounding the animal's leg joints in a sample of Greek manuscripts of the eleventh and twelfth centuries (see fig. 1.8.5) and the use of statistical analysis (Maniaci 1999a and 1999b) has pointed to a specific way of subdividing the skins through a T-cut resulting in three bifolia from each skin, a process not to be seen as a unique alternative to the *folio* and *quarto* folding patterns proposed by Léon Gilissen for western manuscripts. While waiting for new and more extensive archaeological evidence, it can reasonably be assumed that the practices in use among Byzantine craftsmen were motivated by the desire to avoid waste of expensive material—through an intensive exploitation of the available skins, not all of the same size—rather than by the wish to economize gestures and working time. Cutting the skins according to need, and not necessarily in a systematic way, enabled craftsmen to obtain from skins of different sizes a variable number of bifolia, which could coexist in one and the same codex. Additionally, the use of patterns, similar to those still in use in Ethiopic book production (see Ch. 1 § 6), cannot be excluded as a remnant of ancient practice, although undocumented in Greek sources.

As for Greek paper codices, whose manufacture has not been systematically investigated, a wider diffusion of folding for quire composition has to be admitted, given the standardization of paper formats, and the position of chain and wire lines in the resulting quires.

8.3.2. The composition of the quires

Some very ancient and modest Greek papyrus codices are composed by series of single bifolia, separately sewn to one another (such as the Dublin papyrus Chester Beatty I (*P.Beatty* II), Gospels, beginning of the third century, made of fifty-five bifolia). More numerous ones are made of a single quire, obtained by nesting a large number of bifolia (up to fifty or more) one into the other: they could contain a whole comedy or one or more books of the Old or New Testament (such as Martin Bodmer's *Menander* codex, third or early fourth century, a single quire made of sixteen bifolia; *P.Bodmer* XIV–XV, second/third century, containing the Gospels of Luke and John, probably obtained by folding 36 bifolia in a single quire; papyrus Chester Beatty II (*P.Beatty* III), third quarter of the second century, Pauline Epistles, a single-quire codex made of 52 bifolia of slightly decreasing width). These extreme forms, whose chronological relation to each other is unclear, were soon abandoned in favour of the use of quinions and quaternions, which in Late Antiquity coexisted for a while. Quinions were apparently rare (they were used for instance in the Bible manuscript Vatican City, BAV, Vat. gr. 1209, or still two centuries later in the *Codex Marchalianus* of the Prophets, Vatican City, BAV, Vat. gr. 2125); quaternions, more frequently adopted, might alternate with quinions in a single codex, or also in conjunction with other types (they are found for instance in the fourth-century *Codex Sinaiticus* (see Ch. 1 § 8.1.2) and in the fifth-century *Codex Alexandrinus*, London, BL, Royal 1. D. V-VIII), before becoming the standard quire structure for Byzantine parchment books of all epochs. Greater variety is later found in paper codices, where the quaternion is still the predominant typology, but is often replaced by quires of thicker structure (quinions, senions, and more rarely octo-

nions, as in Paris, BnF, Coislin 93), which were probably thought to be more resistant to wear. In the sixteenth century, also thinner quires are attested, including ternions (incorrectly regarded as a clue to Italo-Greek origin and favoured, among others, by the Vatican scriptor Giovanni Onorio da Maglie) and binions, sometimes alternating with quaternions; a regular alternation between quires of different structure (quaternions/senions, as in Vienna, ÖNB, Cod.hist.gr. 39, from the year 1399, or binions/quaternions, as in Vatican City, BAV, Vat. gr. 146, written by the already mentioned Giovanni Onorio) is also found occasionally in later times (no earlier than the fourteenth century). The central (internal and/or external) fold of paper quires is only rarely reinforced by means of a parchment strip (sometimes re-used from an earlier manuscript); Greek 'mixed' quires, obtained by 'wrapping' a regular paper quire in an external and/or internal parchment bifolium are even rarer (fewer than fifty known occurrences, long erroneously connected to Crete or Southern Italy).

The final quires of a codex or of one of its sections may show an irregular structure, thus offering precious clues for understanding the book's genesis and further history.

8.3.3. Pricking and ruling

Unlike papyrus book rolls, in which the writing could be guided by horizontal fibres, the empty surface of the codex page required preparation to accommodate the contents, through the addition of a grid of perpendicular lines designed to demarcate its limits and facilitate its alignment (see also General introduction § 1.3.3).

In most cases, ruling was preceded by pricking, often removed by subsequent trimming(s) and therefore now completely or partially invisible. Pricking already appears in ancient Greek codices, where pricks were usually executed within the written area (in both *Codex Vaticanus* and some sections of *Codex Sinaiticus* they are hidden inside the outer column); later they tended to be located toward the outer bounding line, and then nearer and nearer to the outer margin and the edge of the page (see fig. 1.8.6). The lack of systematic research on the oldest Greek codices and the extreme rarity of dated or datable ones do not allow for more than general observations. The presence of a double row of prickings in both inner and outer margins of the page is rare in Greek codices and deserves special mention: it appears, for instance, in some majuscule codices such as the ninth century Cosmas Indicopleustes manuscript Vatican City, BAV, Vat. gr. 699, of uncertain origin. In the absence of specific archaeological research, it is impossible to say anything well founded about the pricking instruments used, or the way they were applied (on open or folded bifolia, on single or superposed surfaces).

Greater attention has been paid to the study of Greek ruling, which in Late Antiquity and the Byzantine Middle Ages was always executed with a 'dry point' technique. In this case, too, Greek craftsmen showed a conservative attitude and disregarded the coloured rulings widespread in Latin book production by the thirteenth century. Rare (and unexplained) occurrences of coloured ruling found in Greek books before the Renaissance are restricted to well defined areas and functions: in particular, Byzantine manuscripts produced between the eleventh and the twelfth century in the Calabro-Sicilian area around the Strait of Messina may show coloured lines (in fading shades, from grey to brick-red, sometimes associated with a slight scoring) that reinforce existing dry-point grooves; traces of vertical coloured ruling appear sporadically as early as the ninth century, to guide the layout of scholia in Vatican City, BAV, Urb. gr. 35, Aristotle, from the year 914, made for bishop Arethas of Caesarea, or in some ninth-century representatives of the so-called 'philosophical collection'; the practices of Renaissance scribes are yet unexplored. It is worth noting that the analysis of some occurrences of coloured ruling has revealed the use of substances whose composition does not correspond to that of mediaeval Greek inks.

Unlike coloured ruling, which had to be executed individually on the recto and verso of each leaf or bifolium, dry-point ruling could be obtained in a variety of ways. Julien Leroy (1976) drew attention to a diverse range of 'ruling systems'—corresponding to the succession of grooves and reliefs within a quire—and proposed a method for their symbolic notation, which takes into account the difference between primary and secondary grooves and records their alternation within the quire. The data in our possession attest that the different systems (thirteen according to Leroy, and others discovered more recently) are very heterogeneously widespread: Leroy 1, with scored furrows visible on all hair sides, is the most common system from the tenth century in Byzantium and related areas (more than 70% of the cases); some systems which had been mainly or exclusively connected to Italo-Greek manuscripts (especially Leroy 9, the

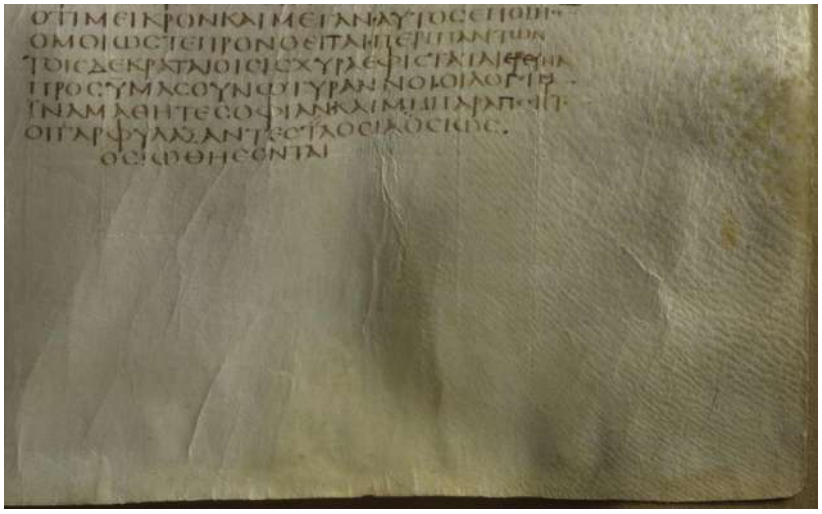

Fig. 1.8.5 *Codex Sinaiticus*, London, BL, Add. 43725, *c.*360 CE, f. 153r, detail, Wisdom of Solomon 6.10.

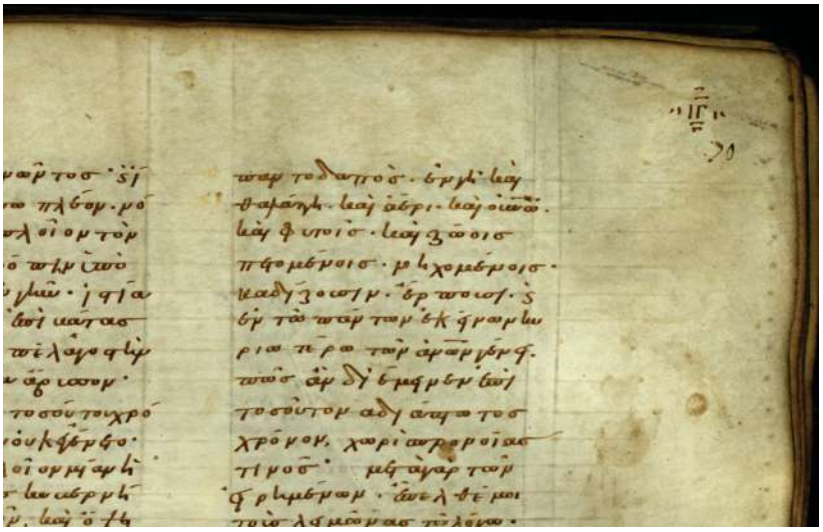

Fig. 1.8.6 Rome, Biblioteca Vallicelliana, B16, early eleventh century, a collection of works by St John Chrysostom, f. 70r, detail showing pricking, ruling for a two-column text layout and a quire signature in the upper right corner.

second in order of frequency after Leroy 1), have been subsequently found in various different areas of the Byzantine Empire; other ones seem to be time-related, such as Leroy 3 and 4, frequently used in old majuscule codices (although this impression has not yet been confirmed by systematic surveys). The parchment is most frequently impressed on the hair side; impressions on the flesh side are particularly common in (but not exclusive to) southern Italy, especially in periods and areas subject to Latin influence. The coexistence of multiple systems in the same codex is quite common, as is the association of two different systems for bounding lines and horizontal ruling within the same quire.

Other possible ways of engraving rulings seem to have spread in Greek codices together with the diffusion of paper, particularly the use of the *miṣṭara*, which has recently been reported for late and post-Byzantine manuscripts (Agati 2012). On the contrary, there is as yet no evidence of the use of the 'rake', widely employed for ink ruling in late mediaeval Latin books, although the extension of late-mediaeval ruling techniques to late Byzantine codices and those produced in Renaissance Italy is probable, and also the use of sets of ready-made quires, bought from Italian stationers (*cartolai*) cannot be excluded, even before the fifteenth century, as a result of intensified contacts and the increased mobility of scribes between east and west. For paper books of modest quality, the use of 'poor' ruling techniques, limited to the written area (or to the sole vertical justification) and obtained by simple folding, should certainly be considered, although it has never been surveyed; the absence of visible ruling is also occasionally attested.

Whatever the details of execution, ruling produces a more or less elaborate grid of perpendicular lines, traditionally called a 'ruling type'. Besides the essential lines (bounding and writing lines) and others that could serve as a guide for the insertion of running titles, initials, glosses or commentaries, many other—seemingly 'superfluous'—marginal rules often appear in Greek codices in a variety of positions, and seem to be guided by purely qualitative and aesthetic criteria: in fact, the number of 'unnecessary' marginal lines reaches its maximum in Bible manuscripts (Maniaci 2002b), while the complexity of the schemes significantly decreases in paper codices. Lines may be not only more or less numerous, but also of variable extent (for example, horizontal lines may extend all the way across the page, or abut onto the bounding lines) and give rise to a great diversity of types: attempts at classifying them, motivated by the

hope of inferring useful hints for dating, suggesting provenance or identifying specific centres, have not given the desired results. The most frequent types are few in number, extend over a large area and are therefore of little use for dating and localization. Of more than 3,000 types (Sautel 1995, based on Leroy [Julien] 1976), only three are represented by more than two hundred codices, and only ten by more than one hundred; more than six hundred types are represented only once. Rarer and/or more elaborate types are peculiar to specific contents (such as associations of texts and commentaries) or depend on individual choices: in the same place, the same codex or even the same quire, multiple types may appear simultaneously, not always attributable to a specific purpose.

8.3.4. Ordering systems

Unlike printed books, mediaeval manuscripts were not always equipped with the devices ensuring, on the one hand, the correct sequence of quires, bifolia and sheets and, on the other hand, the immediate retrieval of specific passages of the text.

In Greek book rolls, column numbering occasionally appears (for instance in PSI XII 1284; *P.Oxy*. III 412; *P.Oxy*. IV 657 = PSI XII 1292). The oldest Greek codices (third and fourth centuries CE) sporadically show page numbers (pagination), unknown in Latin codices, but the figures (written in the upper—central or outer—margin, sometimes only on rectos) are often later than the hand(s) of the scribe(s) (Turner 1977, 75–76). Leaf numbering (foliation) is extremely rare: ancient (but not coeval) traces appear on the versos' upper outer margins in the Bible *Codex Vaticanus* (probably meaning that the opening was numbered, rather than the leaf). Extant foliations were often added much later: sometimes more than one series coexist in the same book, and often they offer useful clues for reconstructing the book's history.

Quire numbering (signature) is found already in ancient Greek codices (one of the oldest examples being *P.Bodmer* II, from the first part of the third century). It is mostly expressed in Greek majuscules, minuscules or mixed characters, used as numerals (with the addition of *stigma* ϛ = 6, *koppa* ϟ = 90 and *sampi* ϡ = 900) and traced in brown or sometimes red ink, occasionally with decorative elements (horizontal, vertical or oblique strokes, straight or wavy, variously combined, see fig. 1.8.6). A rare curiosity is the use as signatures of groups of letters or entire words to be read one quire after the other, forming a meaningful sentence (as the beginning of Psalm 103 in the tenth-century Venice, BNM, gr. 269).

Signatures are more frequently written on the first page of the quire, preferably in the upper outer (fig. 1.8.6) or lower inner margin, but they are also more rarely displayed only on the last page (lower inner margin), or simultaneously in both positions: all these possibilities are found already in Late Antique codices. The attempt to define geographical and chronological distinctions (Mondrain 1998) so far has not brought about fully convincing results, although some trends do stand out: the placement in the upper, outer or inner, margin seems to prevail in the oldest books; signatures appearing only on the last page of the quire (preferably at the centre of the lower margin) are rarer and could betray a Latin influence; in the (frequent) case of double signatures, at the beginning and end of the quire, the prevailing associations are those between upper-outer and lower-inner margin or between the two lower-inner positions. Double signatures on the first and last page of the quire, both on the lower-central margin, spread in Greek codices from the fourteenth century.

Quire signatures may be inserted by the scribe, or by the coordinator and/or reviewer of a collaborative copy; they can also be due to more than one hand, especially if they are later than the transcription of the text. In some cases, also in codices of miscellaneous contents (but composed of a single 'production unit'), quire signatures may begin anew with each new text (as in Vatican City, BAV, Vat. gr. 204, first half of the ninth century), showing that they were perceived as separate units. Single initial and/or final quires or groups of quires may not bear a quire number, as they contain accessory texts (such as indices, Canon Tables, liturgical calendars) which were—and were perceived as being—distinct from the main work; loose leaves—such as those containing the evangelists' portraits in Gospel books—are usually unnumbered. The presence of several series of quire signatures in a single manuscript or the use of numerals other than Greek (Slavonic, Armenian, Georgian, etc.) may contribute useful information for reconstructing the history of the books in which they appear. Quire numbering may also be associated with other marginal devices, such as one or more small crosses or asterisks (as in *Codex Alexandrinus*), sometimes related to specific copyists or centres: in the absence of any other evidence, risky generalizations must be avoided, as the scribes could change their habits from one codex to another (see for instance the case of

the Constantinopolitan tenth-century monk Ephraim, or that of the Stoudite scribes, with their inconsistent ways of affixing crosses in the upper margins of their codices).

From the thirteenth century, under the influence of Latin usage, the appearance of 'quire and leaf signatures' ('segnature a registro', later established in printed books) is sporadically observed in Greek codices: sets of letters, numbers and symbols, combined in various and more or less fanciful ways, appear on the first half of all the bifolia composing each quire, to indicate both the position of the quire within the codex and of the bifolium within the quire (as in Vatican City, BAV, Vat. gr. 1960 or Rome, Biblioteca Angelica, gr. 68, in Greek numerals, or in the tenth unit of Vatican City, BAV, Vat. 1902, in Latin numerals).

Although catchwords are occasionally reported in Greek papyri (West [S.] 1963), their use in Byzantine codices might also be due to Latin influence. The oldest dated Greek example is a copy of the so-called *Suda* lexicon, Vatican City, BAV, Vat. gr. 1296, probably made in southern Italy in 1205; but they were already employed by the scribe Iōannikios and his associates at least half a century earlier (Degni 2008). Catchwords remained sporadic until the fifteenth century, when they became more frequent, under western influence, replacing quire signatures; they are usually placed in the lower inner corner, horizontally or vertically.

8.3.5. The codex as a complex object

Recent research (Gumbert 2004; Andrist et al. 2013) has underlined the centrality of the relationship between the structure of the codex and its contents and the need to investigate the form this relationship takes not only in the original stage of a codex's manufacture, but also during the various phases of its later life.

A high percentage (*c.*50%) of extant Greek codices contain multiple texts, and only some of them are in fact structurally homogeneous books (Maniaci forthcoming): many are the product of assemblage under a single cover of pre-existing units and/or others created ad hoc, which might have occurred at different times, in various ways and for different reasons, according to some principle, or merely out of convenience. Moreover, modularity is not exclusive to multiple-text codices: it may also be a feature of volumes that appear to have homogeneous content ('single-text' codices) but whose structure reflects some commonality among groups of quires and textual sub-units.

The lack of adequate catalogues—sufficiently accurate in listing the contents and particularly in describing the complex structure of the codices—hampers the compilation of an accurate typology of the Greek multiple-text codex, taking into account times and places, contents, cultural contexts, language, functions and uses of the books: the attempts made up to now only provide a rough picture of the spread of multiple-text manuscripts in the Byzantine and Latin Middle Ages. Codices containing a single text show an initial prevalence of religious content in the form of Bibles and commentaries, liturgical texts, homilies, theological treatises and hagiographies, followed from the thirteenth century onward by an increasing presence of literary works of history, poetry, novels and philosophical works, and technical works on grammar, philology, lexicography, astronomy, medicine, mathematics, or law. As already mentioned, the analysis of multiple-text manuscripts is even more limited by their structural diversity: presumably homogeneous books, which are easier to characterize, tend to bring together a limited number of works by different authors (usually two or three of them), and only approximately 15% contain more than ten texts; a significant increase in multiple-text manuscripts occurs only in the late Byzantine period, particularly in the thirteenth and fourteenth centuries, when a main text usually located at the beginning of the book is often followed by a series of short, even very short, texts. With regard to content, Greek multiple-text 'monoblock' books tend to aggregate texts belonging to the same religious or secular genre (which prevails in the late Byzantine period); the first text contained in each manuscript is usually the longest.

The data from ancient and recent catalogues are inadequate for further advances in the knowledge of 'complex' Greek codices, which requires the direct, in-depth analysis of the codices themselves, which need to be considered and described, regardless of the number of texts they contains, as complex objects consisting of one or more elements produced simultaneously or at different times and possibly different places. These elements, or 'production units', may or may not have circulated independently; they may have been joined with other elements and originated new 'circulation units' corresponding to stages in the history of the codex, the last of which coincides with the book in its current form. The archaeological study of the codex therefore requires the reconstruction of a 'genetic' history that investigates the origin

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of each production unit, and a 'stratigraphic' history that reconstructs the succession of forms taken by the codex as a result of the addition or subtraction of units or changes to the existing ones (see Ch. 4 § 4).

8.4. The layout of the page

The size and layout of Greek manuscripts are favourite themes of Greek manuscript research, especially of the so-called 'quantitative codicology', allowing one to go beyond isolated observations on individual manuscripts and to highlight the existence of some general trends.

Books less than 10 cm tall—although occasionally made for mainly devotional use (Gospels, lectionaries, and especially Psalters: Weyl Carr 1980)—are extremely rare in the Greek-speaking world; at the other end of the scale, volumes whose height is equal to or greater than 60 cm are also very uncommon, probably because of the preference for *sexto* rather than *quarto* skin subdivision in Byzantine book manufacture (making it possible to obtain three bifolia out of a skin, instead of two larger ones). Some manuscripts of astronomical and geographical contents stand out among the isolated exceptions, such as the sumptuous Venice, BNM, gr. 388 (coll. 333), Ptolemy, written for Cardinal Bessarion by the Cretan scribe John Rhosos (Iōannēs Rhōsos), in which each bifolium is the result of the coupling of two skins of about 585 × 435 mm. Aside from extreme cases, the distinction proposed for Latin books by Armando Petrucci (1969a) between large books ('libri da banco'), intended to be read, viewed or simply displayed without displacing them, medium books ('libri da bisaccia'), transportable from one place to another in case of need, and portable books ('libretti da mano') may also be generally applied to Greek codices. This categorization implies the existence of a (sometimes very close) connexion between size and text types, imposed for certain categories of texts by reasons of a technical nature (as in the case of the—necessarily large—codices in which the main text is framed on three open sides by an extensive commentary). Other texts could be accommodated in volumes of very different sizes: this is the case with certain liturgical books, which could be very large or very small, depending on whether they were intended for group worship or personal devotion; the transcription of individual books or groups of books of the Bible is similarly characterized, on the basis of use, by a large range of dimensions.

Apart from the pioneering efforts made by Eric Turner (1977) to typologize the dimensions of papyrus and parchment codices (through the creation of classes based on size and proportion that require a global rethinking), some significant facts emerge from recent research on the construction and layout of Middle Byzantine codices. With regard to proportion (expressed through the ratio of width to height), the squarish shape of ancient Greek parchment codices tends to be perpetuated over time. The oldest examples show a definitely large proportion, averaging about 6/7 (0.86) and rarely narrower than 5/7 (0.71); Middle Byzantine codices evolve toward a slightly slimmer, but still rather large ratio, of approximately 3/4 (0.75). Manuscript books whose proportion is greater than 1.0, i.e. wide rather than tall, are not attested in Greek. As for absolute dimensions, the rarity of exceptionally large Greek codices (semi-perimeter over 700 mm) is balanced by the frequency of medium-sized codices (around 500 mm), favoured even for texts intended for public use (homilies, hagiographic collections, writings of Church Fathers).

With the diffusion of paper, book size and proportion undergo changes associated with the gradual standardization of sheet sizes, which for oriental paper await a more precise definition (see above § 1.1.3). The diffusion of Italian watermarked paper in Greek books involves the generalization of the two formats (*reale* and *reçute*) imposed in the west by Italian paper makers from the mid-thirteenth century.

Only two of the very few known layout canons concern Greek codices, in a more or less direct way. The first one is a Latin (Carolingian) recipe, transmitted by a Parisian codex (Paris, BnF, Latin 11884, f. 2v), which seems indirectly to reflect Late Antique habits, later preserved—with some adjustments—in Byzantine parchment books (Maniaci 1995, 2013). The text provides a series of recommendations aimed at the manufacture of codices of large proportions (4/5, or 0.80), completely incompatible with the standards in vogue in the west, but found in a sample of Greek manuscripts on parchment, with maximum diffusion from the ninth to the twelfth centuries. The second source, recently brought to scholarly attention (Vatican City, BAV, Vat. gr. 604, fourteenth century) proposes a set of detailed instructions in Greek related to the specific layout of Aristotle's *Organon* and its framing commentary, contained in the same volume (Bianconi 2010; see also Maniaci 2013). So far, no other witnesses of the same layout have emerged.

Apart from these isolated and problematic examples, the statistical analysis of dimensional data collected from large samples of manuscripts reveals some general criteria relating to the layout of Byzantine

parchment manuscripts (specific studies on paper ones are still lacking). In Middle Byzantine codices (as in Latin ones), the average 'occupancy rate', or 'black' (determined by the ratio of the written rectangle to the total area of the page), remains well below the half of the total available space, i.e. around 43% (whereas it reaches 50% in the oldest Greek codices). Within the written area, writing is arranged over one or two columns (rarely over three, as in Vatican City, BAV, Vat. gr. 1209). After a more or less equal diffusion of the two layouts in the oldest centuries of Greek codex production, two-column layout gradually prevails, reaching its peak in the eleventh century; the following century marks a turnaround, with the return of full-page layout, predominant in late Byzantine manuscripts, both sacred and secular, except for certain text types (such as homiliaries and lectionaries), which remained faithful to older traditions. According to tendencies already well investigated for Latin codices, the two-column arrangement prevails in large codices, for reasons of readability.

Beyond these general trends, the filling, space exploitation and text layout of Greek codices undergo variations related to their chronology and geographical origin, but especially to book contents: research started for the Macedonian and Comnenan ages (Maniaci 2002b) should be extended to later centuries and more systematically related to historical and cultural events. Additionally, the fundamental continuity in book manufacturing techniques and the overall limited amount of typological differentiations generally confirm the judgment of substantial conservatism deserved by other aspects of Byzantine book manufacture. At least between the ninth and twelfth centuries, Greek craftsmen adopted without evident discontinuity the same general criteria: volumes show small or medium sizes, large proportions (3/4 or more) and relatively large margins, respecting a fairly rigid (probably Late Antique) hierarchy.

Nevertheless, Greek craftsmen were also able to construct complex layouts, characterized by the association on the same page of a 'main' text and a 'secondary' one, usually a commentary. Especially when the commentary surrounds the text in the form of a frame, as is most frequent in Greek codices until the thirteenth century, the simultaneous management of two different 'text streams' implies, since the preliminary design of the book, a detailed and complex codicological project, and requires, on the part of the scribe or scribes of the two 'primary' and 'secondary' texts, a delicate coordination, especially if text and commentary are derived from two—or more—different antigraphs. Research based on extensive and detailed surveys has been devoted in recent years to some manuscripts of the *Iliad* and to the layout of biblical *catena* manuscripts, containing a form of commentary made up of excerpts from earlier biblical exegesis (Maniaci 2000b, 2006a, 2006b; Sautel 2000, 2001; Vianès 2000): it has contributed significantly, although still incompletely, to shedding light on the specific strategies used by the scribes to solve the difficult problems they faced in synchronizing text and commentary.

8.5. Text structure and readability

8.5.1. Writing and decoration

The devices adopted by the scribe to highlight the structure of the text and allow the reader to navigate easily within it also belong to the field of page and text layout; the role played by initial letters, running titles and display scripts, however, must be framed in the context of decoration. At least one typical feature of Greek manuscripts is worth mentioning here, namely the way of placing in the margin, as a 'hanging initial', not the first letter of a new paragraph or section, but the first letter of the first full line of that section, with the actual beginning of the paragraph occurring in the preceding line.

Research devoted to a sample of Byzantine minuscule books of the ninth to twelfth centuries showed that Greek scribes were also attentive to 'line management', as is revealed by the tendency to avoid or limit word division at the end of the line, where it was considered an obstacle to reading ease. The control usually became even more attentive at the last line of the page, where the eye trajectory was necessarily longer than from one line to the next on the same page; not surprisingly, fewer divisions are observed between recto and verso (where the reader had to turn the page) than between two facing pages (Maniaci 1997).

Although a detailed discussion of the characteristics and evolution of Greek book decoration pertains to the history of art, it cannot be ignored that decoration also has a codicological significance, particularly underlined by recent research.

Technical sources on Byzantine book decoration are almost totally lacking: knowledge of materials and processes is limited to a few recipes, while the existence of preliminary sketches and the composition of colours and grounds can be detected only through direct observation and scientific analysis.

The variety and richness of Greek book decoration is documented by several manuscripts, and reflected in the art of other cultures influenced by Byzantium (Coptic, Ethiopian, Syrian, Armenian, Georgian, Russian, Bulgarian, Serbian, Sicilian, as well as that of the eastern Latin kingdoms). Narrative miniatures and illustrations, consisting of scenes of various content and size, were restricted to luxury books of specific types (such as the Bible, liturgical and hagiographic collections and secular classics) and to some technical works (military arts, medicine, botany, astronomy, etc.).

Figural miniatures and decorated initials were usually the purview of craftsmen other than the scribes, or executed in specialized workshops. In papyrus rolls, illustrations were freely inserted in the middle of the columns, unframed and without background. With the diffusion of the codex—which allowed for richer and more varied decoration—the layout of the pictures was adapted to the new closed format of the page and to the new text arrangement, acquiring backgrounds and frames and adjusting itself to the width of the page or of the column. Miniatures might be executed on separate leaves which were then inserted into the book (sometimes also at a later date).

The study of early Byzantine miniature painting is based on rare and fragmentary surviving examples. Among sacred texts, there are for instance the remains of two fifth- and mid-sixth-century Genesis manuscripts, both of uncertain provenance: the Cotton Genesis (London, BL, Cott. Otho B.VI) and the Vienna Genesis, written on vellum dyed in purple (Vienna, ÖNB, Cod.theol.gr. 31); two fragmentary sixth-century Gospels are also worth mentioning, also of unconfirmed provenance, the Rossano Gospels (Rossano Calabro, Museo dell'Arcivescovado) and the Sinope Gospels (Paris, BnF, Supplément grec 1286), both on purple parchment. Lay examples include manuscripts such as the fifth/sixth-century *Ilias picta* (Milan, Biblioteca Ambrosiana, F 205 inf.), originally containing more than two hundred miniatures, and the Vienna Dioscorides (Vienna, ÖNB, Cod.med.gr. 1), prepared around 512–513 for the Byzantine princess Juliana Anicia, still containing 383 extant illustrations of plants out of the original 435. These examples represent a range of different types: the pictures can be arranged in the lower half of each page (as in the Vienna Genesis) or in spaces of variable size and extension (as in the Cotton Genesis); they may appear in the form of a series of frontispieces (as in the Rossanensis) or as full-page naturalistic plant depictions, as in the *De materia medica* treatise. In the middle and late Byzantine period the number of decorated manuscripts increased considerably, especially from the mid-eleventh century. The Four Gospels feature Canon Tables and evangelists' portraits painted on the verso page preceding the beginning of each Gospel, followed by a decorated band, a major initial and a distinctive title on next recto often written in gold. The structure of the Four Gospels shows interesting codicological peculiarities: the portraits could be executed on loose (ruled or unruled) leaves, sometimes included in older volumes (as proposed for Mark's portrait in the Rossano Gospels: see Kresten – Prato 1985) or conversely re-employed in later codices; the insertion of the miniatures was facilitated by the correspondence between groups of quires and individual Gospels (frequent until the twelfth century and often marked by one or more unusual or irregular quires). Decorated lectionaries, whose pictures, as well as the text, are distributed according to the liturgical year, are not very frequent but often of high quality. After Gospels, the most frequently decorated biblical books include Psalters, Job with commentary, and Octateuchs; the Major Prophets (Isaiah through Malachi) may also be collected in a single painted volume; Vatican City, BAV, Reg. gr. 1, commissioned in the second quarter of the tenth century by the *sakellarios* Leo, is the exceptional example of an illustrated complete Bible. Some homiliaries (such as Paris, BnF, Grec 510, a codex of John Chrysostom dated 880–883) and liturgical collections arranged according to the calendar (menologia and synaxaria, such as the famous 'Mēnologion of Basil II', Vatican City, BAV, Vat. gr. 1613, written around 1000 CE) have splendid miniatures. An outstanding example of a richly illuminated secular text is the Madrid Skylitzēs (Madrid, Biblioteca Nacional, 5–3 n. 2), most likely produced in Messina before the mid-twelfth century. It features 574 miniatures (having probably lost some one hundred more). Another one is the hunting treatise (*Cynegetica*) by pseudo-Oppian, preserved in a single copy from the eleventh century (Venice, BNM, gr. Z. 479).

'Minor' decoration, often in the scribe's own hand, is represented by lines, ornamental bands, frames (also Π-shaped, *pylai*) enclosing the titles, large 'carpet pages', and also decorated initials (less developed than in western books) and 'distinctive' scripts (see fig. 1.8.7). Abstract ornamentation—widely developed in Byzantine codices from the beginning of the eleventh century, after the conclusion of the iconoclastic controversy—shows a variety of motifs (geometric interlaces, arabesques, vegetal, zoomorphic and anthropomorphic designs), colours and styles. The execution may be monochrome (employing the

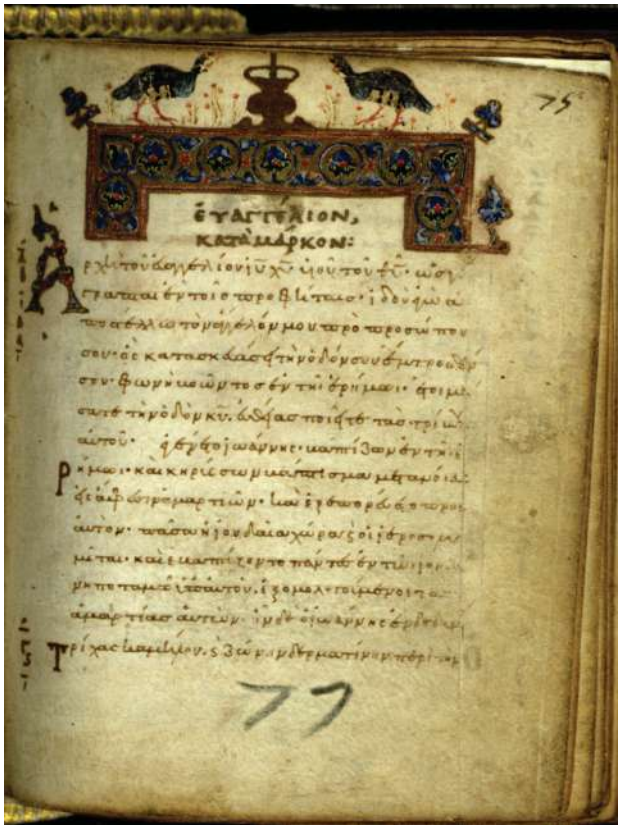

Fig. 1.8.7 Rome, Biblioteca Vallicelliana, B133, mid-eleventh century, Four Gospels, f. 75r: the beginning of the Gospel of Mark.

same ink as the text or more often a minium or carmine red) or polychrome (showing a variety of colours and possibly also the use of gold and silver).

The main (over-simplistic) opposition has been often made between 'Constantinople' styles—such as 'serrated style' (Laubsägestil) or more refined 'flower-petal style' (Blütenblattstil)—and 'peripheral' styles (more contrasted, coarse and spontaneous, marked by the influence of other book traditions; see Džurova 2008). However, recent research suggests that the contrast between 'metropolitan' and 'provincial' book art should not be overestimated, insisting on the mix of patterns and influences within a multi-ethnic empire. In the past years, many suggestions of provenance—often based on this alleged opposition—have been disproved. Although not without uncertainties, the most easily definable province is Byzantine southern Italy, characterized since the tenth century by a marked preference for specific colours (green, orange, yellow, brown), naïve techniques and a contamination with western book crafts (with the exception, in the twelfth century, of the area surrounding the Strait of Messina).

Apart from an aesthetic function, decoration (including display scripts, historiated initials, ornamental bands, the use of red, ranging from orange to brick-red to minium and carmine, or other colours) contributes to the structuring of the text and therefore impacts directly on the fruition of the contents. It introduces precise dimensional and chromatic hierarchies; at the same time, the insertion of decorative elements in certain positions breaks the flow of the text, forcing the scribe (generally coinciding with the rubricator) to plan his transcription carefully and to adopt various graphic devices (abbreviations, changes in the form of the letters or in the width of their spacing, horizontal expansion or compression, and so on), in order to adapt the writing to the available space (Cavallo 1996). The reconstruction of the manufacturing stages of decorated and illuminated manuscripts has similarly been scarcely investigated thus far, particularly with regard to the relationship between the work of the scribe (often also responsible for 'minor' decoration), and the intervention of individual painters or organized teams or workshops for the execution of miniatures. A careful analysis often reveals the hidden presence of guidance letters or signs, intended to serve as a reminder for the execution of titles or decorated letters and mostly added after the transcription of the text: but these sporadic indications do not allow for firm or general conclusions about the working methods and the possible interaction of individuals having different skills.

As for the collaboration between scribes and painters, the few Byzantine examples studied so far point to a wide and elusive range of possibilities, which likely reflect the diversity of ages, places and contexts of production and hint at complex and still largely unexplored ways of interaction. This is particularly evident when the decoration shows different and exotic features as compared to the accompanying writing (as in the eleventh-century Vatican City, BAV, Chis. R.IV.18, John of Damascus, whose decoration echoes that of the ninth/tenth-century Maghrebi Qurʾāns) or even when scribes and painters belong to different cultural traditions and the decoration may incorporate a text written in a language other than Greek (as in Athens, National Library, 149, a Psalter produced in eleventh-century Calabria, in which the Pauline Epistles were later supplemented by the portrait of the apostle with a roll showing the *incipit* of the epistle in Slavonic, the language also used for Paul's name; or in Athens, National Library, 127, Gospels with evangelists' portraits in Armenian style, with Mark tracing Armenian letters on the book open on his

knees). Apart from single cases, the reconstruction of a sufficiently clear and detailed picture still remains a distant goal.

8.6. The scribe, the painter and the illuminator at work

8.6.1. Persons, places and methods

In the Byzantine 'bibliophile society' (Grünbart 2004), laymen and clerks, scholars, monks, notaries, civil servants, and even, in some cases, emperors and women of high birth could engage in the transcription of books, without distinctions of status and role. Research conducted over thirty years ago (Cutler 1981) on the subscriptions of ninth- to fifteenth-century Byzantine manuscripts (substantially confirmed by recent surveys: see Ronconi 2012) identified the monks, mainly devoted to the transcription of sacred texts, as an absolute majority (53%) of the scribes, against 6% for lay people and 22% for priests. Ecclesiastic scribes wrote mainly, but not exclusively, to gain spiritual merit (but they also made copies for sale); learned laymen often engaged in book transcription as a mean to better understand the text they reproduced (but also as a solution to overcome the high costs of manuscripts). 'Pious' and 'amateur' scribes were flanked by a minority of professional calligraphers, who earned their living by copying manuscripts.

Information on the physiology of the copy, i.e. on the position taken by the Byzantine scribe and the use of any specific furnishings (benches and desks) almost exclusively depends on the ambiguous testimony of miniatures, depicting the evangelist or other author-scribe on a seat in front of a workbench; on the other hand, colophons contain formulaic references to the practice of holding the writing surface on one's knees (*kalamos m'egraphen, dexia cheir kai gony*, 'the reed pen wrote me, the right hand and the knee'). It is unclear whether the scribe wrote on loose bifolia or on already formed quires: the few traces of 'tackets' found until now (see Ch. 1 § 1.3.1) are too uncertain and sporadic to allow one to conclude in favour of the second option, but habits may have changed over time.

References to the duration of the copying process and the speed of the scribes are more explicit, but also quite rare, consisting in occasional notes which would seem to point to the transcription of a medium volume in about forty days (at a rate of about half a quire a day: see Ronconi 2012): a much lower 'productivity rate' as compared to that attested by hagiographic sources, in which saints (usually with divine help) perform the copying of an entire volume within a week or even a few days. The variety of circumstances and the subjectivity of the scribal experience suggest, however, that we should avoid generalizations.

Even though the Byzantines were not used to structured forms of scribal activity similar to those practised in Latin scriptoria, copying was not necessarily solitary work: collaboration between copyists was a frequent phenomenon. The division of labour could be aimed at simultaneous transcription from different and independent models, or from parts of a single model available in the form of loose gatherings (Canart 1998); in other cases, shared copying (also with frequent alternation of a high number of hands) within late Byzantine learned circles could be motivated by intellectual needs (Cavallo 2001a). By highlighting the relationships between textual flow(s), scribe rotation and the physical structure of the books, codicology can help to distinguish different situations, whose reasons, however, cannot always be clearly defined.

8.6.2. Colophons

Colophons are found only exceptionally in older majuscule codices (without mention of date), while their frequency increases significantly in the Byzantine Middle Ages. No figures based on reliable surveys are available to estimate the percentage of subscribed Greek manuscripts; those which are explicitly dated, from the ninth century onward, are rather more numerous than—for instance—Latin ones (from about 8–9% up to the twelfth century to about 50% in the fifteenth century, and 67% in the sixteenth century).

Texts are usually shorter than those found in other oriental book cultures, and they are composed by varying combinations of the following elements: scribe's name, name of the person on behalf of whom he wrote, date of completion of the copy (see fig. 1.8.3, Athos, Pantokrator, 84, f. 425r, with the subscription of the scribe, monk Theoleptos, who wrote the manuscript under the sponsorship of the doctor Michael Gabras, completing it on 6 May 1362 CE); other information, such as the place of copying (toponyms are mostly difficult to identify), and other details (reasons for copying, mention of emperors or other secular or religious authorities; memories of historical facts) are found much more rarely. These main data are in-

tegrated by formulaic remarks (refrains or stereotyped phrases of various kinds), containing apologies for copying errors or expressions of satisfaction for the accomplished task; prayers and invocations; speeches to the reader, invectives against theft: they can appear in slightly different formulations, and some of them may have a local connotation, thus offering some hints for localization (but, as for other features of Byzantine books, in most cases making exclusive connexions with specific areas risks being contradicted by further research). Other information—such as price or various remarks of historical interest—appears only occasionally but further contributes to enhancing the value of colophons as historical sources.

Scribes usually mention their name (in late examples, their surname too) and social status or profession. Apart from monks and hieromonks (or priest-monks) there were also priests (*presbyteroi*) with various functions in the ecclesiastical hierarchy, or representatives of professions that involved a high degree of knowledge of writing (for instance notaries or school teachers). The scribe's name is often followed by an epithet expressing humility or unworthiness.

A patron—either an ecclesiastical dignitary or a secular authority—may also be cited, often with flattering titles; if he was an abbot or an emperor, his mention can also serve as a dating criterion (or even a criterion for localization). Patrons appear as *ktētores* ('founders') or are indirectly referred to through words describing their intention (such as *pothos*, *spoudē*, *dōron*).

A systematic structural survey of Byzantine colophons, as well as a typology of their position within the book, lettering and decoration, has not yet been proposed (some preliminary remarks are to be found in Cutler 1981).

8.6.3. Dating systems

The date may be expressed through a mix of various elements (and inconsistencies often occur in their combination). In the most complete form, it consists of the following mentions: year (mainly according to the Byzantine World Era, beginning on 1 September 5508; before the seventh century, according to the Alexandrine World Era, beginning on 25 March 5492; western and Renaissance manuscripts may be dated according to the Christian Era); indiction (a fifteen-year—originally five-year—cycle introduced by Emperor Diocletian for the collection of land taxes, initially starting on 23 September, later on 1 September); month and day of the month; day of the week; sun and moon cycles (twenty-eight and nineteen years, respectively); and (rarely) the hour of the day (often referred to according to the liturgical calendar).

8.7. Bookbinding

Almost all preserved examples of Byzantine original bindings are quite late (fourteenth or fifteenth century); hardly any original bindings survive from the first half of the Byzantine millennium (*c.*500–1000). Byzantine bindings show the following distinctive features (Federici – Houlis 1988):

- Byzantine craftsmen preserved the older oriental tradition of unsupported sewing, using one single thread (or even two in some of the earliest examples). The link stitches were usually accommodated into (three to seven) V-shaped grooves (*grecquage*), cut through the spine-fold, which therefore appears completely flat (not all Greek manuscripts have *grecquage*, which is often omitted in paper manuscripts);
- board attachment occurred: (a) by making the hinging loops on one board and proceeding until the end of the text block; (b) by making the loops on both boards, and proceeding towards the centre of the text block, the two halves being then joined together with figure-of-eight stitches ('biaxial stitch disposition'); or (c) by sewing the text block without the boards, which were attached subsequently by making a series of loops thorough sets of holes along the spine edge of the boards. The connexion could be made with the same sewing thread or with a similar one, by drawing a path from one loop to another, across the inner or outer surface of the boards;
- the (mostly rounded) spine is lined with a cloth, extended onto at least one-fourth of the outer surface of the board, glued with starch or animal glue;
- the wooden boards (poplar, conifer, oak or other species) are given the same dimensions as the leaves, and they do not show the slight protrusion adopted in late Mediaeval Latin bookbindings;
- boards may show grooves (of various form) in the three open edges;
- head and tail endbands, extending far over the board edges, are worked with thread on cord (or leather) cores and then attached to the boards by means of sewing through holes in the boards. They can be

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made of natural-coloured thread wound around two overlapping cords or display a colourful chevron-patterned interlace, woven on a single or double support: both types are covered with raised leather caps;
– the fastenings (a single one, or two, or more rarely four), used to keep the volume closed, consist of a metallic peg driven into the edge of the upper cover and a strap (mostly in form of a tripartite slit braid with a final tip) attached through the board at the edge of the lower board.

Coverings are usually made of dark brown or blackish leather, mainly goatskin or sheepskin. The decoration of Byzantine bindings changed considerably throughout the centuries and according to the different geographies. During the early Byzantine centuries (eighth to tenth) geometric designs with blind lines were preferred, and gradually small hand tools appeared with vegetal or animal motifs. During the thirteenth and fourteenth centuries decoration, still accomplished with small tools in blind, became much more elaborate, with new patterns often originating from Europe. The use of centre-pieces and corner-pieces started to appear with some delay in comparison with European binding traditions, but by the end of the seventeenth century most genuinely Byzantine decorative features became extinct and were replaced by Italian or Eastern European type of decoration. Gold tooling was never a preferred technique for the Byzantine binders, with very few exceptions. The leather could be protected by (rarely surviving) metal bosses and corners. The title does not usually appear on the covering, but was usually written in ink on the tail edge. Decoration of the text block edges with rings and interlaces, most often drawn with black and red inks, is another interesting feature of the Byzantine binding.

Sumptuous bindings have been only sporadically preserved, especially those embellished with precious metals, ivories and gems, or covered with silk, velvet or satin damask.

The Byzantine binding tradition survived for several centuries beyond the fall of Constantinople and spread to Armenia, Georgia, and the Slavonic area. It gave rise to Armenian and 'alla greca' bindings, introduced by Byzantine exiles in Renaissance Italy and successfully exported throughout Europe by western craftsmen. These bindings are almost identical to Byzantine ones, except they employ western sewing supports, strong western-style tooled decoration of the leather covers and also hybrid Byzantine–western type of endbands. Thorough examination may reveal evidence of multiple bindings, witnessed by the simultaneous presence of different sets of guards or sewing holes (other than those currently used). More rarely, the comparison between original bindings provides an important clue of provenance and/or for reconstructing ensembles of scattered codices. The description of individual toolings and their groupings opens unexplored research paths, particularly as regards the allocation of groups of bindings related to specific geographical areas (such as Constantinople in the Palaiologan era, the island of Crete, or monasteries such as St John Prodromos of Petra, St John Prodromos at Serres, in Macedonia and St Catherine's Monastery in Sinai) or the reconstruction of specific binding ateliers (and of the scribes' circles connected to them, such as that of the Cretan Michaēl Apostolēs in the second half of the fifteenth century).

Finally, the study of bookbindings may provide valuable evidence for reconstructing the vicissitudes of currently dispersed libraries or collections of codices, or offer clues to the history of the texts, contributing to defining the origin of the volumes to which they belong and to highlighting connexions with specific scholarly circles (as with the aforementioned atelier of Michaēl Apostolēs, which served at the same time as scriptorium, editorial centre and bookbinding workshop).

References

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9. Hebrew codicology (MBA)

9.1. Materials and tools

9.1.1. The finds from Judaean Desert and the Dead Sea Scrolls

The great majority of the literary works and documents found in the Judaean Desert, mainly at Qumran and Masada, are written on leather, parchment or papyrus. In addition, a large number of pottery sherds (*ostraca*) were used for writing documents. Exceptionally, there is the Copper Scroll from cave 3 in Qumran, and there are also two texts written on wooden tablets. Accelerated Mass Spectrometry (C_{14} analysis) has indicated the time range of the Qumran materials to be between 250 BCE and 70 CE.

In the absence of long literary texts surviving from earlier times, the kind of writing materials used in the Pre-Exilic period is not clear. Scholars interpreting descriptions of scrolls and writing in the Old Testament have reached contradictory conclusions: either papyrus or parchment. Scrolls of parchment are less neatly written than the great majority of leather scrolls. It is possible that papyrus was preferred only for private copies of sectarian literary texts (such as those found at Qumran), for later rabbinic legal literature forbids writing sacred scriptures on papyrus, prescribing instead the use of skins. Thus the few biblical papyrus scrolls among the Judaean Desert finds may have originated in a circle that did not comply with the rabbinic tradition. All the Qumran texts that are written in Palaeo-Hebrew are written on skin-based material (Tov 2004, 31–55).

In later centuries, parchment was the overwhelmingly dominant writing material for Hebrew books, being supplanted by paper in the Orient as early as the middle of the eleventh century, but much more slowly in Europe.

9.1.2. Papyrus

Apart from the few dozen Judaean Desert papyri and small fragments excavated in Egypt together with Greek papyri (Sirat et al. 1985), only one large fragment of a papyrus codex has been found, in the famous Cairo Geniza (a depository of worn-out books and documents in the old Jewish synagogue of Ben Ezra in Old Cairo, al-Fusṭāṭ district; see also Ch. 4 § 2.7; Sirat et al. 1985, 69–80).

9.1.2. Parchment

The use of parchment as standard writing material for Hebrew books started probably at the time of the canonization of the Hebrew Bible (roughly around the beginning of the Common Era) and continued until the end of the first millennium in the Orient, and until the mid-fifteenth century in most parts of Europe. The number of surviving dated Hebrew parchment manuscripts that were produced in the Orient is meagre: twenty-eight codices, mostly fragmentary, constituting 8% of the total corpus of dated oriental Hebrew manuscripts. They were all produced before 1327, all of them containing biblical texts except for two eleventh-century Geniza fragments. All extant codices from the tenth century are parchment biblical manuscripts. However, the Cairo Geniza collection and the Firkovitch collections in the National Library of Russia in St Petersburg contain many undated parchment biblical codices, or remains of them, which can be assigned to the tenth and eleventh centuries. The drastic decrease in the use of parchment in oriental Hebrew book production during this period correlates to the same phenomenon in the production of Arabic codices in the Orient.

The ratio of the parchment manuscripts within the entire corpus of dated manuscripts up to 1500 is 43% (71% in the thirteenth century, 54% in the fourteenth century, 34% in the fifteenth century). In the Sephardic zone it is 36% (84% in the thirteenth century, 46% in the fourteenth century, 22% in the fifteenth century); in Franco-German territories it is 82% (100% in the thirteenth century, 98% in the fourteenth century, 51% in the fifteenth century); in Italy it is 59% (98% in the thirteenth century, 82% in the fourteenth century, 51% in the fifteenth century); in Byzantium it is 14%; and in the Orient it is only 8% (in Yemen 13%).

The selection of the expensive writing material parchment was also dictated by the economic capability and social status of those who commissioned the copies, or who copied books for their own use; it was also genre-bound: Bibles, prayer books and to some extent halakhic (legal) corpora were copied on the more durable and prestigious writing material even after the use of paper had spread. Classification of the writing materials by the destination of the books produced does not show that self-produced copies were

made mainly of paper, the cheaper material; however, in all regions (outside the Orient, where parchment was almost entirely abandoned), paper was used twice as much as parchment in user-produced (dated) manuscripts.

Cattle skin of which only one side was processed for writing is called in Hebrew *gevil*. Talmudic instructions require writing the liturgical Tora Scroll on *gevil*, and this dictate persists to this very day. Literary halakhic sources and chemical analyses attest to regional differences in the materials used for the processing of the skins to be made into scrolls, particularly the utilization of tannin in the Orient. No doubt, this kind of analysis can be applied to codices in only a very limited way. Yet it is feasible to grade the kinds of parchment by means of their visual appearance, especially that of the hair sides, which vary from zone to zone (in one specific zone they vary even from period to period). Consequently, these visual differences may serve as a codicological criterion for identifying the provenance of a manuscript (while in Ashkenazic manuscripts they serve for indicating the period as well).

Oriental parchment. Oriental parchment is known from early dated biblical codices and from later Yemenite manuscripts. The method of preparing the parchment makes it difficult to distinguish between the hair and flesh sides, since both sides are glossy and smooth. Nevertheless, it is always possible to identify the sides by their hue, the flesh sides being slightly lighter and brighter than the hair sides. It is obvious that despite the similarity of the two sides, the manuscripts' producers distinguished between them, as the arrangement of the bifolia in a quire and the method of ruling them demonstrate.

Sephardic parchment. The visual features of the parchment used in Christian Spain in the late twelfth century are known from a few dated manuscripts. This parchment is similar to the Italian type (see below), whereas an earlier parchment manuscript (St Petersburg, RNB, Evr. II B 124, the damaged colophon indicates a year dated between 941 and 1039) produced in Kairouan (Tunisia) shows a similarity to the oriental type. The absence of dated parchment manuscripts from Muslim Spain and the Maghreb before the thirteenth century prevents us from establishing whether the oriental-Arabic type had indeed been used there in early times. Later, the appearance of Sephardic parchment changed and it becomes possible to distinguish between the two sides, because in most cases the hair side is not scoured and hair follicles and roots are visible, although in some manuscripts the hair side is scraped and the remains are not visible. The flesh side is very bright and glossy.

Italian parchment. The parchment employed in dated Hebrew manuscripts of Italian origin, from the earliest dated manuscript of 1072/1073 (Vatican City, BAV, Vat. ebr. 31) until the late Middle Ages, typically retains the natural difference between the hair and flesh sides. Their disparity is sharp and easily discernible: hair sides are rough and scraped, yet the follicles and residues of hair roots are visible. Flesh sides are smooth and much lighter than the hair sides. The difference in the appearance of alternate openings in a codex is very conspicuous. Only high-quality manuscripts which were produced during the fifteenth century, more particularly illuminated ones, were written on refined, thin, very light parchment (known from humanistic copies), in which hair roots are not seen, although one can distinguish between its two sides.

Byzantine parchment. The characterization of parchment in Byzantine Hebrew manuscripts is impeded by the small number of dated manuscripts that survive. It seems that this parchment bears a similarity to the Italian type, in that its processing retained the natural differences between the two sides, and thus it allows clear differentiation between them.

Ashkenazic parchment. The appearance of the parchment employed in the German lands and their adjacent territories, and in some variant way in northern France, especially from the last third of the thirteenth century and thereafter, does not resemble parchment types in the other geo-cultural zones; it reflects a shift in the processing technique and in an aesthetic concept of book design. Until this shift, the processing of hides in all areas of Hebrew book production retained substantially or moderately the difference between the two skin sides, and the quire openings were arranged according to Gregory's Rule. Indeed, an appearance like that of the Italian codices is seen in the earliest dated Ashkenazic codices, of the last quarter of the twelfth century, and more distinctly in earlier (but undated) codices. It seems that in Germany, northern France and England, a change in the processing of the parchment had already started to evolve in the late twelfth century, at least as attested by Hebrew manuscripts. The differences between skin sides had gradually been reduced, until they became entirely alike in the last decades of the thirteenth century, most prominently in Germany. It is evident that the parchmenting process aimed at reducing the

difference between the two skin sides by the scraping of both, so that the hair and flesh sides would present a very similar or even identical appearance. Nevertheless, it seems that scribes were well aware of which side was which, as they arranged the bifolia according to Gregory's Rule.

Fig. 1.9.1 Vatican City, BAV, Vat. ebr. 468, La Rochelle, 1215; colophon.

Due to the scarcity of Ashkenazic manuscripts with indications of place of origin, classification by the provenance of these manuscripts (either German lands or northern France) has to be established by their contents, mainly the liturgical rite of prayer books. The examination of the parchment in all dated and localizable Ashkenazic manuscripts reveals a difference between the appearance of the parchment of manuscripts produced in the German lands and that of manuscripts produced in northern France. This difference can serve as a basic criterion for distinguishing between 'German' and 'French' manuscripts, which share types of script and other codicological features. In most of the localized and localizable French manuscripts, it is possible to distinguish between the parchment skin sides either easily or with only some small effort. In many of them, starting from the earliest localized manuscript, written in La Rochelle in 1215 (Vatican City, BAV, Vat. ebr. 468, see fig. 1.9.1), up until 1499, remains of hair roots are visible, and there is not one single French parchment manuscript in Hebrew that is written on entirely equalized skin sides. By contrast, most dated manuscripts definitely manufactured in German lands after 1226/1227, and without exception after 1264, were written on 'equalized parchment', that is parchment with equalized sides. Only with great effort can one distinguish the skin sides in a few manuscripts from the late fourteenth and early fifteenth centuries.

9.1.3. Paper

According to the dated Hebrew codices, the replacement of parchment by paper as the main writing material was a rapid process only in the Orient, already complete in the early eleventh century, but progressing more slowly in Byzantium. Elsewhere—in the Iberian Peninsula and Provence, France, the German lands and Italy—the transition was gradual, as was the development of papermaking, and occurred at a much later date. In the Sephardic zone, paper became the main writing material in the second half of the fourteenth century; in Italy and Ashkenaz (central and northern France, the German lands and their adjacent territories), parchment remained the main writing material until the mid-fifteenth century, while in the second half of that century paper was used as often as parchment (*SfarData*; Beit-Arié 1981; Haran 1985, on literary sources).

'Oriental' paper was used in Hebrew codices in the Orient at least since 1005, which is the date of the earliest extant dated paper manuscript (Cambridge, Cambridge University Library, Taylor-Schlechter 8 Ca.1; Beit-Arié et al. 1997, 15; for documents, paper was in use by 933 at the latest). From that time on, oriental-Arabic paper became the standard writing material for oriental Hebrew manuscripts. Only some dozen fifteenth-century oriental Hebrew manuscripts and a similar number from the first four decades of the sixteenth century were written on European watermarked paper, most of them by Sephardic immigrant copyists. The oriental-Arabic paper that was used so predominantly for oriental Hebrew manuscripts displays several different patterns of laid and grouped chain lines that can be distinguished according to regions and periods of time (see below).

The earliest dated paper manuscript in the Byzantine region was written in Gagra (Caucasus) in 1207, on oriental paper (St Petersburg, RNB, Evr. II C 161). However, very few Byzantine Hebrew manuscripts written on oriental paper are dated; almost all the dated manuscripts are written on European paper.

In the Sephardic region (Spain and the Maghreb), the earliest dated paper manuscript in Hebrew was written in Muslim Valencia in 1119 (St Petersburg, RNB, Evr.-Ar. I 2240), on oriental-Arabic paper

probably produced in Islamic Spain (that the beginning of papermaking employing an improved oriental technique goes back as far as the mid-eleventh century has been proven by commercial letters in Judaeo-Arabic found in the Cairo Geniza). A fragmentary manuscript (St Petersburg, RNB, Evr.-Ar. I 4587) written in 1125/1126, probably in Mahdia (Tunisia), is made of oriental paper (or rather Maghrebi paper produced by the oriental technique). The rest of the dated Sephardic manuscripts up until 1315 were written on pre-watermarked Spanish paper, some of them showing zigzag marks. Since that time, all the Sephardic paper manuscripts were produced on European watermarked paper.

There was, naturally, no utilization of oriental paper in Italy (earliest dated paper manuscript, produced on watermarked paper, from 1276/1277–1284, St. Petersburg, Oriental Institute, B396), nor in Ashkenaz (earliest dated paper manuscript, 1343/1344, private collection, Australia (formerly Jerusalem)). In both areas, the use of paper had been limited at the beginning and spread only gradually. In fourteenth-century Italy, it is limited to 15% of the surviving dated manuscripts, while in the first half of the fifteenth century it grew to one-third, and in the second half of that century it reached about 50% (likewise in Ashkenaz).

There follows a presentation of morphological types of oriental-Arabic paper based on dated mediaeval manuscripts written in Hebrew characters, with a characterization of their patterns according to chronological and regional distribution. In addition, the corpus includes 140 dated oriental manuscripts kept in the Bodleian Library, Oxford, written on oriental-Arabic paper, all of them in the Near East, mostly in Arabic script, but partly in Persian and a few in Syriac script. Altogether, the typology is based on 620 dated manuscripts (and some additional 110 undated ones, many of which are datable).

One should bear in mind the frequent difficulty in identifying the visible structure of the oriental-Arabic papers even in well-preserved manuscripts, as well as the many cases of ambiguous documentation and the inconsistent or contradictory impressions which blur clear and distinctive description. Only a systematic reproduction of the wire patterns of a large number of leaves (or, when it is feasible, unfolded bifolia), such as is obtainable by means of the beta-radiography technique, might provide us with a clearer typology. Regular small-size beta-radiography reproductions have usually been found to supply insufficient information, because of the irregularities inherent in oriental-Arabic paper.

The earliest paper manuscript that was examined is apparently the earliest known (dated) Arabic paper manuscript, from 848, in the Regional Library of Alexandria (Egypt). The only other pre-1000 manuscript examined is dated 983 (Oxford, Bodleian Library, MS. Huntington 228). The earliest surviving dated Hebrew paper manuscripts are from 1005 (a fragment, Cambridge University Library, Taylor-Schlechter 8 Ca.1) and 1006 (a codex, St Petersburg, RNB, Evr.-Ar. I 4520).

The following seven types, mostly in accordance with those pointed out by Jean Irigoin and his colleagues (Le Léannec-Bavavéas – Humbert 1990), can be discerned, outlined and characterized chronologically and, to certain degree, also regionally.

A. Wireless paper

The occurrence of paper of this type in the earliest dated manuscript (Alexandria, dated 848 CE) may very well indicate that early oriental-Arabic paper was wireless or pattern-less. This type of paper, in which no laid or chain lines are visible, was in constant use from the beginning of the eleventh century until the end of Middle Ages. It has been found in a considerable number of manuscripts, produced everywhere in the Near East, but relatively much more frequently in manuscripts localized in Iraq and in Iran, where it can be found in some 18% of the manuscripts that were recorded.

A particular kind of wireless paper showing some ‘chaotic’ patterns and conspicuous fibres was extensively and exclusively used in Yemen from the beginning of the fourteenth century until the introduction of Italian watermarked paper around the middle of the sixteenth century. This peculiar type, found in almost 80% of the 110 dated manuscripts produced in Yemen, was most probably manufactured in that region, as it is not to be found in any other oriental manuscript. The only recorded Arabic codex written in Yemen indeed shows a similar type of paper.

B. Laid lines only

An early type, whose first appearance in our corpus is dated 983, was produced continuously and used extensively until 1500. It was the dominant type until 1250, declining thereafter in competition with the emerging and spreading types with clustered chain lines. Yet the ‘laid lines only’ type still constituted 35%

of the dated paper manuscripts in the second half of the thirteenth century, and about 23% in the following century.

This type was used everywhere, but many of the manuscripts belonging to it were produced in the eastern part of the Near East, namely Iraq, Iran and central Asia, where this kind of paper was the main type from the eleventh century on, constituting an average of about 70% of the dated manuscripts. Thus, lack of chain lines characterizes paper produced in those north-eastern areas. The production of both wireless and particularly 'laid lines only' paper is still attested there in the sixteenth century. The limited use of various types of chain-lined paper in those areas may hint that this kind of oriental-Arabic paper was not produced there, but was imported from neighbouring (western) areas.

C. Laid and chain lines

In many cases, the visible pattern of the chain lines is not clear enough, being seemingly irregular or presenting combinations of more than one type. Two sub-types must be distinguished, the second of which has four sub-sub-types, as follows.

C.1. Single chain lines

Visible chain lines in oriental-Arabic paper are usually clustered in several different groupings. Paper manuscripts showing single chain lines are extremely rare, comprising about 3% of our corpus. This type was found in dated manuscripts from the beginning of the twelfth century (perhaps already in 1048, in a manuscript in which single chain lines seem to be visible, spaced 30–35 mm) until the late fifteenth century. Usually, single chain lines are curved and not evenly spaced. In most clear cases, their distribution is very dense: only 12–25 mm apart. Two cases showing more widely spaced single chain lines (36–40 mm apart) might represent paper produced in North Africa, as might perhaps all the rare occurrences of single chain lines.

C.2. Clustered chain lines

This multi-pattern type emerged clearly at the beginning of the twelfth century, perhaps sometime earlier. Gradually its use increased, equalling the 'laid lines only' paper in the second half of the thirteenth century and becoming the dominant type from the first half of the following century on. This type of paper was hardly found in Iraq, Iran or the Central Asian areas, and never in Yemen after the beginning of the fourteenth century. Everything indicates that it was produced and/or used in the western parts of the Near East—Syria, Palestine and Egypt.

C.2a. Chain lines grouped in twos: This type is the earliest of the 'clustered' kinds of oriental-Arabic papers. Its first clear appearance in our corpus is dated 1119/1120 (Oxford, Bodleian Library, MS. Heb. d. 58). Its peak usage, according to our corpus, seems to have been in the second half of the fourteenth century.

C.2b. Chain lines grouped in threes: This type apparently emerged in the early thirteenth century, although the earliest clear pattern was not found before 1249 (St Petersburg, RNB, Evr.-Ar. I 3911). However, its extensive diffusion came much later: it dominated other types used in the western Orient in the fifteenth and the first half of the sixteenth century (when it remained as the only surviving type of chained paper).

C.2c. Chain lines grouped in twos and threes alternately: This youngest type is attested for the first time in our corpus by an Arabic manuscript dated 1338 (Oxford, Bodleian Library, MS. Arab. d. 223). The late Don Baker, however, noticed it in an earlier Arabic manuscript dating from 1304 (Baker 1991, 31). Only in the second half of the fourteenth century did its spread dominate all other types of paper used in the western regions.

C.2d. Chain lines grouped in fours: This unusual type has so far been noticed, but without certitude, in only two Hebrew manuscripts dating from the fourteenth and the fifteenth century, and clearly only in one Arabic codex, dated 1210 (Oxford, Bodleian Library, MS. Marsh 38). The scarce occurrence may indicate that such a type was produced on a very limited, probably local, scale, or that it has not been properly identified.

Finally, a note concerning the peculiar feature of the splitting of the edges of oriental-Arabic paper sheets. This phenomenon, for which a definite explanation is still lacking, was frequently observed in recently recorded dated manuscripts, both the Arabic ones of the Bodleian Library, and the Hebrew codices of St Petersburg. Among the latter, which were studied more thoroughly, 40% were found to show splitting

edges, or rather *splittable* edges. In some cases, the edges, mainly external corners, were split into three layers.

The phenomenon can be seen in manuscripts as early as the eleventh century until the end of the Middle Ages. It seems that it does not characterize wireless paper at all, including the peculiar Yemenite type, which may refute scholarly suggestions (backed by mediaeval literary sources) that such a paper was manufactured by pasting two sheets together. In solving the puzzle of the splitting, or splittable, oriental-Arabic paper, however, one should pay attention to the fact that a similar phenomenon can also be observed in a few Hebrew manuscripts written in early twelfth-century Spain, or thirteenth-century Italy and Byzantium. Thus, this feature should be studied in comparison to the Occidental-Arabic (Spanish) paper and the pre-watermarked Italian paper (Beit-Arié 1999).

9.1.4. Ink

The Dead Sea Scrolls are written with carbon inks. Five scrolls, among them the Genesis Apocryphon scroll, have considerable amount of copper in addition to carbon in accordance with Dioscorides' recipe. No systematic study of inks in the medieval Hebrew manuscripts has been conducted, However, iron-gall inks have been detected in a number of Ashkenazic and oriental manuscripts.

9.1.5. Writing instruments

Hebrew scribes employed two kinds of pens. One was made of reeds, the other was made of birds' quills (or of bones). Reed pens were used in the Orient; they are attested by documentary sources and already mentioned in the Talmudic literature, and they are still employed by religious 'Sephardic' scribes when transcribing Tora scrolls and legal documents. It seems that the reed pen was used also in Byzantium. Quill pens were used in Ashkenaz (in northern France, England and the German lands). The writing instrument used in the Sephardic areas and Italy requires further study. Sephardic scribes seem to have employed reed pens, and so did Italian scribes until they replaced them with quill pens.

9.2. Book forms

9.2.1. The roll/scroll and the rotulus; the codex

The scroll (i.e. the horizontal roll) was the only book form used by the Jews for their scriptures in antiquity and for literary compositions—as in the Judaean Desert finds—in post-biblical times. It became, and remains to this day, the only form for the liturgical Pentateuch (*Sefer Tora*) in its use for reading in synagogues. A Munich palimpsest (Bayerische Staatsbibliothek, Clm 6315, 29022) in which a sheet of a scroll containing a Hebrew prayer book was reused for a Latin text in the Bobbio scriptorium around 800 attests to the late use of the scroll (Beit-Arié 1967–1968). All references to books in the rich Talmudic literature, both of Palestine and of Babylonia, relate to scrolls; only a few isolated passages use, metaphorically, the Greek term *pinax*, apparently meant to designate a concertina-like manuscript, more like a scroll than a codex.

The revolutionary codex form of book, which was adopted and diffused by Christians already in the first centuries CE, was employed by the Jews only much later. Between the abundant finds of Hebrew books (scrolls) from Late Antiquity and the earliest dated and datable surviving Hebrew codices, there is a salient gap of some eight hundred years, for which almost no evidence of the Hebrew book is found, either in roll form or in codex form. The earliest certainly dated extant Hebrew codices were inscribed at the beginning of the tenth century, all of them in the Orient. However, in the structural, figural, and artistic design of the copied texts, in their harmonious scripts and in the mature employment of codicological practices, these earliest manuscripts demonstrate elaborate craftsmanship and regularity, surely attesting to a long-established tradition of codex design and production.

In fact, the earliest reference to the codex form in Jewish literature does not date from before the end of the eighth or the beginning of the ninth century. Moreover, the earliest term designating a codex (*miṣḥaf*) was borrowed from Arabic and persisted in the Orient for quite a long time. Therefore it seems that the Jews in the Orient adopted the codex only after the Arab conquest, very likely not before the ninth century or a little earlier. The long gap with no evidence of a Hebrew codex until the ninth century can be explained by the basically oral transmission of Jewish literature in the Hebrew language and by the belated adoption of the codex. The long rejection of the codex—rejected despite its being the more capacious, durable and usable form of book, easy to carry about, store and refer to—can be explained by

assuming that the Jews adhered to the scroll form of book in order to differentiate themselves from the Christians, who first used the codex for disseminating the New Testament and the 'Old Testament' translated into Greek (the Septuagint). Indeed, the *Sefer Tora* and some other biblical books are written to this day on scrolls.

Old rotuli (vertical rolls) were noticed in the Cairo Geniza decades ago, but only recently have their extent, chronology and variety of genres been clarified, by Gideon Bohak (2011) and especially Judith Olszowy-Schlanger, who was the oral source for the information which follows. The production and use of these Hebrew rotuli was rather extensive. So far, hundreds of fragmentary vertical scrolls have been recorded, half of them written on parchment and half on paper. They spread mainly in Egypt in the eleventh century, yet some of them undoubtedly date from the time of the birth of the Hebrew codex. They contain a large variety of texts: about half are liturgical, while the rest include Talmudic treatises, halakhic literature, anthologies of biblical verses, dictionaries, glossaries, medicine and magic. About half of the rotuli were copied on the blank side of re-used documents, some of them in Arabic in Arabic script. The sizes of the pieces that were stitched together to form a rotulus are not uniform; their width is narrow and their length varies. It seems that the rotuli, whose production was cheap and rapid and whose form was conveniently portable, were produced by their users—rabbis, scholars, physicians, and magicians—for personal and professional use.

9.3. The making of the codex

9.3.1. The making of the quires

So far, there is no clear evidence for parchment quires having been constructed by folding. But it should be admitted that no systematic observation of this facet has been carried out in Hebrew codicology. However, the odd number of bifolia (five) in the quires of most of the dated Hebrew codicological units thwarts this possibility. Only a few undated early Hebrew oriental codices, produced probably in Iraq prior to the tenth century, show an arrangement of the parchment sides (HHHHH) that also disproves any hypothesis that imposition might have been used, whereas all the dated manuscripts follow Gregory's Rule. Nevertheless, it seems that most of the Hebrew codices imply that quires were composed by stacking bifolia from a pile of already-cut bifolia, picked up at random.

As for the possible preparation of paper quires by folding oriental paper sheets, in most of the early dated Hebrew paper manuscripts the direction of the laid lines in relation to the width of the folium is horizontal. But it is evident that this characteristic was not conditioned by the format of the book or by the number of times the paper sheet was folded. This fact is demonstrated by a comparison of manuscripts whose bifolia are close in size. While two such manuscripts, nos. 60 and 65 in Beit-Arié et al. 1997, show horizontal laid lines, another, no. 57, shows vertical laid lines. Furthermore, an additional manuscript showing single chain lines and horizontal laid lines, no. 61, actually contradicts the horizontal evidence of nos. 60 and 65, because the size of its bifolia—386 × 294 mm—is twice the size of the more or less identical bifolia of the other manuscripts with single chain lines. Thus, although the dimensions of most of the paper manuscripts attest to considerably standardized production sheet sizes before folding and trimming, it seems that the direction of the wire lines was not uniformly maintained in the making of quires from these sheets. This is demonstrated incontestably by codex no. 51, which was written on two different papers of the same size, one showing vertical laid lines, the other horizontal laid lines. The possibility that there were two manufacturer's sizes of paper sheets, one the double of the other, should be considered and verified, or not, by additional data on the dimensions of the oriental papers.

9.3.2. The composition of the quires

In general, Hebrew parchment quires comprise four to six bifolia (only very rarely ternions, of three bifolia), while paper or mixed quires contain four to fourteen bifolia (but usually not exceeding ten bifolia). The only extant papyrus codex (preserved in the Cairo Geniza) contained at least twenty-four bifolia in a single quire. Only in the Orient did parchment and paper manuscripts share the same standard structure, while some of the Franco-German and Italian paper quires were constructed, to some extent, like the parchment quires from the same regions.

Before presenting the typology of Hebrew quire structures, one must draw a correlation between the quire structure and the disposition of the hair and flesh sides within the quire. As already mentioned, all

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the dated parchment manuscripts have quires whose skin sides are arranged for matching at the openings (Gregory's Rule). As the earliest dated manuscripts are from the early tenth century, this practice correlates to the Syriac and Arabic shifts to the same arrangement. However, there are two ways of respecting Gregory's Rule—the outer bifolium starts and ends either with the hair side, or with the flesh side. In most of the Hebrew geo-cultural zones, quires start with hair side, but in Italy, beginning from 1280, the practice of starting with the flesh side spread gradually until it was employed in about 60% of the dated manuscripts of the fifteenth century. At that period, almost all the humanistic Latin manuscripts were arranged likewise, according to the extensive corpus studied by Albert Derolez (Derolez 1984). The wide diffusion of this practice since the second decade of the fifteenth century among Hebrew manuscripts ruled in pale ink, unguided by pricking, and the fact that it was common also in manuscripts copied by immigrant scribes (from France, Germany, Spain and Provence) prompt the question whether ready-ruled quires were manufactured and sold by stationers (see below on pricking and ruling). Strangely enough, starting quires with the flesh side is found in only a small part of the Hebrew codices from the Byzantine zone, where this was the common practice for Greek manuscripts.

In most of the mixed parchment and paper quires, both outer and central bifolia are made of parchment; in about 20% only the outer bifolium is parchment (in Byzantium the figures reaches 36%), and in just a few manuscripts is it only the central bifolium that is parchment. Most of the mixed quires start and end with a parchment hair side, including those produced in Italy. Somewhat more than two-thirds of the combined parchment and paper manuscripts in which the central bifolium is parchment display the hair side at the central openings of the quires.

Ternions are very rare amongst the dated Hebrew manuscripts and are found mainly in Spain and North Africa; apparently they were more common in Toledo—a centre of production of accurate copies of the Bible—between the end of the twelfth century and 1300 (a practice possibly inspired by Arabic scribes, particularly in North Africa).

Quaternions were the standard composition of Franco-German (Ashkenazic) parchment manuscripts, found in almost all the dated codices since the earliest, from the last quarter of the twelfth century, until 1540; about half the dated paper manuscripts share this composition. Quaternions were the most common structure of parchment manuscripts in the Sephardic zone (Iberian Peninsula, Provence and Bas Languedoc and the Maghreb). It was very rare in the Orient, except for paper manuscripts from Iran and Uzbekistan, according to localized or localizable manuscripts (the numbers of which are rather limited), where it seems to have been the standard composition. This conclusion is verified by the data on the quiring of Arabic and Persian paper manuscripts from the second half of the thirteenth century. The earliest Persian Hebrew manuscript (Oxford, Bodleian Library, MS. Poc. 96) is dated 1190, but most such manuscripts date to the fourteenth and fifteenth centuries. In Italy, this composition was rather rare, but from the last decade of the fourteenth century it was used in 15% of the parchment manuscripts, most of them produced by Ashkenazic and Sephardic immigrant scribes who settled in Italy in the wake of the expulsion from France and the persecutions in Spain in 1391.

Quinions were the standard composition in the Orient since the earliest dated codices, regardless of the writing material. The same is found in Arabic manuscripts as well as Syriac and Coptic paper manuscripts. This is also the quiring practice found in Italian manuscripts since the earliest dated manuscripts of the eleventh century and later, and in 30% of the dated paper manuscripts of the fifteenth century.

Senions are not common in parchment codices, but are notably employed in paper ones. In the Iberian Peninsula and Provence, senions were a secondary composition in parchment codices since 1275, yet they were used until 1500 in only 15% of them. Senions were used in about 45% of the dated paper manuscripts in the Sephardic zone, and in half of the dated Byzantine manuscripts. They are found in a quarter of the Italian paper manuscripts, but only in very few oriental manuscripts. All these data are from manuscripts whose quire structure is uniform and which survive completely rather than only as fragments.

The compositions of seven to fourteen bifolia were used only in paper quires and in mixed quires of parchment and paper in the Sephardic zone, Italy and the Byzantine zone. All of them were used only occasionally, except for the eight-bifolium quire, which was relatively common in the fourteenth and fifteenth centuries in those areas.

The technique of constructing paper quires by adding protecting outer and central parchment bifolia, as a compromise between the durable but expensive parchment and the more vulnerable but cheaper paper,

is not attested at all in the dated oriental Hebrew manuscripts, whether commissioned or self-produced. Notwithstanding the fact that the earliest mixed-quire manuscript, dated 1212 (Frankfurt, Universitätsbibliothek, Heb. 4º 2), was copied in Alexandria, it betrays a Byzantine codicological book craft. Perhaps the speedy replacement of parchment by paper as the main writing material can explain its composition. The practice of using mixed quires was widespread in Byzantine Hebrew codices: one-third of the dated paper manuscripts in the fourteenth century and nearly the same percentage in the fifteenth century have mixed quires. In the Sephardic zone, where the earliest extant sample from Spain is dated 1225 (Jerusalem, NLI, Yah. MS Heb. 1), mixed quires constitute one-third of the dated paper manuscripts in the fourteenth century, and only 10% in the fifteenth century. In Italy, half of the small number of surviving dated paper manuscripts of the fourteenth century show mixed quires, and one-fifth in the fifteenth century. Thus, unlike the situation in Latin manuscripts, the technique was not adopted by Ashkenazic scribes and copyists, who replaced parchment with paper very late.

Finally a remark about a practice witnessed in paper manuscripts, which can be viewed as a reduced and minimal variant of the mixed quires (known also from papyrus codices), namely the placement of a narrow strip of parchment in the central fold of a quire and on its outside fold; usually this strip is pasted onto the paper and sewn in order to reinforce the folds and protect the quire from the sewing thread. The practice is found in Hebrew manuscripts produced in the same areas where mixed quires were used, namely the Byzantine zone, the Sephardic zone and Italy (the earliest manuscript of this kind is a Sephardic codex dated 1282, London, BL, Add. 27113).

9.3.3. Pricking and ruling

The practice of using ruled lines to guide the writing of Hebrew manuscripts is old, predating the birth of the codex. It was employed already in the Judaean Desert scrolls, in dozens of which it has been observed. However, the ruling lines were guided not by pricks, but by dots, or sometimes strokes, written in ink. Pricking for guiding the drawing of the horizontal ruling lines and the vertical bounding lines on the codex page was employed in almost all the parchment Hebrew manuscripts that were ruled in hard point or plummet, in all regions and periods. Only in early oriental paper manuscripts, which were ruled in hard point—like the early parchment manuscripts—, pricking was also employed. This technique of ruling was shared between parchment and paper codices for the most part only during the first century of the Hebrew paper codex, that is during the eleventh century (it reappears again in the late twelfth century). The ruling technique of oriental paper codices was radically and rapidly transformed in the first third of the twelfth century, at the latest, by the use of the ruling board, which did not require any pricking. Outside the Orient, complete sets of pricking were applied only rarely in paper manuscripts.

In most dated manuscripts, pricking was applied to all the folded leaves of each quire concurrently, not only to reduce labour time but no doubt also to ensure ruling uniformity. When the ruling unit comprised an unfolded bifolium—the smallest codicological component—only the outer margin of a folded quire was pricked (fig. 1.9.2), and the horizontal lines were then ruled across the unfolded bifolia. When the ruling unit was a single leaf, or several leaves (or a page), both inner and outer margins had to be pricked, and horizontal lines were ruled across each leaf or page separately.

In the Orient, Byzantium and Italy, the pricking was confined to the outer margins. Manuscripts written by Maghrebi or Spanish scribes in the early period working in the Orient, and some of the manuscripts written in Italy by Ashkenazic and Sephardi immigrant scribes, were pricked in both margins. Since the twelfth century, pricking in both margins was the standard practice in the Sephardic zone and was dictated by the system of ruling the two leaves of a folded bifolium at once. The earliest manuscript to have been pricked in both margins was produced in the Maghreb by a scribe from Libya in 1123 (Cambridge, University Library, Taylor-Schlechter F2(2).60 + London, BL, Or. 5558A f. 17 + Oxford, Bodleian Library, MS. Heb. b 1, ff.10-20), and after that date all the extant Sephardic dated manuscripts until 1279 are pricked also in the inner margins. The earliest Sephardic codex (apart from the Kairouan manuscript) whose pricking is only in the outer margin is dated 1271 (Cincinnati, Hebrew Union College, 563), and after that date single pricking (and the ruling method associated with it) was employed in about one-third of the Sephardic manuscripts, while the old pricking practice (and the ruling) continued to characterize the Sephardic book making.

Pricking both inner and outer margins became the standard practice for most Franco-German manuscripts (unlike Latin manuscripts) from the late thirteenth century. The shift from outer-margin prick-

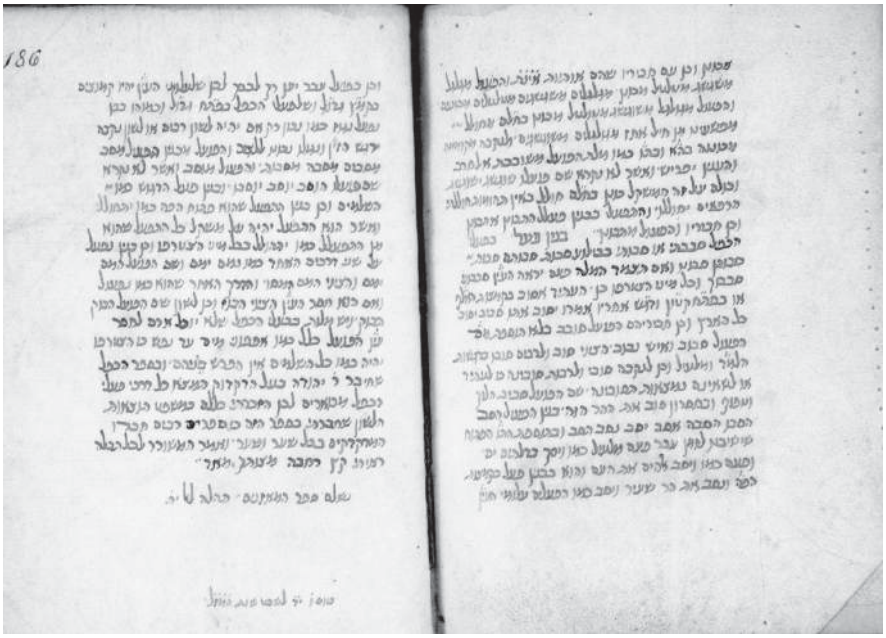

Fig. 1.9.2 Paris, BnF, Hébreu 1221, copied in Italy, 1285–1287, ff. 185v–186r, showing pricking on the outer margins.

ing only, the old standard practice, to outer- and inner-margin pricking, with a concomitant change in the method of ruling, was gradual, and it was associated with the shift in parchment processing (mentioned above), whereby the skin and hair sides became increasingly indistinguishable, or even identical. The additional pricking of the inner margin emerged, at the latest, at the end of the first third of the thirteenth century. The earliest manuscript (private collection of David Sofer, London) which displays a complete pricking of both margins, as well as the new method of ruling and the new appearance of the parchment, is dated 1264. According to the only surviving dated manuscript produced in England before the expulsion of the Jews at the end of the thirteenth century, written in 1189 (London, Valmadonna Trust Library, 1), and a few undated manuscripts, Hebrew manuscripts produced there adopted the English two-margin pricking which became the standard practice after the Norman conquest. Again the shift to pricking both margins was required by a change from blind ruling of unfolded bifolia to coloured ruling of individual pages. However, the one-margin pricking did not disappear, and almost half of the dated Ashkenazic manuscripts in the fourteenth and fifteenth centuries were pricked in the outer margins alone, although they were ruled with plummet.

In some manuscripts, mainly in the Ashkenazic zone, the vertical row of pricks itself has a guiding ruled line to guarantee a straight row. An oriental example of this device can be found in a manuscript copied in Yemen in 1299 (San Francisco, CA, Sutro Library, WPA 106).

A custom that pertains to pricking which is characteristic of Ashkenazic manuscripts is double pricks for special lines—one or two or three lines out of the three upper, three central and three bottom lines. The lines that were pricked by double pricks are ruled as through lines; thus the practice was intended to mark them and remind the scribe while writing. The practice occurs both in manuscripts which were ruled in hard point, and in manuscripts with coloured ruling, particularly in Gothic (Latin) and Hebrew manuscripts, in which the grid structure was emphasized. Almost half the parchment Ashkenazic manuscripts display this practice (46%).

Finally it is worth mentioning the phenomenon which has been recently discovered of marginal single pricks, that are probably related to ruling with ink (see B.3 below).

Ruling already guided the regularity of writing in even and straight lines already in the ancient Near East and on ancient Crete, as is already noticeable on Sumerian, Akkadian and Babylonian clay tablets written in cuneiform script, where the lines are incised, and similarly on clay tablets inscribed in Mycenaean B script, where the lines are in relief. The Judaean Desert scrolls were ruled in hard point, and the Talmudic law requires, according to earlier Tanaitic (post-biblical) sources, that Tora Scrolls should be ruled in blind ruling.

In a considerable number of manuscripts (*c.*14%), no ruling is visible; or, more frequently, they only have frame ruling that demarcates the written area, or just vertical bounding lines. Most of these manuscripts were written on paper in the Orient in early times; yet some of them were produced later in Europe by copyists transcribing texts for their own use. When the written lines do not correspond one to another on the two sides of a leaf, and their number is not identical, one can infer that indeed no horizontal lines

were ruled. Of these 'sloppy' manuscripts in which only the vertical boundary lines (or the frame, or portal) were traced, 3% are parchment and 11% are paper manuscripts (not taking into account oriental Cairo Geniza fragments). It is no wonder that so many paper manuscripts, chiefly those produced for self-consumption, were ruled in a reduced manner. Apparently, ruling required proficiency and time, and its cost in the calculation of the prices of commissioned books constituted a considerable part of the expenses of production, as attested by a unique list of the detailed costs of writing material, ruling and copying, written in Venice in 1393 by the scribe of a commissioned paper manuscript (Moscow, RGB, Guenzburg Collection, MS 666) at the end of his work. According to this evidence, the cost of ruling—which may have not been executed by the scribe—was twice as high as that of the paper. Parchment manuscripts in which the ruling is easily observable show many variations in and modifications of patterns, which suggests that the scribes themselves executed the ruling. If so, then it would seem that specifying the cost of ruling—which was surely simpler to do on paper than on parchment—implies that the job was handed over to be executed elsewhere. However, in some manuscripts there is evidence that they had been ruled beforehand, in a pattern not suited to the copied text, and consequently the scribe had to adjust the ruling, convert one column into two columns, or vice versa, extend the lines, etc.

The wide dispersion of the Jewish communities engendered the employment of a large variety of ruling techniques and systems over the six centuries of extant dated Hebrew codices. In general, they can be classified into two main kinds of techniques: one is the technique of relief (or blind) ruling, and the other is the coloured techniques. Relief ruling was made either by a sharp metallic instrument such as a hard point, a knife or a stylus, or by ruling boards; in the Orient, the boards held cords and were used for ruling paper manuscripts, while in Europe they were allegedly made with strings and were sometimes used for ruling parchment as well as paper manuscripts. The shared feature of the two kinds is the reduced presence of the scaffolding of the grid area and the time saving process by which more than a page or one side of an unfolded bifolium is ruled in one go: namely, either the back of the prime ruling unit, or, in case of hard point ruling, even several leaves or unfolded bifolia at once.

The other techniques used by Hebrew scribes include ruling with metallic plummet, engraving plummet and, only later, in ink.

The various ruling techniques can otherwise be classified from the viewpoint of the ruling guidance method. We can distinguish between rulings which are guided by prickings and those which are guided by ruling boards. The oriental ruling board is mentioned in mediaeval sources, with some specimens surviving. The European boards are attested only in sixteenth-century written sources, but their use can be detected in many paper and some parchment manuscripts which do not show any traces of guiding pricks (particularly in the inner margins, as those in the outer margins were prone to loss through trimming) and yet are ruled by blind ruling leaf by leaf.

In general, Jewish scribes first employed relief ruling, while coloured ruling was employed later on, in the Ashkenazic zone, and still later in Italy.

A. Relief/blind rulings

A.1. Ruling in hard point (dry point)

Relief ruling in hard point was the standard technique in the early Hebrew parchment codices in the Orient, and in early paper codices as well. It was the current technique in parchment codices also in the west, including Byzantium, Italy, Ashkenaz and the Sephardic zone, and in most of these areas it remained so until the late Middle Ages. This technique was always guided by pricking.

A.1a. Ruling in hard point of each unfolded parchment bifolium on the hair side: Such ruling had to be executed before assembling the quire. The ruling was guided by outer-margin pricking, which was made—as far as we can judge by the shapes of the pricking slots and the track patterns of their rows—on all the leaves of each folded quire in one go, while it was arranged according to Gregory's Rule. Thus the pricking process contradicts the ruling process and we must infer that first the quire was assembled according to Gregory's Rule for the pricking, then disassembled for the sake of the ruling, and finally reassembled, again following Gregory's Rule. Each opening displays not only the same parchment skin side on facing pages, but also the same ruled sides, either furrows (on hair sides) or ridges (on flesh sides), alternately. This complex process seems ergometrically strange and uneconomical, but it demonstrates the preference for aesthetic considerations over ergometrical convenience and saving time.

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This system was the standard ruling practice in Italy since the earliest manuscripts of the eleventh century; moreover, until the 1380s it had been the only practice. Only in the fifteenth century, following the spread of ink ruling from the 1430s on, the use of hard-point ruling decreased, particularly in the second half of the century. In the Ashkenazic territories, the technique was the only practice that suited parchment with easily distinguishable sides, until the last third of the thirteenth century; then the coloured ruling in plummet and prickings in both margins and the use of equalized parchment started to spread. In the Sephardic zone, this system of hard-point ruling together with pricking was employed in many manuscripts only from 1271 and later, while ruling leaf by leaf in some manuscripts can be observed since 1198. However, as we shall see later, until 1270 (and quite considerably also in later times) the standard system was ruling two consecutive leaves at once.

A.1b. Ruling in hard point on each unfolded bifolium on the flesh side: In the Orient, too, the practice of hard-point ruling on each unfolded parchment bifolium guided by outer-margin prickings was employed, but always on the flesh side, unlike in Europe and the Maghreb. This is a unique codicological practice that enables us to identify the provenance of manuscripts and fragments written in non-localizable script. Ruling on the flesh side characterizes almost all the Latin manuscripts written before the eighth century and produced probably in the Orient.

A.1c. Ruling in hard point on each unfolded paper bifolium: Early oriental paper manuscripts of the eleventh century were pricked and ruled in hard point, apparently like parchment manuscripts. Yet the bifolia within the quire were not arranged by corresponding ruled sides after being ruled; instead, the scribes of the eleventh century arranged the bifolia in such a way that all rectos of the first half of the quire and all versos of the second half display furrows, and furrows face ridges. Only at the end of the twelfth century did one scribe who produced several dated pricked and ruled paper manuscripts in Cairo arrange two manuscripts so that furrows face furrows and ridges face ridges.

A.1.d. Ruling in hard point of successive parchment leaves in one go on the hair side: An economical method of implementing hard point ruling is manifested in many manuscripts produced in the Sephardic areas. Successive leaves, while they are arranged in corresponding sides within the quire, are ruled in one go, the primary page always showing the hair side. The ruled sides in the opening pages do not correspond. The usual number of leaves ruled together is two; the hair-side recto of the first leaf of the pair displays the furrows executed by the direct blind ruling while the flesh-side recto of the second shows the indirect furrows. In a few manuscripts produced in Spain it is possible to discern more than pairs of leaves, even up to an entire quire, as is the case with Latin manuscripts until the Carolingian period. In a few cases ruling was also done on successive bifolia. The ruling of pairs of leaves implied pricking both margins, while the ruling of pairs of bifolia required only outer pricking. The economical Sephardic system characterizes the book production of parchment manuscripts in Spain, Provence and North Africa from the last three decades of the thirteenth century. However, the system was practised about three hundred years earlier as it is attested by a manuscript produced in Jerusalem in 988/989 (St Petersburg, RNB, Evr. II, B 39) and two others produced in Palestine in the third decade of the eleventh century by Maghrebi scribes (St Petersburg, RNB, Evr. II, B 88, dated 1020/1021 and Cairo, Karaite Synagogue, dated 1028). The system was practised in Visigothic Latin manuscripts.

The ergometric advantage of ruling four (or multiples of four) pages at once had also its disadvantage: in many manuscripts we can observe that the secondary, indirect ruling, particularly on the fourth page, is hardly visible, so much so that the scribe had to re-rule it, partially or entirely.

A.1e. Ruling each leaf by means of pricking and hard point: This laborious system is found in a small number of the parchment manuscripts produced in Byzantium and in the Sephardic areas (including manuscripts written by Sephardic immigrants in Italy and Byzantium) from the mid-fourteenth century and later. Many Spanish manuscripts ruled leaf by leaf were pricked in both margins. Some that were not pricked at all must have been ruled by means of a ruling board of some kind. Apparently, ruling each leaf in hard point was the standard system for all the Hebrew paper manuscripts ruled by a relief technique in all geo-cultural areas, apart from the Orient. The fact that none at all of the oriental paper manuscripts was pricked implies that they were ruled with a ruling board or template (method A.2).

A.2. Relief/blind ruling with ruling boards or templates

The other kind of relief (or blind) ruling was not guided by pricking, but was executed by means of ruling boards that ruled leaves mechanically; or possibly the ruling was executed by means of templates

Fig. 1.9.3 A student's model of ruling board (*misṭara*) preserved in the Cairo Geniza, Cambridge, University Library, Taylor-Schlechter K11.54.

that guided the tracing in hard point of some sort. Most oriental Hebrew paper manuscripts were ruled by means of a ruling board, on the verso pages. The nature of the ruling board is known to us through Jewish and Arabic literary sources, as well as by finds of such boards from the mediaeval period and the existence of modern boards. The use of ruling boards in Europe is deduced on the basis of observation and is known from textual evidence in sixteenth-century printed manuals on calligraphy. (To the category of mechanical ruling one can add the technique of coloured ruling executed by means of an instrument whose nature is not clear, ruling in pale ink a group of several lines in one go; see method B below.)

The oriental ruling board—*misṭara* in Arabic, *kanna* in mediaeval Hebrew sources—was made of cardboard or wood; one such board was brought from Yemen at the end of the nineteenth century by German geographers and is now in the Israel Museum. Indeed, in recent generations, Jewish scribes in Yemen were witnessed ruling paper manuscripts with a *misṭara* made of wood (fig. 1.9.3). Cords were threaded into grooves and stretched across the wood, forming ridges in accordance with the ruling needed for the desired *mise-en-page*. The scribe would place each leaf of the manuscript on the board and rub it with the thumb along the cords, which consequently left their impressions in the leaf. Strangely enough, the same kind of ruling board is still used in the western Siberian scriptoria of the Old Believers. Samaritan scribes in Nablus, as well as a single Syriac scribe in a monastery in Jerusalem, use to this very day a similar device, made of cardboard.

That such a device was employed by oriental Jewish scribes in the Middle Ages is clearly proved by a student's model of such a board that was fortunately preserved in the Cairo Geniza and presently is kept in the Cambridge University Library among the Geniza fragments. This model board was made by gluing together used leaves of paper inscribed with Coptic writing. The threads, pulled into two rows of grooves, were glued to the surface of the board. On its other side the board was labelled in Judaeo-Arabic 'a practise *misṭara*', a term mentioned already by Maimonides, in a work that appears in book lists in the Geniza manuscripts. Most oriental Hebrew paper manuscripts were ruled by *misṭara* on the verso pages.

It is easy to recognize this technique of ruling. First, there is no guiding pricking. Second, the ruled lines are not deep and narrow (as are the lines ruled in hard point), but wide and rather flat, and often they are not straight, but tend to be slightly curved. Third, in some manuscripts it is possible to see the impression of the twisted fibres of the cords. Fourth, an identical pattern is repeated page after page. And finally, the horizontal lines never exceed the boundary lines.

The earliest dated manuscript ruled by means of a ruling board dates from 1131 (St Petersburg, RNB, Evr.-Ar. I 1679). Oriental scribes and copyists invented an efficient ruling technique which considerably reduced the time and cost of producing books made of paper, a mechanical device that later on was imitated in Europe.

In fact, it seems that a relief ruling board of some kind that enabled quick, uniform and economical ruling was employed in Europe as well, but unlike in the Orient, it is not attested in written sources earlier than the sixteenth century. Moreover, none of the actual devices is known to have survived. Evidence for the use of a ruling device in European Hebrew manuscripts is the occurrence of a certain kind of ruling in the manuscripts. The conclusion that certain parchment manuscripts were ruled by a ruling device does not stem from the appearance of the traced lines, as it does in the case of oriental paper manuscripts, but from the simple fact that while these manuscripts are ruled leaf by leaf, there is no trace of any guiding pricking

in them. Ruling of leaf units without the use of a mechanical device requires pricking in both the outer and the inner margins. While outer margins may have been trimmed over the years, inner margins stayed intact. The absence of prickings in the inner margins of a manuscript indicates that it must have been ruled by the 'mechanical' means of a ruling board, or perhaps a template of some kind. The phenomenon is prominent in the Iberian Peninsula and appears in 87% of the paper manuscripts of the fourteenth and fifteenth centuries. It is found in about two-thirds of the Byzantine paper manuscripts and in almost one-third of the parchment ones, and in about half of the Italian paper manuscripts and some parchment ones.

The ruled lines that result from this method in the European manuscripts are thin and straight, and seem to have been executed with metallic wires or thin strings (rather than thick cords as in the Orient). Indeed, according to a sixteenth-century Spanish calligrapher (citing in 1550 a book printed in 1531), the ruling board was made of wood on which strings for musical instruments were stretched, over which a leaf or bifolium was placed and then rubbed with a cloth.

B. Coloured ruling

The adoption of coloured ruling—executed with plummet or, later on, with ink—was a revolutionary turnabout in the book craft in all the codex civilizations that adopted it, despite its being an ergometrically regressive step. The main change was the shift from the economical technique of the blind ruling system, by which it was possible to rule two sides of one or more leaves or bifolia in one operation, to a technique that required separately ruling each page or each side of a bifolium. However, the coloured-ruling technique enabled flexibility of the ruling pattern and thus of the disposition of the text, while hard-point ruling imposed a uniform layout, at least for the pages that were ruled together.

B.1. Plummet ruling

The use of plummet for tracing lines emerges in Latin manuscripts as early as the late eleventh century. Beginning in the twelfth century, it became a widespread practice everywhere (except in humanistic manuscripts in fifteenth-century Italy). In oriental Christian Syriac manuscripts, the employment of plummet preceded its use in western Christian manuscripts. The vague information on this topic was recently corroborated by Sebastian Brock in his catalogue of the Syriac fragments in St Catherine's Monastery in Sinai (1995a). Brock indicates that plummet was used in many fragments, initially—i.e. from the sixth century—only for vertical lines, then later on for full ruling (first found in an eighth- to ninth-century fragment).

Hebrew scribes in Europe started to employ plummet, gradually and hesitantly, about one hundred years after Christian Latin scribes had adopted it, at first in the Ashkenazic zone, and later, only partially, in Italy and Spain, but never in the Orient and Byzantium. The delay in using the new instrument seems to have stemmed from the halakhic context. The spread of the use of plummet in Latin Europe during the twelfth century raised the question among the rabbinical authorities as to whether it could be used in ruling the ritual Tora Scroll, which had to be ruled—and for about one thousand years had indeed been ruled—by blind ruling and not by coloured ruling. The plummet substitute was rejected by all the Jewish authorities in France, Germany and Provence. It is likely that the rejection of the use of lead plummet in the liturgical scrolls deterred scribes from using it in codices, at first. But the avoidance of plummet ruling subsequently evaporated gradually: initially it was in partial use, in the earliest extant dated codices from France and Germany, since the last quarter of the twelfth century, until it became widespread there in the last third of thirteenth century.

It is possible that the gradual acceptance of the metallic plummet, in spite of everything, was promoted by literary developments and scholarly needs. The adoption of the use of plummet matched the emergence of many glossed works, multi-layer texts and commentated Bibles in the thirteenth century, culminating at the end of the century. These popular copies required a dynamic, changing ruling which the hard-point technique could not provide, whereas plummet ruling did. Perhaps it is no coincidence that the emergence of the twelfth-century Latin glossed Bible coincided with the spread of the use of plummet in Latin manuscripts.

At the beginning, the use of plummet in Hebrew codices was only partial, used mainly for reinforcing invisible lines traced in hard point. Sephardic scribes too employed plummet in the same manner, using it to reinforce vertical bounding lines in manuscripts ruled by hard-point ruling of two leaves at once, where the original ruling was unclear on the fourth or the third page.

In France and in the German lands, complete plummet ruling spread while being associated with the shift in pricking and in the visual appearance of parchment skin sides. In the fourteenth and fifteenth centuries, 94% of parchment manuscripts were ruled by using plummet, either page by page or each bifolium on both sides separately. Apart from the secondary use of plummet for reinforcing the more economical blind ruling practised in Sephardic parchment manuscripts and in other areas (apart from Ashkenaz), plummet ruling was used in some manuscripts in Italy, mostly by immigrant Ashkenazic scribes. Yet, another application of the metallic plummet ruling spread in a limited diffusion, combining the old economical relief ruling with the new coloured ruling, perhaps using a different sort of plummet.

B.2. Ruling by engraving plummet

In certain Ashkenazic and Sephardic parchment manuscripts, and particularly in Italian manuscripts, one notices that the direct ruling is executed by a sharp plummet on one side of each unfolded bifolium or of each leaf, like the Ashkenazic plummet ruling; yet the ruling on the other side of the bifolium or leaf is not coloured at all, but displays the ridges of the direct ruling. In other words, the metallic plummet technique was employed like the system of hard point. Julien Leroy (1976) reported that a few dozen Greek manuscripts from Byzantine Calabria were ruled by plummet used as hard point (or by hard point reinforced by plummet or ink). Such a mixed technique was perhaps created as a compromise between the old technique and the new one, mainly in Italy, where the mixed technique was quite extensively used. The codicological practices employed in Italy were quite conservative, undergoing no transformation until the 1430s, unlike the case with Latin manuscripts. The use of plummet enabled some of the Italian scribes to adhere to the traditional relief technique and at the same time use the new instrument. Indeed, in some Italian manuscripts, part of the quires were ruled by the engraving plummet and some entirely by hard point, which implies that plummet was regarded in Italy as a relief instrument. It seems that there were two kinds of plummet; and indeed several recent scientific analyses have detected in different samples of plummet different chemical elements that had been mixed with lead, which is the main component of the plummet.

The earliest dated manuscript ruled entirely by the engraving plummet was produced in Lisbon in 1278 (Oxford, Bodleian Library, MS. Can. Or. 67). A German manuscript from 1286 (Paris, BnF, Hébreu 1-3) is pricked in both margins in accordance with the new practice, which fits the use of plummet, and was ruled page by page by means of sharp plummet. In Italy, the sharp plummet was first put to use in a manuscript of 1304 (London, BL, Add. 9401-9402); however, like the 1286 manuscript, this one too was ruled on both sides of the bifolia. Soon thereafter, in 1311, in Tarquinia, we find the earliest Italian manuscript (Paris, BnF, Hébreu 81) ruled entirely by the engraving plummet, on the hair sides of the unfolded bifolia, as if the ruling had been done in hard point.

B.3. Ruling with ink

The employment of coloured ink for drawing lines guided by pricking spread in Latin manuscripts during the thirteenth century, about two hundred years after the beginning of the use of plummet. This technique was never used by mediaeval European Hebrew scribes (yet some of the Judaean Desert scrolls are ruled with diluted ink). In Hebrew manuscripts showing ruling executed with ink, it is not the coloured ink characteristic of Latin manuscripts, particularly Gothic ones, but a very light, diluted ink. In these manuscripts, the horizontal ruling was not guided by pricking. This kind of ruling appeared only in Italy, not before the 1420s, and was implemented in parchment and paper manuscripts alike, page by page. Naturally, then, this kind of ruling serves as a useful and reliable codicological criterion for localizing and dating manuscripts in which it is found.

In the first decades of its emergence in Italy, ink ruling was employed only to a limited extent in comparison to the other techniques, especially the hard point ruling that was the standard method until the middle of the fifteenth century. In the twenties and the thirties of that century, only a few manuscripts were ink-ruled; in the forties, the rate was some 22%, in the fifties 16%, in the seventies 50% and then about the same until 1500. In 84% of the ink-ruled manuscripts, only the horizontal lines were traced with ink, while the vertical lines were added with plummet, clearly at a later stage, while copying, as blank ruled pages attest. As mentioned above, ink ruling was not guided by pricking, yet the vertical bounding lines, ruled with plummet, were guided by a single prick in the upper and lower margins, reinforcing the suggestion that the ruling was executed in two stages.

In the beginning of the 1980s, Albert Derolez, while documenting 1,200 humanistic parchment manuscripts, noticed a single prick that does not correspond to any of the horizontal lines that usually occur in the outer margins of ink-ruled manuscripts which do not have pricking. He suggested the existence of an unknown ruling device which guided in a mechanical way the drawing of the horizontal lines. This instrument required minimal pricking to guide its positioning. Derolez further suggested that ink-ruled quires were mass produced and commercially marketed. His assumption was supported by the inventories of Italian Renaissance *cartolai* which listed ruled quires. Meanwhile, more documents have been found to substantiate this evidence. Ten years earlier, Malachi Beit-Arié offered a similar suggestion concerning the marketing and consumption of ruled quires due to the mobility of members of Jewish society. The puzzling fact that more than half of the ink-ruled manuscripts produced in Italy were written by Sephardic and Ashkenazic immigrant scribes from Spain, Provence, France, and the German lands—where ink ruling was not practised at all—led to the assumption that scribes purchased ruled quires or were supplied with them by their patrons, a supposition which might explain the sweeping adoption in Italy of the local practices both in ruling technique and in using quinions.

If these arguments consolidate the assumption of mass production, marketing and consumption of ruled quires, then we see here the precursor of mechanical mass production of an important part of bookmaking before the invention of mechanical printing. Yet, such an assumption, as well as the hypothesis of an obscure and enigmatic ruling instrument, arouses doubts. To begin with, if ruled quires were marketed, we should expect to be able to detect among the many hundreds of documented Hebrew manuscripts some clusters of codices sharing an identical disposition of the ruling, pattern and size. But in fact we find a large variety of patterns, spacing between lines and numbers of lines which do not group even in the same locality, time and genre. Furthermore, ink ruling appears also in multi-layer texts, like commentated works, which require a dynamic and changeable ruling.

No doubt ruled quires were sold by *cartolai*, both wholesale and tailor-made. But it is possible that some scribes used some 'enigmatic instrument' for ruling their own quires. Whether ruling by ink was a scribal initiative or a commercial enterprise, it is still unknown whether it was executed by means of a mechanical device or by means of a template of some kind, which guided the ruling only line by line, as implied by the lack of uniformity in line lengths. If the latter possibility is correct, then we should acknowledge the superiority of the oriental scribal inventiveness, which initiated mechanical ruling long before the European scribes did.

9.3.4. Ordering systems

Hebrew scribes and copyists employed various systems for ensuring the correct order of the codex based on numbering the quires in Hebrew letters, or on the repetition of the last copied words, in two variations, and by marking the central opening of each quire.

The dated Hebrew manuscripts of the tenth century do not contain any ordering system, probably due to the fact that all of them are copies of the Bible: the scribes of this early period of the Hebrew codex were no doubt deterred from adding anything to the Masoretic text. (The absence of signatures in the earliest copies of the Qurʾān may be due to similar considerations.) Indeed, a few undated non-biblical codices that probably an-

Fig. 1.9.4 Signatures at the head of quires, MS Jerusalem, NLI, Heb. 8º2238, (Iran), 1106/1107, ff. 16v–17r.

tedate the tenth century do contain quire catchwords, and traces of sheet signatures were found in a fragmentary scroll from Qumran. However, from the beginning of the eleventh century, both signatures and catchwords appear in oriental Hebrew manuscripts, and in codices produced in all other geo-cultural areas. Moreover, both systems could be used in one and the same book. In Ashkenazic manuscripts, however, signatures are extremely rare.

Quire signatures appear for the first time in dated manuscripts in the earliest extant paper codex, written in Fusṭāṭ (Egypt) in 1006 (St. Petersburg, NRB, Evr.-Ar. I 4520). It is a Karaite codex written in Judaeo-Arabic, which also contains, for the first time, catchwords (Beit-Arié et al. 1997, 16).

The appearance of signatures in a manuscript (containing the Prophets, in Cairo, the Karaite Synagogue, see fig. 1.9.8) written, according to a long colophon, in Tiberias (Palestine) in 894/895 stands at variance against all the biblical codices from the tenth century, thus adding a codicological doubt to philological doubts that have been raised concerning the authenticity of the colophon. Indeed, a C_{14} test conducted at Oxford University yielded a dating range between 990 and 1160 (with a certitude of 95.4%). Since the codex was repaired in 1129/1130, it must have been written before, most probably at the end of the tenth century or early in the eleventh, when biblical manuscripts started to be equipped with means for ensuring the right order of the quires. The same codicological argument relates to another biblical manuscript that apparently has a record of sale dated to the year 847 (St Petersburg, Oriental Institute, D62). The occurrence in it of quire signatures is one of several reasons to doubt the authenticity of the record of sale.

Fig. 1.9.5 Double pricks for special lines (through lines), Vatican City, BAV, Vat. ebr. 438, f. 107v.

Numbering quires was the commonest ordering system in use in the early periods, since the beginning of the eleventh century, but it is absent from the early manuscripts in the Maghreb and Italy. Usually signatures coexist along with quire catchwords. Only a small number of manuscripts, produced in the Orient, the Sephardic zone and Italy, particularly from early periods, employ signatures alone.

The digits in all the numbering systems are expressed almost exclusively by Hebrew letters, which is the normal means of numeration in Hebrew. In the Orient, in almost half (45%) of the manuscripts which contain quire signatures, parallel signatures were added in Arabic, mostly expressed in words, and always in Arabic script (this is witnessed also in a few manuscripts in Yemen and in two manuscripts in Spain). Usually the Arabic equivalent signatures (in numerals) at the beginnings of the quires are written at the outer corner of the upper margin, while the Hebrew signatures (in letters) are placed at the inner corner (in some manuscripts which have double signatures—at the beginning and the end of the quire, or only at the end—the Arabic numbering was added at the end).

This practice of using bilingual signatures can be found already in the eleventh century, and it was employed in the earliest extant complete Bible (St Petersburg, NLB, Evr. B 19a), written in Cairo in 1008 (as in many other manuscripts, the Arabic is written in a different ink; the book also contains Hebrew signatures added by a different hand). No doubt, these Arabic additions were intended for Arabic binders, and probably written by them.

Quire signatures were widespread especially in the Orient, where they were employed in more than half of the dated manuscripts that are not fragmentary up to 1500, particularly in Yemen, where they appear in nearly all the manuscripts (82%), and in Italy, where the device appears in 41% of the manuscripts. The use of partial numbering is found in one of the earliest manuscripts, which most probably was produced in Italy in 1105/1106 (Karlsruhe, BLB, cod. Reuchlin 3); in a regular manner, it appears in a manuscript dated 1246/1247 (Paris, BnF, Hébreu 163). Quire signatures appear in a quarter of the dated manuscripts

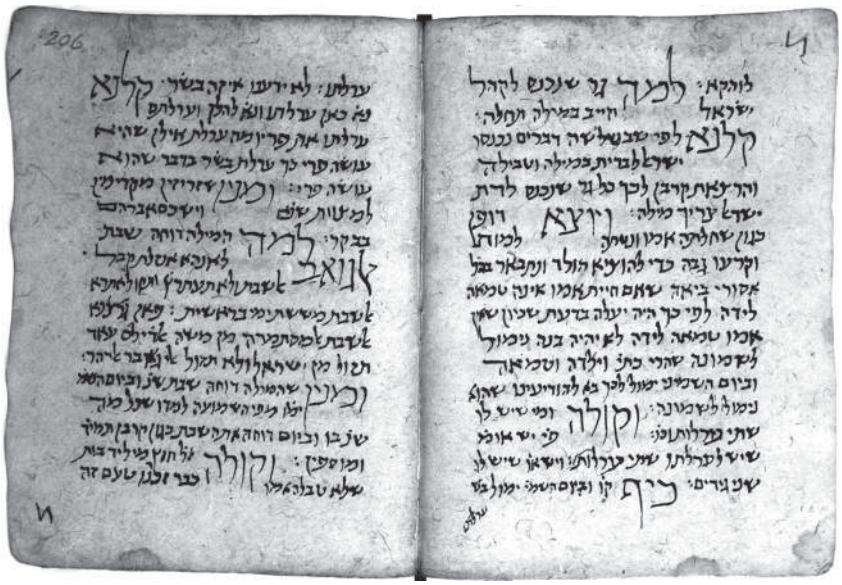

Fig. 1.9.6 Marking the openings of the central bifolium of the quires, Oxford, Bodleian Library, MS Huntington 372, ff. 205v–206r.

of the Sephardic zone; however, the use of signatures was very rare until the last quarter of the thirteenth century. Quire signatures in Byzantine manuscripts are also rare, and in Franco-German manuscripts they are exceptions.

In the Sephardic zone and in Italy, there is a conspicuous difference in the use of signatures in parchment manuscripts as against paper manuscripts or manuscripts with mixed quires. The ratio of parchment manuscripts to paper manuscripts in the corpus of manuscripts with quire signatures is, in the Sephardic zone, two to one. In Italy the proportion is close to four to one (78% vs. 22%). This characterization cannot be applied to the Orient, where the majority of surviving manuscripts are made of paper.

The 'placement practice' with regard to quire signatures relates to two positions: the position of signatures within the quire, and their placement on the page on which they are written. The numbering in Hebrew manuscripts may be written at the beginning of each quire, usually in the inner corner of the upper margin; or at the end of the quire, in the inner corner of the lower margin; or both at the beginning and at the end.

In the entire corpus of studied dated manuscripts up to 1500, 56% have double signatures at the beginning and at the end, 30% only at the beginning, and 19% only at the end (the total of 105% is due to those manuscripts in which two systems were employed, and this explains further ratios which exceed 100% in total).

In none of the geo-cultural zones do all the codices conform to one single positioning, but preferences are noticeable. In the Orient, excluding Yemen, 80% of the manuscripts with quire signatures have them at the beginnings of the quires, up until the mid-twelfth century, as attested by all the extant manuscripts. But 32% have double signatures and 7% contain end-of-quire signatures. In Yemen, 63% have double signatures; in the Sephardic zone, 60% have the double system, 23% have end signatures, 19% have beginning signatures; in Italy, 69% have double numbering, 24% end signatures, and 10% beginning signatures. The number of signatures in Byzantine Hebrew manuscripts is meagre.

The earliest partial appearance of the double system is in an oriental manuscript of 1112, and in regular use in a manuscript written in Damascus in 1161/1162 (London, BL, Or. 2595 + St. Petersburg, RNB, Evr.-Ar. II 675). In Spain, the earliest extant parchment manuscript, produced in Girona in 1184, contains double numbering, while in Italy the earliest use is attested in 1246/1247 (Paris, BnF, Hébreu 163).

An exceptional numbering where the number of the next quire is written at the end of the quire preceding it should be termed 'counter-signatures'. The system appears in only a handful of manuscripts and seems to have emerged in Germany and France (where signatures were not used) in the thirteenth century. Outside the Franco-German zone, it appears also in a few manuscripts in Byzantium, Spain, Provence and Italy.

Bifolium signatures appear in only a small number of manuscripts, and it seems that bifolium catchwords or counter catchwords took over their role. In most of these manuscripts, the signatures are not accompanied by quire signatures, except for a few manuscripts written in Judaeo-Arabic (mostly Karaite) between 1146 and late in the fourteenth century, in which the bifolia are numbered mostly in Arabic, but also in Hebrew letters, such as '2 of 3', following the practice of several Arab Middle Eastern manuscripts produced between 1149 and 1292.

Foliation by the scribe is very rare and appears in only 1% of the dated palaeographical units within the codicological units. It was employed sometimes in the Sephardic zone, for the first time in 1272 (Paris, BnF, Hébreu 26), mainly in parchment manuscripts, and in Italy (where the earliest occurrence is from 1286, Vatican City, BAV, Ross. 554, and then in the fifteenth century), but never in the Orient or Byzantium. In Ashkenaz, it appeared in the second half of the fifteenth century.

In some of the oriental manuscripts, and particularly the Yemenite ones, the openings of the central bifolia of the quires are marked by variously shaped signs, but mostly by marks similar to the *ġubār* numeral 5, placed in various corners of the opening, sometimes at the top outer corner of the right-hand page (fig. 1.9.6), as well as in the bottom outer corner of the left-hand page; sometimes only one corner is marked, and occasionally all four corner are marked by short diagonal strokes. Usually these marks are inscribed in an ink different from that of the text. Marking the central opening of a quire follows a practice found in certain Arabic manuscripts in the Orient and the Maghreb, as described by Guesdon (2002). The earliest Hebrew codex with such middle-of-the-quire marks (St Petersburg, RNB, Evr. II, B 39) was written in Jerusalem in 988/989 by a Maghrebi scribe (Beit-Arié et al. 1997, 12), and the next one (St Petersburg, RNB, Evr. II, B 88) was also written by a Maghrebi scribe, in Palestine in 1020/1021 (Beit-Arié et al. 1997, 19). Marks in the central openings are found in a biblical codex written in Kairouan (St Petersburg, RNB, Evr. II B 124); the date is damaged, but it must have been written between 941 and 1039 (Beit-Arié et al. 1997, 29); the marks are usually in both upper corners. Disregarding a few manuscripts from North Africa, most of the marked manuscripts are oriental. The marking was most probably meant for the non-Jewish binder, and very likely was added by the binder himself, as is implied by the use of different inks.

The catchword system is used in two ways. In the commonest one, the first word(s) of a quire or bifolium or leaf is written at the end of the preceding quire/bifolium/leaf, at the bottom of the page, usually placed below the end of the written text, mainly horizontally. Catchwords would sometimes be inscribed in European manuscripts in the middle of the lower margin. Such positioning sometimes occurs also in Byzantium, but not in the Orient. Catchwords would sometimes be placed vertically (mostly quire catchwords, but also a few leaf catchwords), as was favoured by Ashkenazic scribes (in 13% of the dated manuscripts). Since the late eleventh century, the practice of writing catchwords diagonally spread amongst the makers of oriental manuscripts; it appears in about one-third of the manuscripts that contain catchwords of any kind. The tendency to write diagonal catchwords is a part of the line-management practices of many of the oriental Hebrew scribes and copyists who used catchwords, which inevitably exceeded the left bounding line and so required special management (writing catchwords diagonally is a practice that was probably borrowed from Arabic scribes).

Catchwords were usually marked or decorated. In Europe, they were often decorated with complex ornament, and in the Ashkenazic regions they were sometimes decorated by pen drawings, mostly representing animals.

The variant type of catchwords also uses repetition of words from the copied text, but instead of writing the repeated word detached from the written page, it is written within the text. The last word of a quire or bifolium or leaf is doubled at the beginning of the succeeding quire. Following Denis Muzerelle's *Vocabulaire* (1985), this phenomenon can be defined as 'counter-catchwords'.

Quire catchwords are an ordinary device in parchment manuscripts in Europe and the Maghreb, whereas paper (or mixed-quire) manuscripts utilized bifolium or leaf catchwords as well. Quire catchwords were less frequently used in the Orient until the late twelfth century, and at that time scribes preferred quire signatures. In Franco-German areas, quire catchwords were, with few exception, the only system in use for ensuring the order of the quires.

Strangely enough, the practice of writing catchwords on the verso of the first leaf of each bifolium (bifolium catchwords), to ensure the right order of the written bifolia within a quire, emerged later than the practice of writing leaf catchwords, which was more widespread. Despite its earliest use in a mixed quire manuscript from 1225 in Spain (Jerusalem, NLI, Yah. MS Heb. 1), it appeared in all other areas only in the fourteenth century. It was found in about 5% of all the dated manuscripts from all regions. While the writing of a catchword on the last verso of the first half of the quire—i.e. in the central bifolium—was not required, most of the scribes did write it.

Leaf catchwords were the most widespread in the late paper manuscripts in all the zones of Hebrew book production and are found in two-thirds of all the dated Hebrew paper manuscripts of the fourteenth and fifteenth centuries, but only in 10% of the parchment manuscripts. Although the earliest extant dated

manuscript (St. Petersburg, RNB, Evr.-Ar. I 1404) that contains leaf catchwords was written on paper in Damietta (Egypt) as early as 1168 (the scribe did not write catchwords in the central openings), the practice started to spread in the oriental paper manuscripts only from the second half of the fourteenth century. In the Sephardic zone, the practice started in correlation with the replacement of parchment by paper in the second half of the century, but its first appearance was in a Provençal parchment manuscript, produced in Tarascon in 1284 (Parma, Biblioteca Palatina, 3239). It became a standard practice for paper manuscripts in the Iberian Peninsula, Provence and the Maghreb in the fifteenth century, and is found in 86% of the dated paper manuscripts (calculated also in consideration of the number of hands in multi-scribe copies). Its first appearance among Byzantine manuscripts is in a parchment codex dated 1298 (Cambridge, University Library, Add. 1733), but it was widely used in paper manuscripts which constitute most of the surviving dated manuscripts. The practice was employed there in two-thirds of the fourteenth-century paper manuscripts, and in the course of the fifteenth century it became almost as widespread as in the Sephardic zone.

The fact that leaf catchwords were mainly used in paper manuscripts implies that the aim of this practice was not only to ensure the right order of the bifolia (which can be achieved by means of bifolium catchwords). Being aware of the vulnerability of the paper and the possibility of detachment of single leaves, it may have been that scribes preferred to secure the position of every leaf in the quire.

Another possibility is related to the catchwords as being instrumental to the copying process on loose bifolia. The recent discoveries of temporary stitching (tacketing) of quires while copying in Latin and Greek manuscripts, at least as early as 800 and then until the twelfth century, and the introduction of bifolium signatures within each quire in thirteenth-century Latin manuscripts, which implies that tacketing was not practised anymore, prompt us to think that the leaf catchwords facilitated the copying sequence on loose bifolia.

Consistent employment of the redundant device of page catchwords is extremely rare. Its earliest example is found in a manuscript (New York, The Jewish Theological Seminary, MS 8225) written in Bursa (Turkey) in 1377 by two scribes, both of whom wrote page catchwords. All other manuscripts are from fifteenth-century Italy, Byzantium, the Orient and Germany (in some of them counter-catchwords occasionally substitute for the page catchwords).

Counter-catchwords (or repeated words) are frequently mixed with regular catchwords. The earliest manuscript containing them is an oriental one of 1112 (Oxford, Bodleian Library, MS. Heb. F.18, ff. 8-41), where the last word of the quire is repeated at the beginning of the next quire. In another oriental manuscript, dated 1282 (St Petersburg, RNB, Evr.-Ar. I 1256), there are leaf counter-catchwords. Counter-catchwords can be observed in many manuscripts in all the geo-cultural areas; however, in a considerable part of them they are not employed regularly, but rather as random substitutes for catchwords. Outside the Orient, counter-catchwords appear in a Spanish parchment manuscript dated 1214 (Vatican City, BAV, Urb. ebr. 54), at the beginning of bifolia (including the recto of the central bifolium of a quire) and at the beginnings of quires; leaf counter-catchwords appear in a mixed-quire codex written in Tripoli in 1293 (Vatican City, BAV, Vat. ebr. 358). Since then, many Sephardic scribes applied the repeated words at the beginning of each leaf. The earliest Byzantine manuscript with regular use of leaf counter-catchwords (St Petersburg, RNB, Evr. I 479) is dated 1319 (mixed quires).

In the fourteenth and fifteenth centuries, counter-catchwords in all their forms are employed, either systematically or mixed with regular catchwords: 21% in Sepharad, 14% in Ashkenaz and Byzantium, 12% in Italy, and 8% in the Orient. One third of these manuscripts are written on parchment.

9.4. The layout of the page

The taxonomy of this aspect of Hebrew codicology is rather meagre. Dukan (1988) classified the ruling patterns prevailing in the dated Hebrew manuscripts of France and Israel (Sirat et al. 1972; Beit-Arié et al. 1979; Sirat – Beit-Arié 1986) without formulating ruling types. Denis Muzerelle, in his online *Analyse des schémas de réglure* (1994, <http://www.palaeographia.org/muzerelle/analyse.htm>), converted those patterns into his formulae. However, one should examine whether Muzerelle's universal formulae indeed suit all oriental non-Christian manuscripts.

As for *SfarData*, in which almost all the dated Hebrew manuscripts are documented, it contains extensive data with regard to the *mise-en-page* and *mise-en-texte*: dimensions and complex proportions of the spatial arrangement, exact measurement of the page, the text area and the margin areas, columns, complex

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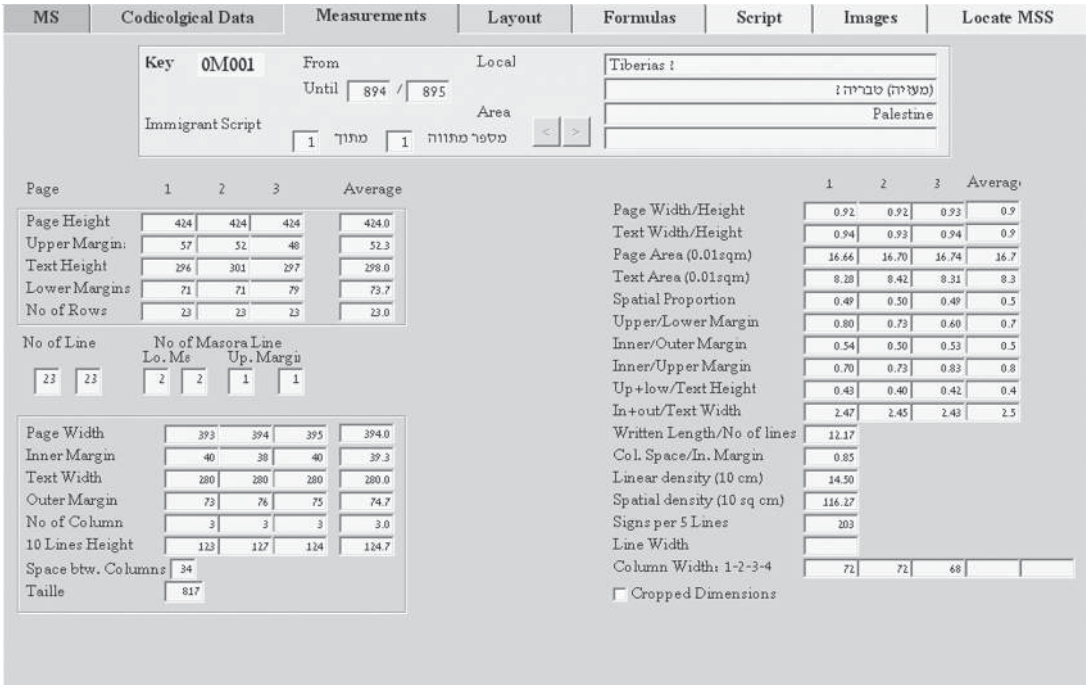

Fig. 1.9.7 Manuscript measurements in a snapshot from the *SfarData* database.

presentation of the many possibilities of proportion between space and written area, between the various margins, calculation of the surface of the page and the text area and their proportions (fig. 1.9.7).

These measurements and calculations may be retrieved and grouped by search facilities that can expose a chronological and regional typology of the page and text area dimensions, as well as proportions of its height and width, thus enabling the examination of whether they are conditioned by textual genres and their functional and social context, and provide further codicological criteria for dating and localizing undated manuscripts.

A few examples (tables 1.9.1–1.9.6) should illustrate the potentialities of such data retrieval relating to column layout and its relation to text genre and height of page.

9.5. Text structure and readability

The role of Hebrew copyists, like that of scribes using Latin, Greek, Arabic or other scripts, was not confined to the physical embodiment of the verbal text; it also involved the shaping of its visual disposition, which in turn affected its verbal perception and reception. The visual presentation of texts was not an autonomous interpretative act on the part of the scribe; there were other factors, conventions and considerations—material, social, economic, aesthetic and scholarly—dictating text configuration or at least affecting it. And yet Hebrew scribes had played a much greater role in the interpretative forging of the copied text, due to the extraordinarily individualistic mode of book production in Jewish societies, the high rate of user-produced books, and the lack of a guiding authority over the reproduction and dissemination of texts (Beit-Arié 1993, 79–84). These singular circumstances gave Jewish scribes considerable freedom of choice, as well as the opportunity to exercise initiative and inventiveness despite certain restraints, though obviously when copying standard texts many scribes would adhere to inherited traditions. Learned and creative professional scribes and copyist-owners who had the possibility of selecting the physical shape and nature of the text's presentation forged the semiotic representation of various genres of texts and designed different meaningful layouts to fit the different functions of books. Through the interpolation of para-scriptural and peri-textual elements in their copying, they had a significant impact on the legibility, comprehension and reception of texts. By means of spacing, compound punctuation, paragraphing and subdividing, underlining certain words or passages, pointing out terms and foreign words, marking biblical citations and lemmata, scribes enhanced readability and understanding. By adding titles, headings and running heads; by writing initial words in larger characters; by inserting decorations, illuminations, illustrations and diagrams; by selecting the type and size of script, or using different coloured inks; by providing tables of contents and other locating devices—elements that were undoubtedly missing from

Table 1.9.1 Geo-cultural distribution of column layout in dated manuscripts until 1500 (excluding the Orient except for Yemen, since many manuscripts are fragmentary); total numbers and percentage within zone.

Zone	Mss 1 column	Mss 2 columns	Mss 3 columns	**Total**
Sepharad	397 (73%)	117 (22%)	16 (3%)	544
Ashkenaz	158 (48%)	120 (36%)	48 (15%)	330
Italy	637 (80%)	130 (16%)	6 (1%)	798
Byzantium	181 (84%)	22 (10%)	2 (%)	215
Yemen	90 (85%)	13 (12%)	0	106
Total	1462 (73%)	402 (20%)	72 (4%)	**1993**

Table 1.9.2 Geo-cultural distribution of column layout in dated *biblical* manuscripts until 1500.

Zone	Mss 1 column	Mss 2 columns	Mss 3 columns	**Total**
Sepharad	16 (15%)	73 (70%)	13 (12%)	105
Ashkenaz	16 (22%)	27 (37%)	34 (47%)	73
Italy	35 (50%)	28 (40%)	3 (4%)	70
Byzantium	1 (14%)	3 (43%)	2 (29%)	7
Near East	18 (46%)	4 (10%)	18 (46%)	39
Yemen	14 (58%)	10 (42%)	0	24
Uncertain	2 (100%)	0	0	2
Total	102 (32%)	145 (45%)	70 (22%)	**320**

Table 1.9.3 Geo-cultural distribution of column layout in dated *biblical* manuscripts up to 300 mm height.

Zone	Mss 1 column	Mss 2 columns	Mss 3 columns	**Total**
Sepharad	15 (19%)	52 (66%)	9 (11%)	79
Ashkenaz	10 (40%)	11 (44%)	4 (16%)	25
Italy	30 (57%)	19 (36%)	1 (2%)	53
Byzantium	1 (20%)	3 (60%)	0	5
Near East	17 (85%)	1 (5%)	2 (10%)	20
Yemen	12 (86%)	2 (14%)	0	14
Uncertain	2 (100%)	0	0	2
Total	87 (44%)	88 (44%)	16 (8%)	**198**

Table 1.9.4 Geo-cultural distribution of column layout in dated *biblical* manuscripts taller than 350 mm.

Zone	Mss 1 column	Mss 2 columns	Mss 3 columns	**Total**
Sepharad	0	3 (43%)	3 (43%)	7
Ashkenaz	2 (5%)	8 (22%)	29 (78%)	37
Italy	1 (17%)	3 (50%)	2 (33%)	6
Byzantium	0	0	0	5
Near East	0	1 (5%)	13 (87%)	15
Yemen	0	5 (100%)	0	5
Uncertain	0	0	0	0
Total	3 (4%)	22 (31%)	47 (67%)	**70**

Table 1.9.5 Heights of dated manuscripts until 1500 (excluding the Orient).

Zone	≤100 mm high	101-200 mm high	201-300 mm high	301-400 mm high	401-500 mm high	> 500 mm high	**Total**
Sepharad	33 (5%)	108 (17%)	402 (65%)	63 (10%)	7 (1%)	0	619
Ashkenaz	36 (9%)	33 (8%)	173 (44%)	105 (27%)	31 (8%)	12 (3%)	389
Italy	65 (7%)	195 (22%)	526 (59%)	96 (11%)	10 (1%)	0	894
Byzantium	22 (8%)	36 (14%)	190 (71%)	16 (6%)	0	1 (0%)	266
Total	156 (7%)	372 (17%)	1291 (60%)	280 (13%)	48 (2%)	13(1%)	**2168**

Table 1.9.6 Heights of dated *biblical* manuscripts until 1500 (excluding the Orient).

Zone	≤100 mm high	101-200 mm high	201-300 mm high	301-400 mm high	401-500 mm high	> 500 mm high	**Total**
Sepharad	6 (6%)	21 (20%)	51 (49%)	24 (23%)	2 (2%)	0	105
Ashkenaz	3 (4%)	5 (7%)	18 (25%)	21 (29%)	22 (30%)	5 (7%)	73
Italy	4 (6%)	21 (30%)	27 (39%)	14 (20%)	3 (4%)	0	70
Byzantium	2 (29%)	0	3 (43%)	2 (29%)	0	0	7
Total	15 (6%)	47 (18%)	99 (39%)	61 (24%)	27 (11%)	5 (2%)	**255**

most of the original works as they emerged from the hands of their authors or compilers—they interpreted and gave shape to the hierarchical construction of the texts being copied. Consequently, by visually embodying in the texts their structure and hierarchy, those learned and creative professional scribes and owner-copyists made texts more transparent.

This claim is corroborated when manuscripts are examined from this perspective in a chronological sequence. Considered historically, it is obvious that the integration of para-scriptural and peri-textual elements within the copied texts was primarily a creative and interpretative act of scribes and copyists, in view of their gradual emergence and evolutionary nature. Needless to say, para-scriptural and peri-textual elements can hardly be found in Hebrew books of antiquity, but these legibility-aiding elements are found to be underdeveloped even after the belated formative stage of the Hebrew codex, as demonstrated by the earliest codices and fragments of codices which predate the tenth century.

A clear example is the common late mediaeval practice of writing headings and especially initial words at the beginning of textual units—the natural custom of scribes using Semitic scripts—in large square characters (even when the body of the text was written in a semi-cursive script). Writing initial letters, the most common practice in Greek and Latin manuscripts, was practised by only a limited number of Hebrew scribes, mostly Franco-German and not earlier than the early thirteenth century. The practice of writing titles, headings, endings, and mainly initial words in larger letters enabled users of Hebrew manuscripts to search for and locate a specific text more expeditiously. This practice, which later developed into assigning different sizes of letters to initial words according to the hierarchical level of the textual units, effectively assisted readers in perceiving the detailed structure of the text.

In the old oriental codices, prior to the tenth century, a text was configured in dense blocks of uniform script in which the titles, headings and ending phrases of textual units were barely perceptible, being embedded and absorbed in the main body of the text. As a rule, headings in the old codices were not written on separate, independent lines and, furthermore, never in a larger script. In the course of the late tenth century and the eleventh century, there emerged the practice of writing spacious, centred and, frequently, marked headings and endings on separate lines, as well as other visual deployments of the text. Among the dated codices, 'headlines' (i.e. headings occupying a separate line) made their first appearance in the late tenth century; yet they were not highlighted by a larger script—the most distinctive visual means for expressing the organization of the copied work and for increasing the comfort of using it—but by being centred on a separate line. Presenting the text in an unvaried script, thus assimilating the headings to the rest of the text, lasted until the late eleventh century. The practice of giving prominence to titles, headings and initial words by means of a larger script, and frequently also by means of a different style of script, evolved successively in non-biblical manuscripts, from the last decade of the eleventh century and on, in the east as well as in the west. It seems that in the transition period from assimilating titles to emphasizing them, headings and endings were disposed on independent lines and marked by simple signs, but were written in the same style of script and in the same size as the text itself; consequently they were incorporated in the text block and were not easily searchable.

From the end of the eleventh century onward, scribal endeavours to mediate between authors (or redactors) and readers, making texts more readable and usable, started to evolve in all the widespread areas where Hebrew books were produced: in the east, North Africa and the west. Among other interpretative and scholarly initiatives, scribes started to highlight headlines, initial words and endings of textual units, as well as lexical entries and the like within the written lines, by using larger, graded sizes (and styles) of letters and by frequently decorating them simply with a quill or reed pen in ink. By the end of the first third of the thirteenth century, headings and initial words in some European manuscripts were predominantly made noticeable by their decoration and illumination, thus indicating in a more complex and conspicuous manner the hierarchical structure of the text and injecting into it elementary finding aids.

Biblical manuscripts evolved at a slower pace. Initial words, which usually constitute the titles in biblical manuscripts, emerged about a century later than in non-biblical texts. The body of the biblical text in all the copies dated before the late twelfth century is in a uniform script. The scribes did not write initial words at the heads of books or sections in a larger script to facilitate location. This abstention from tampering with the uniformity of the biblical script was undermined only at the end of the twelfth century, when the practice of writing large initial words, and even decorating them, started to spread, mainly in France and the German lands, but also in other areas such as the Iberian Peninsula, Provence, North Af-

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Fig. 1.9.8 Micrographic 'carpet' page of Masoretic notes in a manuscript of The Prophets, the Hebrew codex with the earliest dated colophon, Tiberias (Palestine) 894/895 (copied about a century later). Cairo, Karaite Synagogue, photograph courtesy of MBA.

rica and Italy, but seldom in the Orient. In contrast with their avoidance of graded biblical script, early oriental scribes did not refrain from decorating and illuminating calligraphic copies of the Bible. Such decorations or illuminations were added to Masoretic lists and colophons which were attached to the biblical text or to Masoretic notes at the end of biblical units, as the scribes did not hesitate to arrange the text of the marginal Masora in decorative micrographic shapes (fig. 1.9.8). Moreover, despite the employment of a uniform script size for the biblical texts, one can already notice in the early oriental codices the emerging use of a range of script sizes, which are implemented for the sake of distinguishing the non-biblical strata of biblical codices. This is first and foremost manifested in the conspicuous way in which the Masora—that body of lexical and grammatical notes pertaining to the biblical verses and intended to preserve their precise transmission—is written continuously in a minute script in the margins and between the columns. The use of an entirely different size of script clearly differentiated the two textual layers and reflected their hierarchy.

From the end of the eleventh century and on, in most of the numerous manuscripts copied in semi-cursive scripts that emerged at the beginning of the eleventh century, headlines were rendered not only in a larger script, but also in a different style of script, namely, in square characters.

Ashkenazic scribes expressed their creativity by enhancing the structural and hierarchical transparency of the transmitted texts. Certain literary genres—compound prayer books and multi-layer integrated core texts such as biblical books accompanied by Aramaic translations and various marginal commentaries, as well as annotated, glossed, and commentated halakhic corpora—emerged in the late twelfth century and more so in the thirteenth century as a creative initiative of French and German scribes, probably in response to scholarly needs. These initiatives involved not only sophisticated copying, skilful deployment of alterable layout and the intricate segmenting, fitting and matching of the related and juxtaposed texts; they also required a more composite and transparent visual presentation of the structure and hierarchy of the multiple textual units and their easy location. Hence Ashkenazic scribes in Germany and France, and later in Italy, utilized a range of five graded sizes of square script when copying and shaping large-size prayer books: strikingly large characters for initial words at the head of principal liturgical parts; very large characters for the initial words at the beginning of a division, large characters for initial words of single poems and prayers; uniform characters for the text, and smaller characters, sometimes in a semi-cursive script, for instructions and poetic refrains. In addition, they made extensive use of red ink for entire passages, or any other component deemed to be significant and meriting emphasis. In some of the manuscripts, they further enhanced structural clarity, visibility of hierarchy and ease of usage by themselves decorating initial words, or by assigning major initial words or headings to be decorated by painters.

The other scribal enterprise, that of biblical exegetical corpora, produced first in Ashkenaz and later also in Spain and Italy, had to juxtapose and match different text strata while assigning to each of them a different style or size of script. Thus the central column (or two columns) occupied by the core biblical text was written in larger square characters, its Aramaic translation in parallel columns in smaller characters, and surrounding them, in the margins, commentaries tailored to fit the basic text in a small semi-cur-

sive script. Naturally, initial words in these books were shaped in accordance with the hierarchical level of that part of the text. Differentially scaled initial words were even more meaningful in legal corpora in which various layers of glosses were incorporated, frequently in decorative interwoven designs, in smaller characters, or in a different style of script.

Apart from tables of contents, sophisticated scholarly tools such as those prevailing in Latin manuscripts of the twelfth and thirteenth centuries did not develop in Hebrew manuscripts.

The history of the production of Hebrew manuscripts mirrors a continual linear improvement in their legibility, transparency and serviceability. This progressive process can be confirmed by inspecting the scribal treatment of further peri-textual and para-scriptural elements, such as the signing of citations, marking foreign words and singling out terms, inserting running heads and the revolutionary introduction of paragraph numeration and tables of contents. Hebrew manuscripts unquestionably display an evolutionary process that was radically accelerated in Europe in the thirteenth century.

9.6. The scribe, the painter and the illuminator at work

9.6.1. Persons, places and methods

Whereas the institutional and centralized character of Christian book production and text dissemination—whether carried out in, or initiated by, monasteries, cathedral schools, universities or commercial outlets—enabled supervision and control over the propagation of texts and the standardization of versions, no authoritative guidance or monitoring could have been involved in the private transmission of texts in Hebrew characters.

And yet, within the individualistic mode of reproduction of Hebrew texts, a distinction ought to be made between texts reproduced by professional or hired scribes and texts copied by scholars and learned people for their own use. Such a high rate of self-production, which characterizes the history of the Hebrew book in the west and in the east (excluding Yemen) and surely reflects the extent of literacy in Jewish society, had an immense effect on the nature of the transmission and versions of the texts. Logic dictates that there must have been an essential difference between texts copied by hired scribes and those reproduced by learned persons or scholars copying texts for their own needs. To be sure, neither hired scribes nor copyist-owners could escape the many inevitable snares set by the unconscious mechanics of copying. The complicated psychological and physiological process of copying frustrated the best intentions of both professional scribes and copyist-owners in their efforts to adhere to their model, as the collation of manuscripts successively copied by different scribes demonstrates. Even more telling are those rare cases in which the same hired scribe or learned copyist copied the same text twice from the same model within a short time. Comparisons between such copies betray the astonishing reality that deviation from the exemplar is not, as is usually assumed, rigidly conditioned by certain psychological, linguistic or mental configurations, nor by the copyist's spelling habits and pronunciation; it is a volatile and inconsistent process (Beit-Arié 2000). However, one is probably justified in assuming that the average hired scribe would have been more consciously loyal to his model, repeating its mistakes and refraining from critical or deliberate intervention in the transmission, yet at the same time more vulnerable to the involuntary changes and mistakes conditioned by the mechanics of copying. The scholar-copyist, on the other hand, might intentionally interfere in the transmission, revise his exemplar, emend and restore corrupted passages, and indeed regard copying as critical editing and not merely as duplicating.

If these assumptions are correct, the high rate of user-produced Hebrew manuscripts must have improved the versions of a considerable number of surviving manuscripts by an accumulated process of critical emendation by learned people and scholars who restored texts that had been corrupted by ignorant hired scribes. These assumptions can be substantiated and verified by scribes' and copyists' own statements in their colophons. Reflective colophons of learned copyists who produced books for their own use confirm the assumption with regard to their critical manner of copying. Yet by the same token, those same reflective colophons by scholar-copyists attest to the increasing freedom with which they were interfering in the transmission of the text. They seem to have been confident that they were entitled, even obliged, to improve the copied text by their personal critical judgment.

Copyists of user-produced books testify that their copying involved not only emending and restoring the corrupted model, but also critically revising and editing it. The inclination to editorial intervention in transmission emerged only in the late Middle Ages, from the early fourteenth century onwards, but it is

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attested primarily in fifteenth-century colophons. One of the main manifestations of the editorial tendency and the critical urge is to be found in colophons of copyists in Italy, Spain, Provence, France and Germany, and later also in Turkey, in which they state that they used two models, sometimes more, blending different sources according to their critical judgment, thus producing totally eclectic versions. These and similar statements by copyists reflect an evolutionary escalation of deliberate interference in the transmission of texts. The individualistic character of Jewish book production and the lack of institutional supervision and authoritative control over the dissemination of texts naturally contributed to this process.

9.6.2. Colophons

Unlike the limited documentary and literary sources on book production and consumption, abundant information can be found within the manuscripts, primarily in colophons. These authentic documents convey information provided by the producer about the copying circumstances. 4,000 colophons of codices written in Hebrew script have survived, some 3,400 of them dated. They constitute about 7% of the estimated 60,000 complete or partial extant mediaeval codices (out of 100,000 Hebrew manuscripts, excluding the many fragments). Half of the colophons include an indication of locality.

A colophon may contain the following details: the scribe's name; the name of the person who commissioned the copying, or an indication that the copyist copied for himself; the title of the copied text; the date of completion of the copy; the locality of the copying; and finally, eulogies and blessings. Sometimes scribes and copyists included valuable information on the circumstances of the copying, on the *Vorlage*, their critical approach and practice, duration of copying, payment and personal and historical data. Not all colophons contain all these components, and some of them are very short, like the earliest undated one, a fourth-century magical papyrus from Oxyrhynchus (London, BL, Or. 9180C), written in Western Aramaic, which contains the scribe's name, definition of the text and an ending formula.

Producer name. The name of the scribe is specified in 85% of the colophons. In addition to scribal colophons, a colophon by the vocalizer might be added in biblical manuscripts, and in rare cases an illuminator added his own colophon. A custom which was common among Hebrew scribes enables us to discover names of anonymous copyists: scribes would often adorn and highlight their own names where these happened to occur in the transcribed text, particularly at the beginning or, less often, at the end of a line, or they might indicate their names in acrostics made from the first letters of a series of lines. This unique practice was common in all areas (but rarely in the Orient) and was implemented in half the extant manuscripts up to 1500, in all literary genres, including biblical manuscripts. It is frequently found even in manuscripts with colophons which include the scribe's name. It appears not only in anonymous colophoned copies, but also in many hundreds of uncolophoned manuscripts and in multi-hand copies in which only the name of the major scribe is indicated. This scribal 'trick' or stratagem provides us with a highly useful tool for analysing multiple-hand copies and assists us in cases of uncertainty as to whether a particular manuscript is homogeneous or a product of several hands, especially if several of the scribes used such a device to disclose their names. The highlighting of the scribes' names also helps in ascertaining the division of the text among different scribes and the distinction of one hand from another (Beit-Arié 2006).

Date. Dates are presented according to five eras. In a considerable number of oriental colophons, two or more parallel eras are used. The commonest is the Jewish Era according to the Creation. The Seleucid Era, which began in 312 BCE, was used only in the Orient, where it was the standard dating practice. There it appears in 61% of the dated colophons (in Yemen, 82%). The calculation according to the destruction of the Second Temple in Jerusalem is the least used era. It appears in 5% of the oriental colophons and in a few dozen Italian ones. Dating by the Islamic Hegira is used only in the eastern Islamic zone (excluding Yemen) and appears in a quarter of the colophons, almost always in manuscripts written in Judaeo-Arabic. The employment of the Christian Era is confined to manuscripts copied by Christian converts. However, since the mid-fourteenth century, a combination of the Jewish calendar and the Christian one is manifested in a considerable number of Italian colophons, where years are rendered according to the Jewish Era of Creation, while days and months are indicated according to the Christian Era.

Locality. Localities are rendered by Hebrew transliteration, reflecting the old mediaeval name, frequently retaining it while disregarding transformations of a political or linguistic nature. Some toponyms are indicated by Hebrew calque translations and some by ascribed biblical names.

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9.6.3. Duration of copying

More than 250 colophons provide information on the duration of copying and enable calculation of the speed and output of scribes. There are two ways to retrieve such data, a direct, explicit one, and an indirect one. In a minority of colophons, the scribe specified the duration of their copying explicitly. From the other colophons, duration of copying can be calculated indirectly because either they include either a statement of the dates of beginning and ending the copying, or there are several fully dated colophon at the ends of different textual units of the manuscript, from which the duration of the copying can be inferred. In both kinds of information, we usually lack a specification concerning the daily input, i.e. how many hours per day were spent on copying, and whether the copyist copied continually, day by day (except for Saturdays and feasts). A few multi-colophoned manuscripts containing information of the direct kind show that the scribe was engaged in copying for only part of the time that passed between the completion of one textual unit and the completion of the next. Thus a calculation of the duration of copying based on indirect evidence might be misleading.

The speed of copying is of course conditioned or affected by several factors: the style of script (the square style, which required many more strokes while executing letters, the semi-cursive style and the cursive style); the genre of the text and its social function; the intended aesthetic quality of the copy; and the copy's destination, i.e. whether the manuscript was commissioned and copied uncritically or was user-produced by a learned person who was copying critically. Moreover, any calculation of the speed must take into consideration the dimensions of the surface area, the width of lines and their number per page, and above all, the average number of written signs within a line. Multiplying the average number of written signs per line by the number of lines and by the number of copied pages, then dividing by the number of copying days enables us to calculate the average output per day in terms of written signs, and to compare it to the writing speed of other manuscripts copied using the same style of script, even when they are written in different layouts. For example, the average daily pace of a copyist, who indicates the exact number of copying days in two colophons in each of two different manuscripts (Cambridge University Library, Add. 173, dated 1289, probably in Rome; London, BL, Or. 6712, dated 1287), both written in a semi-cursive script, was 49,550 written signs (about 20 leaves) per day. Three manuscripts in Parma, Biblioteca Palatina, 3118, 3126, 3099, were copied in 1323 by a professional scribe, active in Rome and its vicinity, for his own use. The speed of this scribe, who wrote in a minute, flowing, semi-cursive script, was only 17,685 written signs per day. Calculating a scribe's speed should be based on measurements of the signs written by him, and not on counts of leaves.

References

Baker 1991; Beit-Arié 1967–1968, 1981, 1993, 1999, 2000, 2014; Beit-Arié et al. 1979, 1997, 2006; Bohak 2011; Brock 1995a; Derolez 1984; Dukan 1988; Guesdon 2002; Haran 1985; Le Léannec-Bavavéas – Humbert 1990; Leroy [Julien] 1976; Muzerelle 1985, 1994; Sirat – Beit-Arié 1986; Sirat et al. 1972, 1985; Tov 2004. Web sources: *SfarData* <http://sfardata.nli.org.il/>, last access May 2014.

10. Slavonic codicology (RMC)

10.1. Materials and tools

10.1.1. Parchment

The beginning of native literacy in Slavonic meant the wholesale importation of Byzantine book culture, which in effect meant the parchment codex. No material evidence survives from the Cyrillo-Methodian period (the middle of the ninth century–885). There are no dated 'round Glagolitic' manuscripts, nor are there any dated Cyrillic manuscripts before the middle of the eleventh century ('square Glagolitic' manuscripts do not appear before the fourteenth century). Scholars usually date the earliest extant manuscript material to the beginning of the eleventh century, or, less cautiously, to the end of the tenth. In certain cases, however, external factors allow the date of a manuscript's creation to be estimated with a reasonable degree of probability. The *Codex Suprasliensis* (now divided amongst three libraries: Warsaw, Biblioteka Narodowa, BOZ 201; Ljubljana, National and University Library, Kopitar 2; St Petersburg, RNB, Q.п.I.4; fig. 1.10.1) is a combined reading menaion and panegyricon for March, considered on linguistic grounds to have been written in eastern Bulgaria, of which 285 leaves survive, written in a fine Cyrillic uncial on high-quality parchment in a large format (310 × 230 mm). It was presumably one of a set of twelve volumes covering the entire year. Such a large and expensive commission can hardly have been undertaken except for a major monastery enjoying substantial (probably royal) patronage. The progressive Byzantine conquest of Bulgaria following the death of Tsar Peter in 969 means that no such institution is likely to have remained in existence by the end of the century, suggesting that the manuscript must have been written, if not during Peter's reign, then shortly afterwards.

The extinction of Bulgarian independence in 1018 resulted not only in a loss of patronage and abruption of the tradition of high-quality manuscript production, but also a very considerable loss of manuscripts themselves: the workaday texts succumbed, as ever, to ordinary wear and tear, while the finer books that might otherwise have been specially cared for perished with the institutions that housed them, leaving only chance survivals to witness to the culture that produced them. Under Byzantine rule, it seems that Slavonic book production continued only at the basic level necessary to ensure the continued functioning of the Church. There could be no making and preservation of large, expensive and artistically ambitious manuscripts without patronage of the sort that could be provided only by the sovereign and the greatest of the lords spiritual and temporal under him, which appeared again with the rise of Kievan Rus' at the beginning of the eleventh century, of Serbia from the end of the twelfth, and of a resurgent Bulgaria from 1185. Even from the more fortunate times, though, the number of manuscripts that survives is small in comparison with the Byzantine heritage: from the East Slavonic lands, only about 300 codices written before *c.*1300, or fragments thereof, are known to exist (Franklin 2002, 23; it is difficult to make any reliable estimate for later centuries); from the Balkans the number is even smaller.

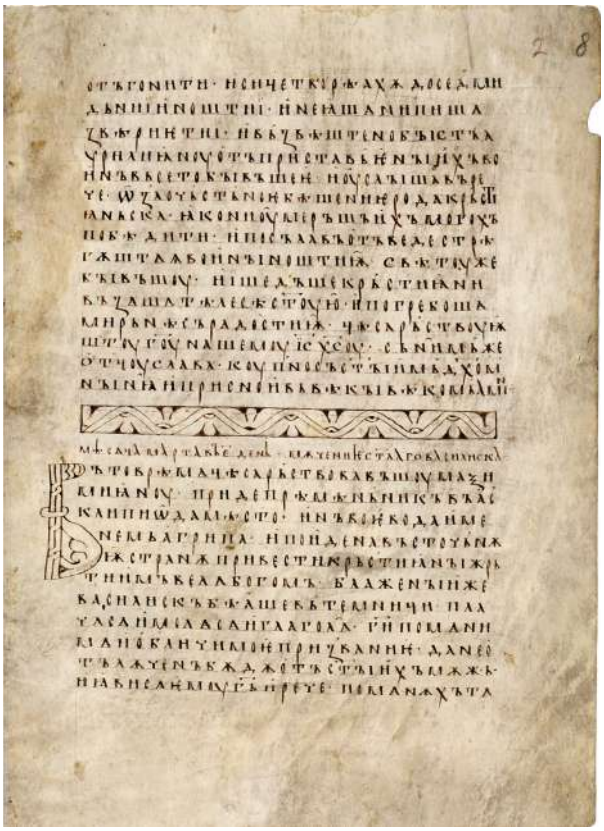

Fig. 1.10.1 *Codex Suprasliensis*, eleventh century, f. 8r, photograph University Library in Ljubljana.

The earliest dated Cyrillic manuscript is the Ostromir Gospels (St Petersburg, RNB, F.п.I.5), written in 1055–1057, a luxury manuscript of exceptionally large format (its pages measure 350 × 300 mm, larger than any other Slavonic manuscript of comparable date; fig. 1.10.2). The place where it was written has long been a matter of debate among scholars: it is certain that it was written for Ostromir, the *posadnik* (governor) of

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Novgorod, but art historians in particular have found strong connexions between its decoration and the traditions of Kiev. (The debates do not seem to have taken account of the possibility of craftsmen moving from one place to the other.) Be that as it may, its existence demonstrates that by the middle of the eleventh century the Eastern Slavs were capable of preparing writing materials of the highest quality: although the models for the book and its decoration were Byzantine, the persons involved in its creation were local. This is certainly true of the scribe and the painters, and there is no reason to think otherwise of the craftsmen who prepared their materials. This is, however, to impose a modern distinction on the culture of the period. Though the Slavs of this period were aware of the ethnic and political distinctions between themselves and the Greeks, they saw themselves as sharing a common Christian art, architecture and literature, and the Cyrillic book of this period could even be viewed as a provincial variant of the Byzantine book.

Like the books' contents (intellectual and visual), the technical aspects of their production were imported from Byzantium. For obvious geographical reasons, papyrus was not used among the Slavs, so that in the earlier period the principal support for writing that was not ephemeral in nature was parchment. This was made mostly from the skins of sheep and cattle (that of very young lambs and calves being the most highly prized), though occasionally that of other creatures such as hares, goats and even deer was used (Džurova 1997, 46). Since parchment had been used for centuries at the time of the conversion of the Slavs, it was taken over as part of the 'ready-made' book culture which they adopted together with the Christian religion, and its diffusion amongst them can thus be dated by the conversion of their various nations (though the earliest surviving examples are invariably a century or so later).

The parchment in use among the Slavs rarely matched the highest-quality parchment of Byzantium, and the most luxurious of all, the coloured parchments on which texts were written in gold ink, do not appear to have been used at all. There is a very considerable range in the quality of the parchment used, clearly dependent on the resources available to the people for whom the book was made. It seems that it did not always satisfy the scribes: the priest Dobrejšo has noted at the bottom of f. 3 of the Gospel book that bears his name (Sofia, NBKM 17, a Bulgarian manuscript of the first half of the thirteenth century, see fig. 2.9.2: the inscription is in the lower margin), 'Oh this damned parchment!' (Hristova et al. 2003, 33). Even the best manuscripts may have occasional leaves with holes or other defects, and the parchment used for ordinary work, while by no means substandard, tends to be rather thick and stiff. Almost invariably there is a perceptible difference in colour and texture between the hair side and the flesh side.

Fig. 1.10.2 Ostromir Gospels, eleventh century, f. 2r, photograph courtesy of the Russian National Library.

The earliest actual records of the manufacture of parchment among the Slavs relate to eighteenth-century Russia (Mefod'eva 2009), but it is clear that it was not a new industry at that time, and it is telling that the extensive Russian foreign trade records relating to the previous century record the import of such items as sealing wax and the raw materials for making ink, but not of parchment (Kireeva 1997, 4). It is reasonable to assume, therefore, that the parchment used for Slavonic books was normally of local manufacture. There is considerable diversity in its thickness, colour and surface texture, which reflects both differences in the raw materials and in the techniques used to prepare it over the centuries, in some cases the result being closer to the type of

parchment produced in Byzantium, in others resembling that of Western Europe (Kireeva 1997, 12–15). The Slavs (or at least the Eastern Slavs) do not, however, appear to have followed Byzantine practice in cutting out the parchment bifolia from the hide according to regular patterns (as described by Maniaci 1999a, 1999b), but crossways, lengthways or even diagonally according to the qualities of a particular hide (Petrova – Sadovskaja 2009).

Since parchment was expensive and, except to the greatest patrons, not always readily available, it could also be re-used. Nevertheless, Slavonic palimpsests are few in number, and tend to be relatively early; almost all the known examples are from the Balkans. In some cases, an earlier Slavonic text was overwritten in Greek, perhaps the most famous example being the Vatican Palimpsest (Vatican City, BAV, Vat. gr. 2502), in which a tenth-century Cyrillic Gospel lectionary was overwritten in the thirteenth century with the four Gospels in Greek. The reverse could also occur, as in the Kochno Gospels (Odessa, National Gorky Library, MS 182). Manuscript Vatican City, BAV, Barb. gr. 388 presents a remarkable example of a Greek text written over a Cyrillic text which had itself been written over a Greek text. In the Bojana Palimpsest (Moscow, RGB, ф. 87, № 8), the Cyrillic text is written over an earlier Glagolitic text. One of the quires (a twelfth-century replacement for some missing leaves) of the *Codex Zographensis* (St Petersburg, RNB, Glag. 1) is Glagolitic over Glagolitic. Overall, in about half the known examples the script of the underlying text is different from that of the later text, which is perhaps not surprising, since scribes might be more likely to re-use manuscripts written in a script or language which was not generally understood in the community which they served.

Parchment remained the dominant support in the Balkans until the middle of the fourteenth century, and slightly later in Russia. In Moldavia and Wallachia it retained this position even longer: almost everything written in Moldavia in the first decade of the sixteenth century was still on parchment, though by the end of the century paper accounted for the majority of items here too. This is to some extent connected with the princely patronage that continued in the Danubian Principalities after other Balkan lands had fallen wholly under Ottoman dominion, and indeed the parchment on which some of the manuscripts produced there at this relatively late period are written is of the highest quality of any in the Cyrillic tradition. The use of parchment for particularly luxurious volumes continued into the era of printed books, when individual volumes of works normally printed on paper might be printed on parchment. An example is the copy in Dublin, Chester Beatty Library (W149) of the Festal Menaion published by Božidar Vuković in Venice in 1538: not only is the entire volume (and it is a large book of 432 leaves) printed on parchment, but many of the printed pictures and headpiece decorations have been coloured and gilded by hand. One must assume that it was specially commissioned by an important individual or institution.

10.1.3. Paper

Paper of oriental manufacture is almost unknown amongst the Slavs. The great collector Nikolaj Lichačev (1862–1936), at the end of the nineteenth century, had speculated about its use (Lichačev 1899), but it was not until 1985 that an actual example was discovered by O.A. Knjazevskaja (Morozov 1994). This is a manuscript of the *Scala Paradisi* of St John Climacus in Slavonic translation, written on a mixture of parchment and paper in Galicia or Volhynia (or possibly elsewhere by a native of that region) during the second half of the thirteenth century (Moscow, RGADA, ф. 181, № 452). The paper is of the type manufactured in Samarkand at this period; this example of its use in a Cyrillic manuscript, however, remains unique.

The earliest use of paper in the Cyrillic tradition is represented by two charters issued by the Bulgarian Tsar Ivan Asen II, one to Vatopedi and the other to Dubrovnik (Daskalova – Rajkova 2005, 29–30). They are undated (or rather, the date of the first is imperfectly legible and the second is not dated), but both were evidently written after 1230, and certainly before the Tsar's death in 1241. The paper is believed to be of early Italian manufacture, but since both have been mounted, detailed study of the paper is difficult and does not so far appear to have been attempted. It is most probably the primitive, unwatermarked Italian paper that was beginning to penetrate into the Eastern Mediterranean at this period; this is certainly the material used for the charter issued by Constantine Tih to St George's Monastery at Virgino Bărdo (similarly undated, but the Tsar reigned 1257–1277). Although the authenticity of this document has been disputed (Daskalova – Rajkova 2005, 8–9), the paper makes the position of those who would see it as a fourteenth-century forgery hard to maintain. Similar paper is used for MS Athos, Hilandar, 387, a substantial codex of 366 leaves, written in the Serbian (Raška) redaction of Church Slavonic and dated on palaeo-

graphical grounds to the second quarter of the thirteenth century (Bogdanović 1978, I, 152 and II, plate 7).

The first use of Occidental paper in a dated Slavonic codex is in the Tărnovo Gospels of 1273 (Zagreb, HAZU, III a 30), which is a mixed manuscript, consisting of quires of eight leaves, of which the outer and inner bifolia are of parchment and the two in between (i.e. the second, third, sixth and seventh leaves) of paper. The paper is of high quality, but still without any watermark, likewise believed to be of Italian manufacture. Though a rarity at the beginning of the fourteenth century, as the century progresses paper accounts for more and more of the manuscripts produced in Serbia and Bulgaria, especially in its latter half. The first known use of Occidental paper in Russia is in an undated charter of Vasilij Davidovič, prince of Nižnij Novgorod, who died in 1345, and by the end of the century paper was also being used for codices.

Given the early pre-eminence of Italy in the manufacture of paper, it is not surprising that the paper used in these early books and documents is Italian. In the Balkans, where Venice and the Adriatic were the main routes for its importation, Italian paper continued to be used throughout the manuscript period, though from the late fifteenth century paper from Germany and Transylvania is also found here (Mošin – Traljić 1957). In northern Europe Italy soon began to face competition from France and later Flanders. French paper first appeared in Russia and the Ukraine in the middle of the first half of the fifteenth century, and by the middle of the sixteenth century France had more or less displaced Italy as the main source of paper for the Eastern Slavs. Polish paper is found here from the beginning of the sixteenth century, mostly in the western territories, where paper from Transylvania also appears. 'German' or perhaps rather Central European paper begins to be imported shortly afterwards, though German—and English—merchants also imported paper into Russia from France. Dutch paper first appeared in Russia in the second half of the seventeenth century, and soon almost entirely supplanted all other sources (Lichačev 1899, lxi).

Though the first paper mills in Russia were set up in the middle of the sixteenth century, their output was insignificant (Keenan 1971). Native production only began on a serious scale toward the end of the seventeenth century, but it expanded very considerably thereafter, and by the end of the eighteenth century the Russian Empire had become self-sufficient in paper. Those parts of Europe that were under Ottoman control, however, remained reliant on imports.

Since most Slavonic manuscripts are written on imported European paper, they share the watermarks found in manuscripts from elsewhere on the continent, and since the manuscript books themselves are so rarely dated, the watermarks are often the prime means of dating them. Their importance was realized very early in Slavonic manuscript studies. One of the very first studies of watermarks was the book published by Kornelij Tromonin in 1844 with the prolix but eloquent title 'an explanation of the signs visible in writing paper, whereby it is possible to discover when any books, documents, drawings, pictures or other items, ancient or not, on which no year is indicated, were written or printed' (Tromonin – Klepikov 1844). Lichačev, who collected not only manuscripts, but also seals, icons, and much else, published both a monumental three-volume study and album on 'the palaeographical significance of watermarks' (recently republished in a revised and reorganized edition, which reflects its lasting value), and the first major study of the paper production and papermills of the Russian Empire (Lichačev 1891, 1899, 1994).

While Russian scholars continue to contribute to the study of paper, outside Russia, the greatest contribution to the study of watermarks in the Slavonic context was made by Vladimir Mošin and his followers in Belgrade. Like Lichačev, Mošin was a scholar of broad interests, and so it is natural that in Serbia the study of paper has been integrated into the study of the manuscript in all its aspects. It is notable that in this tradition manuscript catalogues usually include albums of the watermarks found in the manuscripts described.

10.1.4. Inks and pigments

As in the rest of Europe, manuscripts were usually written with inks based on iron salts in combination with gallic acid, for which the principal source appears to have been tree bark (oak, alder, etc.) or the cones of various conifers. A number of recipes survive, going back to the fifteenth century; some have been printed by Simoni (1906). The resulting inks vary in quality from a fine black through various shades of brown; occasionally, mostly in the later period, the acid content of the ink has led to corrosion of the paper.

It is relatively uncommon for a manuscript to be written entirely in black (or brown) ink. Most often the titles, sectional initials and (where present) rubrics are written in red, which may also be used for mar-

ginalia where they occur (see figs. 1.10.4, 1.10.8). The red pigment is usually cinnabar, to the extent that red ink is invariably referred to in Russian as *kinovar'*, even though other red pigments such as minium are occasionally found. There may be quite abundant red text in manuscripts with long sectional headings or extensive rubrication, and it is also used in combination with black in tables such as paschalia or lectionaries. This reflects a tradition of textual presentation in scriptural and liturgical books which goes back to Byzantium and is continued to this day in the printed service books of the Orthodox Church. To this extent the use of red ink may be said to be an essential, or at least a normal part of book production in the Cyrillic tradition, and not only in religious texts, where it becomes more or less standardized and where tradition acquires the force of obligation; red titles and initials are usual in secular books as well.

The same cannot be said for other colours. In the most luxurious manuscripts gold may be used for the most important titles and in other places (such as headpieces) where red is commonly used, but not so extensively, so that such manuscripts tend to have writing in both red and gold, with the latter occupying a more significant place in the hierarchy of decoration; it may be overlaid on text that had originally been written in red. Occasionally red (and even more occasionally gold) may also be used for punctuation. The use of inks of other colours for text is rare in the extreme, but they are not uncommonly found in purely decorative elements such as headpieces and large initials. On the other hand, there are also some very elegant manuscripts (and some less elegant ones) in which all the decoration is in red.

10.1.5. Writing instruments

The principal writing instrument was the quill. This is clear from occasional scribal notes and *probationes calami*, some as early as the thirteenth century, which refer to it as *pero*, the usual Slavonic word for a feather. Occasional references in text to a reed (*trŭstĭ*) are more likely to be literal translations of the Greek *kalamos* than a reflection of actual local practice. There is little other direct evidence of the tools of the trade until the early modern period, and their use must be more or less inferred from the result: mediaeval depictions of scribes at work (typically the evangelists) probably owe more to Byzantine iconographical tradition than to contemporary observation.

10.2. Book forms

10.2.1. Miscellaneous forms

Since the Slavs inherited from Byzantium a fully-formed tradition in which the codex was the principal form of the book, there is no question of 'the birth of the codex' in their practice. Nevertheless, other formats were known, though they tended to be limited in their use. In particular, in the early period, when parchment was expensive and in limited supply, it was necessary to have some other medium that could be used for ephemeral or unimportant writing. In the north, birch-bark was commonly used for this purpose. A piece of bark was removed from the wood and the text incised on its inner surface using a stylus made of metal or bone. This usually produces a fairly crude uncial, with the angular and irregular lines of equal thickness resulting from such a method of writing. There are occasional references in early sources to the use of birch-bark, but since the letters themselves were always thrown away after use, scholars had no direct knowledge of them until 1951, when the first examples were unearthed during archaeological excavations in Novgorod, where soil conditions proved particularly favourable for their preservation (fig. 1.10.3).

Since that first discovery, more birch-bark letters have been found every year, so that the total now stands at over a thousand, the vast majority from Novgorod, but a few also from other towns such as Pskov, Smolensk and Staraja Russa. Their state of preservation ranges from complete (about a quarter of them) to fragmentary. In most cases their horizontal dimension is between 150 and 400 mm, and their vertical dimension between 20 and 80 mm. The most extensive of them contains only 176 words, and this is exceptional: few of them contain more than fifty, and most of them twenty or less. They are dated mostly by stratigraphy, according to the layer of the excavation from which they were recovered, though in some cases the dating may be confirmed by other means (for example, references in them to known individuals); the oldest come from the second quarter of the eleventh century, and the most recent are four hundred years later. A few contain such varied texts as drafts of official documents, school exercises, love charms, etc., but the vast majority are private correspondence. Many relate to business, but some deal with more personal matters. While it is not always clear that the senders of such letters wrote them in person (though in many cases they did), they provide evidence for the use of the written word in much wider circles than

Fig. 1.10.3 Birch-bark document, fourteenth century, Novgorod, State Historical Museum, gramota 366, photograph courtesy of V.L. Janin, <http://www.gramoty.ru>.

those represented in ink on parchment, including women and peasants. Their informal contents and format are matched by their colloquial language, and it is fair to say that their discovery has revolutionized the study of the history of the Russian language, by providing information unavailable from other sources, particularly about the Novgorod dialect. This reminds us again that 'the book' is by no means the sole repository of language, and that—at least in this tradition—the record it provides is by no means complete.

Another widespread medium for temporary writing was wax. It had long been inferred that written waxed surfaces had been in use among the Slavs, not least from the frequent discoveries of styli with one end pointed for writing and the other flat for smoothing out the wax surface so that it could be used again. Direct evidence, though, was lacking until the sensational discovery in 2000—again in excavations at Novgorod—of a set of three tablets with the wax intact upon them (Franklin 2002, 46–47). These form a triptych, in which the two outer leaves have a wax-filled depression on their inner sides only, and the inner one on both sides. They bear the text of Psalms 75 and 76 and part of Psalm 67. The archaeological stratum beneath which they were found has been dated by dendrochronology to 1036, and thus, in terms of the Slavonic written record, they are very early, and both the text and the letter forms are consistent with such a date.

10.2.2. The roll and the rotulus

As elsewhere in Europe, legal records and accounts might take the form of rolls made of pieces of paper or parchment stuck together with text running parallel to the short edge of the roll: for this particular purpose, this form has the advantages that it is more or less indefinitely extensible, and that it is very hard to remove something from the middle of it without its being noticed. Apart from this, rolls are uncommon. The liturgical rolls prevalent among the Greeks are hardly reflected among the Slavs. Only a few are known, and they are typically found at points of cultural contact, where they are nevertheless heavily outnumbered by codices. There are three on Sinai, all Serbian and written in the middle of the fourteenth century: Sinai slav. 38N, Sinai slav. 39N (another part of which is Vatican City, BAV, Vat. slav. 9), and the fragmentary Sinai slav. 40 / 40N. The first of these has been identified as written by a scribe active in the Middle East, and the second was commissioned by the Cæsar Hrelja Ohmućević (d.1342/1343), who had detached himself from Stefan Dušan's kingdom and allied himself with Constantinople. Both of these may have been open to influence by Byzantine liturgical practice. On Mount Athos there are six rolls at Hilandar Monastery (3/I, 3/II, 3/III, 16/IV, 16/V, 16/VI) and one, associated with the reforming Patriarch Evtimij of Tărnovo, at Zōgraphou Monastery, all of parchment. Equally noteworthy is a very fine parchment roll, written in Russia but according to Bulgarian (Tărnovo) norms, St Petersburg, RNB, F.п.I.33, possibly one of the manuscripts commissioned by Archbishop Evfimij of Novgorod (consecrated 1434, d.1458) in connexion with the introduction of the Jerusalem Typicon at Novgorod. Evidence of a further Novgorod manuscript, now lost, is provided by Moscow, RGB, Uvarov 632 (44/561), a nineteenth-century copy which preserves the colophon of the original with the date 1424. It would appear that these Slavonic liturgical rolls were written in imitation of Greek liturgical practice in the context of liturgical contacts or reforms, but that the tradition never gained a wide currency among the Slavs. The parchment liturgical rolls may be written on both sides and wound around a wooden cylinder; in both these features they differ from the other types of roll. In all types of Slavonic rolls, the text runs in a single column with the lines parallel to the short edge of the roll, so that in this respect the Slavonic rolls resemble the Byzantine, and not the classical tradition in their layout.

In marked contrast to the liturgical rolls is a second group of Slavonic manuscripts that take this form, but have a completely different function and cultural status. These are rolls that typically bear so-called 'apocryphal prayers' (unofficial and sometimes doctrinally suspect Christian invocations) or short narratives describing encounters between Jesus or the saints and the unclean spirits held to be responsible for disease. They are found in both the Glagolitic (Vatican City, BAV, Vat. slav. 11) and Cyrillic traditions. The earliest paper examples date from the end of the fourteenth century, but the practice of using such rolls as amulets evidently goes back to the beginnings of Slavonic literacy. A group of amulets in the form of rolled sheets of lead has been found at various sites in Bulgaria and dated by archaeologists to the tenth or eleventh centuries. These bear incised texts, including some of the same apocryphal prayers and the *Epistola Abgari*. This last (which, although perfectly Orthodox, sometimes appears on the lists of prohibited books precisely because of this superstitious usage) is particularly interesting because of its persistent use as an apotropaic text in the Balkans. It gives its name to the celebrated *Abagar*, famous as the first printed text to contain elements of vernacular Bulgarian, printed in Rome in 1651 by Filip Stanislavov, Roman Catholic Bishop of Nikopolis. This was printed in narrow columns on one side of the paper only, in such a way that the columns of text could be separated and combined into a roll in order, as explicitly stated in the colophon, to be worn on the person 'instead of relics'. It is remarkable both as a move by the Church to adopt elements of folk religion and as the transition of a very specific form of written text from the manuscript to the printed era. Manuscript scroll-amulets continued to be produced in Bulgaria well into the nineteenth century; they may include pictures and other decorative elements.

A third group of manuscripts for which the roll form was preferred is represented by the calligraphic rolls which were produced in Russia from the sixteenth to eighteenth centuries (but most specimens date from the seventeenth; for examples, and illustrations, see Du Feu – Simmons 1970). Although they may incorporate continuous texts of various sorts, their principal purpose is to display the alphabet, each letter usually being represented by a multitude of cursive (*skoropis'*) forms. It is not clear whether they had any purpose beyond the demonstration of the writer's skill. In many cases this was considerable, so that the result may be highly decorative, but not visible unless the manuscript is unrolled.

10.3. The making of the codex

Apart from these very specific categories, 'the book', as far as the Slavs were concerned, meant the codex. By the time they had adopted it, its structure had become largely standardized in Byzantium, and this is reflected equally in the nascent Slavonic traditions.

10.3.1. The making of the quires

Any attempt at a comprehensive study of the Slavonic codex is hindered by the fact that, until quite recently, catalogues of Slavonic manuscripts have tended to omit any codicological description beyond the number of the leaves and the material of which they are made, so that there is much data yet to be collected (cf. Ch. 4 § 2.9). Nevertheless it is clear that from the earliest times the quires (errors and omissions excepted) normally consisted of eight leaves. This is not an absolute rule, any more than it is with Greek manuscripts (if anything, somewhat less), but it is a persistent norm. It continues, moreover, after paper replaces parchment, everywhere except in the Ukraine, where gatherings of ten or twelve leaves become the rule.

The rule of Gregory is by and large observed (though not always and not with total consistency), but—particularly in Cyrillic manuscripts—the quires most frequently begin with the hair side of the parchment. From the Greek point of view this is a 'provincial' practice, and may relate to a local tradition in the Greek uncials of the eighth and ninth centuries on which the earliest Cyrillic manuscripts were modelled. The earliest Glagolitic manuscripts, paradoxically, may follow a more 'modern' practice (for example, the quires of the *Codex Assemanianus*, Vatican City, BAV, Vat. slav. 3, begin with the flesh side; cf. Džurova 1997, 231). It is tempting to see in this the heritage of Constantinople, the city from which the mission of Cyril and Methodius set out.

10.3.2. Pricking and ruling

The Slavs inherited from the Greeks the practice of pricking and ruling the parchment in order to produce a consistency of layout throughout the volume. Pricking was most frequently done with an awl from the flesh side of the leaves; ruling in dry point may be done from the hair side or the flesh side, but most often

from the former, at least in those manuscripts in which the flesh side forms the outer surface of the quires. Occasionally the ruling was carried out leaf by leaf, but more often two bifolia at a time. No research on the scale of that done by Leroy for the Greek tradition (Leroy [Julien] 1976) has been carried out for Slavonic manuscripts; however, Džurova and Stančev have provisionally proposed a number of 'Slavonic' ruling types and ruling systems. (Given that Leroy was dealing with manuscripts in which the quires, as a rule, begin with the flesh side, and that in the vast majority of Slavonic manuscripts they begin with the hair side, the direct application of Leroy's categories to Slavonic manuscripts is problematic.) The results are so far somewhat inconclusive, not least because it is not infrequent for different systems to coexist within the same manuscript. However, Džurova has noted that while the earliest Glagolitic manuscripts tend in this respect to reflect contemporary practice at Constantinople, Cyrillic manuscripts are more 'archaic', and their ruling, like the organization of their quires, finds closer parallels in the Syriac, Armenian and Georgian traditions (see the more detailed discussion in Džurova 1997, 47, 92–106, 230–231).

In round Glagolitic manuscripts the text is generally written below the line, as is commonly the case with Greek minuscules after the tenth century; indeed, the alphabet seems to have been intended to be written in this way, as some of the letters, such as ⰻ, do not reach the base line (cp. fig. 1.10.4). Cyrillic, by contrast, like the Greek uncials from which it is derived, is generally written above the line (cp. fig. 1.10.1), though there are occasional examples of 'hanging Cyrillic', written below the line. These are few in number and almost all very early, including such important manuscripts as the Enina Apostolos (Sofia, NBKM, 1144). They may reflect the practice of scribes accustomed to writing in Glagolitic.

Hardly any research has been done on the ruling systems of paper manuscripts. These can be quite complex, sometimes including guidelines for marginalia, running titles, etc. Double ruling—providing not only a base-line but a head-line—is particularly prevalent in Romanian manuscripts, but rare elsewhere. The use of a ruling board, typically made of wood with cords glued to it to form ridges against which the paper could be pressed down in order to be impressed with the desired ruling pattern, was common from the fifteenth century onwards. This, the equivalent of the Turkish (Arabic) *miṣṭara* was known as *karamsa* in Russian and *karaksal* in Bulgarian; both words are presumably derived ultimately from Greek *charassō* 'to engrave', though it is not entirely clear by what processes. The use of such a board was evidently very convenient in reducing the labour involved in ruling, to the extent that it might be used even though it did not correspond perfectly to the layout of the book it was intended to produce—two columns instead of one, or *vice versa*, superfluous marginal guidelines, a written area inappropriate for the size of the page. In such cases the scribes were quite capable of using the ruling pattern as only an approximate guide, ignoring unnecessary elements, writing outside the ruled area, etc.

10.3.3. Ordering systems

Quire signatures are often lost when they are placed very close to the edge of a leaf which was subsequently trimmed during binding, so that the fact that they are frequently absent, particularly from the oldest manuscripts, does not mean that they were not originally there, and examples are known from as early as the eleventh century. The signatures are always numerical, and may be on the first recto of each quire, or on the last verso, or on both; the practice of signing quires at both ends becomes more frequent with the passage of time. They are usually placed in the lower margin, either centrally or toward the outer edge (rarely toward the inner edge) of the page (cp. fig. 1.10.8). Signatures in the upper margin are uncommon, but may occasionally be encountered in manuscripts of all periods. Occasionally scribes mark the first leaf of a gathering with a cross placed centrally in the upper margin of the recto; this may be combined with other signing systems and is found mostly in Ukrainian manuscripts. Catchwords and signatures on the inner pages of gatherings are infrequent and appear only toward the end of the manuscript period, evidently under the influence of printed books; the same is true of foliation or pagination, which remain unusual. Running titles, however, are often met with (but not obligatory) in certain types of manuscript such as the Gospels, where the name of the evangelist may appear in abbreviated form at the top of each recto (though there are examples where not every leaf is so marked).

10.4. The layout of the page

The enthusiasm that Byzantinists have shown in recent years for 'quantitative codicology' has not been matched by Slavists, and in the absence of extensive statistical data one can only give a tentative and

approximate outline of this aspect of the Slavonic book. An analysis of forty-eight codices in Budapest, carried out for the purposes of this chapter, reveals that the ratio of height to breadth varies from 0.85 to 0.59, with some correlation between this ratio and the overall size of the volumes, the smaller books being 'squarer' (only one book with a vertical dimension over 300 mm has a ratio greater than 0.65). While this may be comparable with Byzantine codices, the proportion of the page occupied by text (the 'black') is not: in fewer than a quarter of the books does it fall below 50%. Those with a very large area occupied by text tend to be late and informal, but even so, in one fourteenth-century Gospel book it reaches 63%. By and large, as one might expect, the higher the quality of the manuscript, the smaller the written area relative to the overall size of the page. However, given the depredations of binders over the years, it is in almost every case impossible to say what the original proportion of text to page was.

Although the above is a very small sample, it is likely to prove typical, at least as far as 'ordinary' manuscripts are concerned. Departures from the norm are more likely in particularly luxurious manuscripts on the one hand, or particularly rustic ones on the other, and not only because of their decoration or lack of it, but even more because of their scribes' attitudes to their materials. In the former case they were able to allow themselves extensive margins to set off the aesthetic qualities of their text, while in the latter considerations of economy seem to have dictated a more intensive use of parchment that was itself not necessarily perfectly regular. Nevertheless, although—as we shall see when we come to look at their decoration—continuing influence and shared development with the Byzantine tradition is easier to trace in manuscripts of the highest quality, it is clear that the major traditions of Cyrillic manuscript production were not only originally derived from Byzantium, but continued to take the Byzantine tradition as their model in later ages.

10.5. Text structure and readability

10.5.1. Writing

The visual arrangement of the text within the manuscript, reflecting its logical structure, essentially continues—or parallels—that of Greek manuscripts, with their headpieces (and more rarely tailpieces), titles and initials. Cyrillic bookhands are derived from uncials, not minuscules, and this does to a certain extent affect the immediate appearance of the page, particularly in the more formal manuscripts (see also Ch. 2 § 9). Nevertheless, the relationship between the majuscule title and the rest of the text is very similar, in usage, proportion, and even the shape of the majuscule characters, to that seen in Greek minuscule manuscripts. The first Cyrillic majuscule titles are very early (in uncial manuscripts such as the *Codex Suprasliensis*, fig. 1.10.1) and the contrast between them and the ordinary bookhand (and, in the more elegant manuscripts, their decorative character) becomes more pronounced with the passage of time. In the later period, and especially in Russia, the use of ligatures in titles may become more and more frequent, until it develops into a style of writing known as *vjaz'*, in which adjacent letters share their vertical strokes, and those without any, such as ϵ, are reduced in size and tucked into the spaces between the others (Ščepkin 1903; cp. fig. 1.10.8); by the seventeenth century this extreme form of ligation, combined with the increasingly elongated proportions of the characters, reaches a point where the titles' decorative function is often achieved at the expense of legibility.

Similarly reminiscent of Greek practice are the large initials which may set off sections of the text which do not merit a separate heading, to the extent that they are known to Cyrillic palaeographers as 'neo-Byzantine'. They normally occur at the beginning of a line, and may protrude into the margin. Typically red, they may be two or more lines in height and may be plain or decorated with nodes and tendrils.

It is not only in their general layout, however, that Cyrillic manuscripts follow their Byzantine prototypes; the resemblance may be even more pronounced in particular books. Thus a page from the Gospels—particularly after the general acceptance of the Jerusalem Typicon in both Byzantine and Slavonic worlds during the fourteenth century—is likely to have exactly the same layout in both Greek and Slavonic traditions: the block of text in black divided by rubrics indicating the pericopes and the occasions for which they are appointed, with, in the margins, pericope numbers in red, chapter numbers in black, and the proems of the pericopes in red.

This is, admittedly, not universal, and some of the finer points of Byzantine textual organization may be lost in Slavonic transmission. One example would be the lists of contents that form part of the Euthalian apparatus preceding each Epistle in continuous texts of the *Apostolos*, in which the sections,

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numbered in black, may be divided into subsections, numbered in red. The distinction of colour is hardly ever maintained in Slavonic manuscripts, so that the numbering ceases to be comprehensible. Similarly, the *Apostolus Christinopolitanus* (Lviv, Historical Museum, 39) is unique among Slavonic commentated *Apostoloi* (of which, dating from the twelfth century, it is the earliest example) in having a layout very similar to Byzantine manuscripts of the same type, with the text occupying the centre of the page and the commentary surrounding it. In later manuscripts (even the commentated *Apostolos* of 1220, Moscow, Gosudarstvennyj istoričeskij muzej, Syn. 7) the commentary is brought in from the margin and intercalated with the text, so that the latter is broken up into very short sections (sometimes even single words), within a simple one- or two-column layout. In the better manuscripts, a visual distinction between text and commentary is maintained, but this is not always the case, and confusion does arise. This is a good example of the tendency of Slav scribes to avoid the elaborate layouts that may be found in Byzantine (and still more in Latin) manuscripts, even to the occasional detriment of the structure of the text. Most manuscripts have a single column of text. Two columns may be used in large-format manuscripts where the length of the lines of a single column might be detrimental to legibility, though often very large manuscripts are also written in large script, so that a single column suffices. It is, however, not uncommon for Gospels written in single columns to be followed by lectionaries (consisting largely of calendrical information and rubrics) arranged in double columns; this partly reflects considerations of legibility and scribal convenience, but also the relative status of the two types of text. Subordinate sections of a work, such as prefaces or apparatus, may be written in smaller script than the main text, and in such cases a different layout may be adopted for them. It would, however, be unwise to generalise about particular formats for specific types of text, as practices varied considerably at different periods and in different places.

The early manuscripts are, as a rule, written in *scriptio continua*, though the Kiev Missal (fig. 1.10.4) is a remarkable exception. Word-division—or rather division into prosodic units—establishes itself in the Glagolitic tradition from the thirteenth century (MacRobert 2002, on which this paragraph is largely based). Cyrillic is more resistant to it, though the otherwise conservative and isolated tradition of Bosnia begins to provide examples of di-

Fig. 1.10.4 Kiev Missal, tenth century, Kiev, Ukrainian National Library, 19264, f. 3r, photograph courtesy of the Ukrainian National Library.

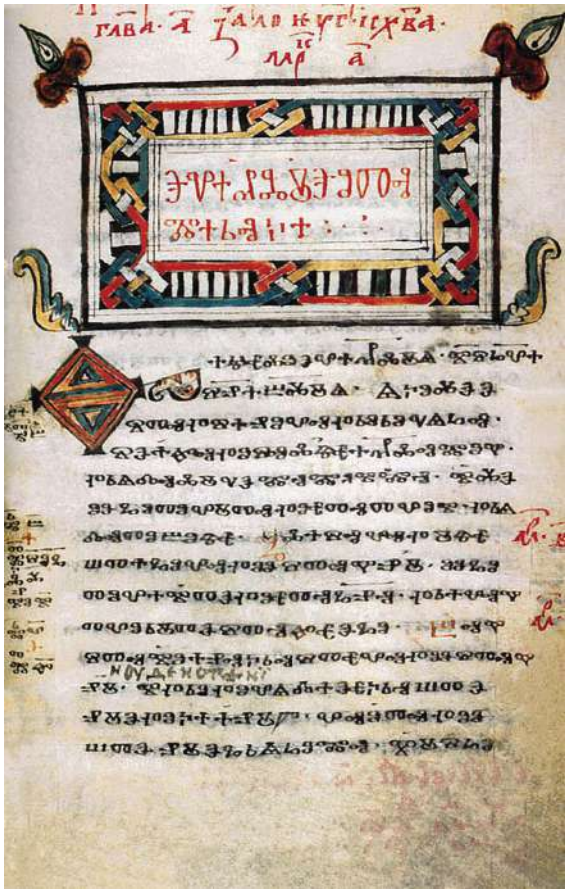

Fig. 1.10.5 *Codex Zographensis*, tenth/eleventh century, St Petersburg, RNB, Glag. 1, f. 1r.

vision on a prosodic basis from about the same period, possibly under Glagolitic influence. Division into prosodic units is observed in the more mainstream Serbian tradition from the beginning of the fourteenth century, though it appears not to have been obligatory and to have been subordinate to other principles governing the disposition of text on the page. By the time of the Second Dragalevci Gospels (Sofia, NBKM, 347, written near Sofia in the 1580s) word-division may be almost modern, with only clitics and non-syllabic words not separated from their neighbours, but in other manuscripts from the same period and even later *scriptio continua* persists: it seems to have been a matter of local or even personal preference. By and large the Balkan Slavs seem to have been more advanced in this respect than those of the east, but it is impossible to lay down hard and fast rules tying the progress of this development to particular times and places. Its general direction is nevertheless clearly from *scriptio continua* toward a progressively more systematic word-division, which was probably assisted by the appearance of printed books, in which prosodic division is used from the beginning.

10.5.2. Decoration and illumination

The illuminators of manuscripts derived their art from the same sources as the scribes, namely the Byzantine codex. The use of decorative elements to reflect the logical structure of the text has already been mentioned, and, just as the practice follows Byzantine models, so does the actual decoration. It is already present in the earliest manuscripts, in which its extent varies considerably. Even in a large and elegantly written manuscript such as the *Codex Suprasliensis* (fig. 1.10.1) the decoration may be confined to simple ribbon-like head- and tailpieces and some outline initials. By contrast, the *Codex Zographensis* (St Petersburg, RNB, Glag.1, a Glagolitic tetraevangelion and one of the major canonical Old Church Slavonic manuscripts, see fig. 1.10.5) has polychrome headpieces, and there is evidence that originally it had miniatures of the evangelists, which do not survive (Zagrebin – Levšina 2009). To some extent, the fact that early Glagolitic decoration is derived from the Byzantine tradition—or even, one might say, represents a provincial strand of the Byzantine tradition—may help to fill in the gaps left by the absence of any possibility of dating round Glagolitic manuscripts by palaeographical criteria. A comparison of the iconography of the historiated initials in the *Codex Assemanianus* (fig. 1.10.6) with Greek manuscripts (which are datable) has shown that the closest parallels are to be found in the eleventh century, which suggests that this is the probable date of the *Codex Assemanianus* itself (Musakova 1996).

The Ostromir Gospels being the earliest dated Slavonic manuscript (1055–1057), its miniatures are also the earliest to which a firm date can be assigned. There are three of them, depicting SS Mark, Luke, and John. (Presumably St Matthew was also originally represented.) They are all of a high quality, and all have evident Byzantine antecedents, which are particularly evident in the treatment of St John's garments. The miniatures of St Mark and St Luke are by a different artist, and while in terms of their iconography and composition they may be compared with miniatures in Greek manuscripts, their technique obviously owes a great deal to Byzantine enamels, the draperies being conveyed by fine gold lines through blocks of colour reminiscent of cloisonné enamel. There had been active artistic contacts between Kiev and Constantinople since the conversion of Rus' at the end of the tenth century (most famously in the decoration of St Sophia in Kiev, but elsewhere as well), so it is not surprising that by the time the Ostromir Gospels manuscript was decorated, local artists had assimilated the styles and techniques of Byzantine painting and were producing masterpieces of their own.

It may thus be said that as early as the middle of the eleventh century, Slavonic book art had acquired a momentum of its own and was capable of an existence without reference to its Byzantine models. It is noteworthy that the miniatures of the Ostromir Gospels were the models for those in the Mstislav Gospels (Moscow, Gosudarstvennyj istoričeskij muzej, Syn. 1203), fifty or sixty years later (in which, incidentally, the miniature of St Matthew survives, providing an idea of its lost original in the Ostromir Gospels). Particularly remarkable is the fact that the Mstislav Gospels are dependent on the Ostromir Gospels for their decoration but not for their text, which represents a different redaction of the Slavonic translation. This shows that its creators did not simply set about reproducing an existing manuscript, but were selective, taking the most admired or most authoritative features from the various sources available to them.

The most luxurious illumination of course depended on generous patronage, which in the eleventh and twelfth centuries meant above all the courts of the Russian princes; from the latter part of the twelfth century, the rulers of Bulgaria and Serbia also began to commission manuscripts, leading up to the golden age

in the reign of John Alexander of Bulgaria (1331–1371). Some manuscripts were also produced for members of the higher clergy. It is noteworthy that some of the most outstanding Slavonic manuscripts from an artistic point of view have Greek models. The Kiev Psalter (St Petersburg, RNB, OLDP F 6) is—apart from its Slavonic text—a typical member of the group of so-called 'monastic' illustrated psalters (i.e. with illustrations on the margins), closest in its iconography to the Baltimore Psalter (Baltimore, Walters Art Gallery, W733). It is hardly co-incidental that the prelate who commissioned it, Bishop Michael of Smolensk, had twice visited Constantinople, in the company of two Metropolitans of Kiev (*de facto* of Moscow), Pimen, and (after his death) Cyprian, a Bulgarian who had spent much time in the Imperial City and was an even more important *Kulturträger* for Russia in the context of the liturgical reforms that accompanied the introduction of the Jerusalem Typicon and were to have a very significant effect on book production in Russia. The Psalter was written in Kiev—hence the name by which it is known—in 1397, during which year both Bishop Michael and Metropolitan Cyprian were visiting that city, and the scribe, Spiridon, evidently from Moscow, was part of their entourage.

Fig. 1.10.6 *Codex Assemanianus*, eleventh century, Vatican City, BAV, Vat. slav. 3, f. 81v, from Ivanova-Mavrodinova – Džurova 1981.

The 'aristocratic' illustrated psalter (i.e. with full-page miniatures) is also represented among the Slavs, by the Tomić Psalter (Moscow, Gosudarstvennyj istoričeskij muzej, Muz. 2752) and the Munich Psalter (Bayerische Staatsbibliothek, Cod. slav. 4). The former is believed to have been commissioned by the Bulgarian Tsar John Alexander in the early 1360s, and the latter for Prince Lazar of Serbia (d.1389) or for his son Stefan Lazarević; they show iconographical affinities with each other and with the Byzantine tradition to which they belong. Even more striking is the case of the Gospels of John Alexander (London, BL, Add. 39627), written in 1356, which has been shown to be directly dependent, as far as its illumination is concerned, on an eleventh-century Greek manuscript now in Paris (BnF, Grec 74).

This is partly to do with the prestige that Constantinople and its cultural traditions enjoyed among the Slavs, and also because it provided the model of Empire: John Alexander and his family are depicted in the Gospels in full Byzantine imperial regalia. Equally, however, Slavs and Greeks were working within the same tradition, and probably would not have recognized the dichotomy that modern scholarship has imposed upon them. It was possible, after all, for a Slavonic artist to illuminate a Greek manuscript: such is the case with London, BL, Add. 24376, a fourteenth-century Greek Gospel manuscript with four full-page miniatures which, to judge by their Slavonic inscriptions, are the work of a Slav. To this extent there was a single Orthodox Christian culture which transcended national or ethnic differences. This is not to say that it was uniform—nobody would mistake North Russian teratological ornament for Greek workmanship—but it did possess a certain wholeness which allowed for cultural transference either in particular instances, as in the major commissions just mentioned, or where there was immediate contact, in such cultural centres as the monasteries of Mount Athos. The essential point is that it was not a question of a single borrowing of Byzantine artistic models and techniques at the outset: the local traditions that developed from them developed not in isolation, but within the overarching framework of the Byzantine Commonwealth, and always with the possibility of refreshing their inspiration from the source.

Naturally, it was those books that were most frequently copied that developed the most regular decorative schemes. It is only the more richly decorated books of the four Gospels that have full-page minia-

Fig. 1.10.7 The Anikievo Gospel Book, early fifteenth century, Library of the Russian Academy of Sciences 34.7.3, ff. 92v-93r, miniature showing St Mark and the *incipit* of the Gospel of Mark, photo from Sarab'janov – Smirnova 2007, 457.

tures of the evangelists, each before his gospel, but almost all will begin each gospel with a large headpiece and very large initial, which may incorporate figurative elements (the initial Ⱬ at the beginning of St Mark's Gospel in particular invites the scribe to turn it into a serpent; fig. 1.10.7) or be entirely abstract; lesser components of the book (prefaces, lectionary tables and suchlike) will also have their headpieces, but smaller and less elaborate than those that introduce the gospels themselves. Other widely-used books had their own decorative norms, though the particular prestige attached to the Gospels (particularly those copies intended to be kept on the altar) meant that as a rule they tended to have more care and attention lavished on them than any others, even those which also had a liturgical function.

Conversely, secular books (which in any case constitute a minority of extant Slavonic manuscripts), being less prestigious, are by and large less extensively decorated, or in some cases not decorated at all. Certain works, such as the *Physiologus*, have subject-matter that encourages illustration, though this is by no means always of a high quality. Amongst secular works it was above all histories that attracted illustration of the heroes and events that they dealt with (though it was not an obligatory component and there are historical manuscripts in which the text is not illustrated at all); this is true both of general chronicles and individual works on historical themes such as the *Alexandriad*. Outstanding among these are the historical manuscripts commissioned by rulers, where the resources of high patronage are combined with the prestige generated by the patrons' consciousness of their own position in the flow of world events. Most famous among these are the Chronicle of Konstantinos Manassēs (Vatican City, BAV, Vat. slav. 2), another of John Alexander's manuscripts, and the colossal illustrated chronicle (*Licevoj svod*) written for Ivan the Terrible, which consists of ten very large volumes, now divided amongst three libraries, containing in all over 16,000 miniatures.

10.6. The scribe, the painter and the illuminator at work

10.6.1. Persons, places and methods

Among the Slavs, as among the Greeks, the production of books was not the prerogative of the monastic scriptoria that dominated scribal activity in Western Europe in the earlier Middle Ages. Although archaeologists have identified one building at the ninth-century monastery at Ravna, in eastern Bulgaria, as a 'scriptorium' (Popkonstantinov – Kostova 2010, 120), this is far from certain; and even if books were copied there, there is no basis for assuming the same sort of organization and regular administration that the word 'scriptorium' implies in a Western European context. The very high quality of some of the work, which is to be found wherever there was wealth and patronage, indicates the existence of a body of highly trained scribes who were available for major commissions, but we have no knowledge of who they were or where or how they were employed. The scribe of the Ostromir Gospels identifies himself only as the deacon Gregory, which presumably means that he was a member of the secular clergy, but there is no re-

cord of what else he may have done in this capacity, where he served, or of any other books that he wrote, though he was certainly an experienced scribe. Of the illuminators of this book we know even less; all that we can deduce is that they were Eastern Slavs, and that they too were experienced craftsmen. There are other cases where a book can be shown to be the work of a professional team of scribes working in a co-ordinated manner, which, again, implies the existence of scriptoria even as early as the twelfth century (see the analysis of Syn. 262 in the Historical Museum in Moscow by Uchanova 2008), but it is not at present possible to identify them with precise locations. Virtually all the major Slavonic manuscripts of the earlier period are isolated; only occasionally can one identify the same hand in more than one of them. All that one can safely deduce from this is that a large amount of material must have been lost. There is, moreover, other evidence which suggests that by no means all manuscripts were produced in such an organized manner in the early period. A man such as the scribe of the Bitola Triodion (Sofia, BAS, 38, twelfth century) who complains bitterly of the cold, even though he was writing in a monastery, was certainly not working in a room properly appointed for the production of books. He was not the only scribe to complain of his working conditions. It is possible to form only a very incomplete idea of the circumstances in which books were written in the earlier period from such random scraps of information.

It may be in part this absence of material that makes the attribution of manuscripts to particular centres—let alone to particular scriptoria—impossible until very late in the history of the Slavonic manuscript book. For the earlier period, in the absence of any explicit evidence in the books themselves, they can only be attributed regionally—and that on linguistic rather than palaeographic grounds. This is reflected in the traditional practices of manuscript description, which differ from those of Western Europe in that instead of the geographical origin which forms part of the summary data normally provided in a western description, the description of a Slavonic manuscript may specify the recension of Church Slavonic used (in Russia) or the orthographical system (in Serbia and Bulgaria).

However, our inability to identify the place of production of a manuscript with any precision is due not only to the gaps in our information, but also to the apparent absence of 'house styles' at many of the places where manuscripts were written. It is not abnormal to come across a manuscript clearly written at one time and in one place by a team of scribes who made no attempt to standardise their practice. Even individuals could be inconsistent. The manuscript Eton College 40 is a Gospel book in which the actual Gospels and their prefaces are written in Church Slavonic of the Serbian recension, but the lectionaries and other material that follow (which are written by the same scribe and begin on the fourth leaf of a quire) are written in the Bulgarian recension. The scribe had presumably copied the latter from a different antigraph, but what is noteworthy is that he evidently felt no need to impose any linguistic consistency.

It is only toward the end of the Middle Ages, in the sixteenth and seventeenth centuries, that we find centres of book production that are recognisable by their products, such as the Kirillo-Belozerskij Monastery in Russia, or Etropole and (even later) Adžar in Bulgaria. There are several factors operating here. One is, of course, the greater quantity of material that has survived from these later times, but another is the organization of production, where a permanent body of craftsmen—not just scribes, but binders and other persons involved in making books—were engaged in catering not only for the immediate needs of the monastery, but for the wider world as well. Although we do not have sufficient evidence to state positively that such centres had not existed previously, it does appear that a significant proportion of the books that were produced in the earlier period were written ad hoc, to satisfy the requirements of a particular church or monastery, or in response to the commission of a rich donor. This would certainly explain the predominance of the clergy amongst early scribes. (The majority of those who identify themselves give no information beyond their names, but those who do are almost invariably priests or monks.) Although not the only people who could read and write, they were the only ones who actually needed books in their daily lives, and might thus be impelled to write for themselves what they could not obtain by other means. This practice continued well into the eighteenth century, for printing, although by that time established in all the Slavonic countries except Bulgaria, was (depending on circumstances) commercially underdeveloped or a state monopoly, and thus not fully responsive to the laws of supply and demand. There was inadequate provision of certain types of printed book, which continued to be written by hand.

In the early period, people who wrote books usually wrote for the institutions that they served rather than for themselves personally, for the materials were expensive and the ordinary parish clergy are unlikely to have been able to afford them as their personal possessions, while monks have no personal

property in principle. Even the great commissions by princes and other prominent individuals were frequently undertaken as donations to major churches and monasteries, although some were for personal use. This means that there was comparatively little trade in books: once a volume was given to the church or monastery, or received by the princely treasury, it was expected to stay there. There is also very little evidence indeed of payment to scribes. In the case of books intended to be used by the writer, the question would not arise, and monks would presumably not expect to be paid for their labours (though their monasteries might, if the books were not for their own use), and in those cases, such as expensive commissions, where it is likely that paid craftsmen were employed, the payment is not recorded in the books.

Fig. 1.10.8 *Codex Rilensis* 4/14, copied by Vladislav Grammaticus in 1456 (*Hexaemeron*), f. 1r, photograph courtesy of the abbot and the monks of the Monastery of St Ivan of Rila, Bulgaria, and the Virtual Library and Digital Archives of the Rila Monastery manuscript collection, Sofia University.

10.6.2. Colophons

Inscriptions regarding the sale and purchase of books become common only in the later period, when a plentiful supply of paper had made books more numerous and affordable. By this time it was common for a book to be purchased, rather than written, for a parish church, so that we find inscriptions such as this: 'This book of the Gospels was bought by the priest Petr Plešovskij and his wife Fenna for the village of Strojne for the remission of our sins and those of our children and of all departed Orthodox Christians. I bought it from Petr Hankuvskij and gave for it a cow and a bull, that was the price of the Gospels. … And I ask for God's sake that whoever shall celebrate using it shall not forget us sinners, and let him serve God in the church to which God shall send it. In the year of Our Lord 1697' (Budapest, OSZK, Fol. Eccl. Slav. 13, ff.5–24). This is informative in several respects. The village of Strojne is in the Subcarpathian oblast' of the Ukraine, which shows that in that region a manuscript written in the middle of the sixteenth century was still a working book 150 years later, for the inscription shows that it was expected to be used in the celebration of the Liturgy. Its price was still substantial, though it seems to have been comparable with prices for large printed books at that time; in 1724 the book was rebound for twelve Hungarian silver pennies (*máriások*). It is unclear (as always in such inscriptions) whether the donor purchased it himself and then presented it to the church, or whether he simply financed its acquisition. Quite exceptional is Father Petr's realism in asking to be commemorated wherever the book was used: usually these inscriptions end with an anathema against anyone who removes the book from the church to which it is given, though this, considering the manuscripts' present locations, was never effective.

Inscriptions such as these, which record events in a manuscript's history, are much more common than those which record its creation. It is customary for cataloguers to record dated manuscripts separately, and a survey of catalogues, despite the variety of the collections that they describe, reveals quite a consistent result: less than an eighth of the manuscripts are dated, and even fewer have anything that could properly be described as a colophon. When scribes' names appear, they are often in brief invocations of God or the saints to have mercy upon them, which say very little about the scribes, or the circumstances in which the book was written.

The formal colophon appears most frequently when the book was commissioned by some dignitary, and as a rule says much more about him than about the scribe. The earliest surviving colophon, that of the

Ostromir Gospels (1055–1057), is typical in this respect. Apart from this, there is no standard format for a colophon. It may mention the place for which the manuscript was written, if it was commissioned by an institution or by a donor for presentation. In an ecclesiastical context, the name of the relevant abbot or bishop may be mentioned, so also secular rulers. It follows that major commissions are more frequently provided with colophons than 'ordinary' manuscripts.

10.6.3. Dating systems

The date in a colophon is given *anno mundi* according to the Byzantine Era (in the seventeenth century sometimes also anno Domini); by and large the indiction is given as well. Occasionally, and particularly in later Serbian manuscripts, quite copious additional calendrical information, such as the lunar and solar cycles, the epact, etc., may be supplied. At the other extreme, the modern researcher may be frustrated by a scribe who gives the day and the month, but omits the year.

Usually only the date of completion of the manuscript is given, but sometimes also the date on which work began. The Ostromir Gospels is such a manuscript, begun on 21 October 6564, and finished on 12 May 6565. Though it is usually dated 1056–1057, this is based on the assumption that the year began in March, which would be most unusual in an ecclesiastical context (Ramazanova 2010). Assuming the normal practice of a September New Year, then this manuscript of 294 leaves, written in a fine uncial, was begun on 21 October 1055, and took eighteen and a half months to write. Since we have no idea of what other calls Gregory had on his time, this tells us very little about the actual time it took him to write the manuscript. However, it is clear that even a less ambitious book was a major labour, though this rarely finds expression in the formal colophon. Occasionally, however, scribes find it possible to address their readers less formally. A seventeenth-century Ukrainian scribe tells us: 'After the beginning comes the end. Glory to the Lord God, who has permitted me, the sinful priest Basil, to complete this book called Šestodnik [a variant of the *oktōēchos*] in the village of Labovo. As the hare rejoices when it has escaped from the stoat and lies safe in its forme licking its paws, so the poor scribe, when he finishes a book, would gladly drink to anyone who could be found to pay him for it' (Budapest, University Library, Cod. slav. 3, f. 271).

10.7. Bookbinding

Like other aspects of book production, the Slavs took over the technique of bookbinding from Byzantium. Like their Greek colleagues, Slavonic binders sewed the quires with the same thread that attached them to the boards, beginning by threading it through grooves on the boards, using a biaxial stitch disposition and finishing by joining the two halves of the book in the middle. The endbands, typically made of a two or more threads wound round a double core of tawed leather, were likewise attached to holes in the boards and sewn into each gathering, providing additional strength very necessary to hold a link-stitched binding together, and giving the book its characteristic appearance, with the length of the spine noticeably greater than that of the fore-edge. Since in such a binding the boards are attached before the text block is fully assembled and the pages can be trimmed, the binding is invariably flush with the pages. The boards would then be covered with leather—in the oldest examples completely undecorated—and might be provided with studs and bosses on the outer surfaces of both boards. Clasps, usually two in number, held the fore-edges together and helped to prevent the parchment from warping (though they continued to form part of the binding long after parchment had been replaced by paper).

In the thirteenth century, Russian binders adopted the sewing frame and began to sew the quires, generally, on tawed thongs, attaching the boards at the end of this process. Initially, however, this had no effect on the outward appearance of the book: bindings continued to be produced flush with the pages and with substantial endbands. It is only in the sixteenth century that we begin to see bindings wider than the text block in Russia, and even later in the Balkans, where binding techniques are consistently more conservative than those farther north. (For a more detailed discussion of Russian bindings, see Mokretsova 1995, and for Serbian, Janc 1974.)

Although the covers of the earliest surviving bindings (which are not numerous) are undecorated, from the fourteenth century blind-tooling becomes the usual technique of decorating the leather. This may take the form of a geometrical division of the surface into various patterns, or the use of small repeating stamps. The patterns created are often very similar to those on contemporary Greek bindings; since the tools used are both durable and portable, the potential for transmission from one place to another is high.

Later, larger tools with figurative depictions come into use, so that by the seventeenth century a typical Gospel book may have an upper cover with a medallion depicting the crucifixion in the middle and the four evangelists in the corners, and some decorative motifs in the intervening space; the lower cover would usually be less elaborately decorated. By this time, gilt tooling is also quite frequently encountered, and the extensive use of larger tools sometimes gives the bindings a somewhat congested appearance.

Although the tooling of the bindings might include images appropriate to the contents of the books they covered, or their actual names, it might also be purely decorative, and this allows a greater cross-cultural influence in the binding than in other aspects of the book. In the Balkans one may find Islamic elements in the bindings of Slavonic books, and very occasionally a binding that is entirely oriental in character, though this is so infrequent that it probably means that the book in question was entrusted to a Turkish binder and does not indicate a wholesale adoption of oriental techniques by Christian craftsmen. Similarly, 'hybrid' bindings combining Russian and Western European practices were sometimes produced in the Grand Duchy of Lithuania.

The usual material used for covering books was leather. The use of metal—usually brass—studs and bosses has already been mentioned, and these may have been both functional, protecting the books when they were stacked horizontally, and decorative. In later bindings these metal fittings may include plates with various designs—again, one most frequently sees a central crucifixion and corner-pieces with the evangelists. These are, of course, intended for the adornment of a book which was held in honour. In the most luxurious bindings, leather may be abandoned altogether, and other materials, usually expensive cloths or precious metals, used instead. Examples are rare: cloth was not durable, and precious metals were not only expensive to begin with, so that they were not often used, but also liable to be despoiled at moments of crisis. The Gospels of John Alexander, for example, originally had a metal binding: the colophon states that the Tsar had it bound with 'golden plates', and this is confirmed by the numerous nail-holes in the boards, which are now covered in red leather. A roughly contemporary binding that does survive is that of the Gospels of Simeon the Proud (Moscow, RGB, ф.304/III, №1), which is dated 1344. It is of silver, with chased decoration of floral and foliar motifs, and has attached to it further silver plates (both chased and niello) depicting the crucifixion, apostles, cherubim, etc. This type of cover also has Byzantine antecedents, and there were definite contacts between Moscow and Constantinople in this area of work: the Altar Gospels of the Cathedral of the Dormition, which is a Russian manuscript, has a gold cover decorated with chased figures, filigree and precious stones made by Greek craftsmen working in Moscow in the first half of the fifteenth century (Sterligova 2013, 150–156). This obviously represents the extreme of luxury in the bookbinder's art; but even so, it exemplifies the close relationship between the Slavonic and the Byzantine book, which manifests itself consistently at all levels of book production.

References

Bogdanović 1978; Daskalova – Rajkova 2005; Du Feu – Simmons 1970; Džurova 1997; Franklin 2002; Hristova et al. 2003–2004; Ivanova-Mavrodinova – Džurova 1981; Janc 1974; Keenan 1971; Kireeva 1997; Leroy [Julien] 1976; Lichačev [N.] 1891, 1899, 1994; MacRobert 2002; Maniaci 1999a, 1999b; Mefod'eva 2009; Mokretsova 1995; Morozov 1994; Mošin – Traljić 1957; Musakova 1996; Petrova – Sadovskaja 2009; Popkonstantinov – Kostova 2010; Ramazanova 2010; Sarab'janov – Smirnova 2007; Ščepkin 1903; Simoni 1903, 1906; Sterligova 2013; Tromonin – Klepikov 1844; Uchanova 2008; Zagrebin – Levšina 2009.

11. Syriac codicology (PGB–FBC–EBW)*

11.1. Materials and tools (PGB–FBC)

11.1.1. Papyrus

Syriac papyri are relatively rare and have come down to us only in a fragmentary condition (on papyri and all other materials, see Briquel-Chatonnet forthcoming). They are kept in various European libraries, in Berlin, Florence, Oslo, Oxford, and Vienna, having been collected from the end of the nineteenth century until the end of the twentieth (for a list, see Brashear 1998, 91 n. 24; updated by Butts 2011). The known surviving fragments—all apparently parts of codices—mostly originate from Egypt (from the monastery of St Catherine on Mount Sinai, and recently from Dayr al-Suryān (Bigoul El-Souriany – Van Rompay 2001), as well as from Kellis in the Dakhleh Oasis), but some were also discovered in Palestine (Khirbet Mird) in 1953; a single fragment kept in Berlin may be of Persian origin. As for the dating, where possible scholars resort to the archaeological context, as in the case of some fragments discovered in Syria, dating back to the second century CE; but in the great majority of cases, dating depends only on palaeographic criteria, according to which most Syriac papyri date from the sixth to the tenth centuries (Sauget 1985). The texts are of religious content, sometimes quoting, or paraphrasing, passages from the Bible. The content of the Kellis papyri is Manichaean (Franzmann – Gardner 1996; Franzmann 1999), and it is not clear if they derive from one codex or from several codices.

11.1.2. Parchment

Several parchment fragments containing private writings and legal documents dating back to the third century CE were found in the 1930s at Dura Europos in eastern Syria. Of particular interest are two fragments studied and published by Teixidor (1990) and subsequently examined by Brock (1991a). The first of them, measuring 200 × 125 mm, bears traces of bending, pricking and seaming at the top, short edge. The content is legal, and the text, written on both the flesh and hair sides, is dated to 552 of the Seleucid Era (239/240 CE). The second fragment, measuring 250 × 150–160 mm and damaged, is an attestation of a sale of land and property. The informal cursive script is extremely difficult to read, but the text is dated to the fifth year of the reign of Emperor Gordian (242).

The oldest extant Syriac manuscript books are written on parchment, such as the oldest dated Syriac manuscript, London, BL, Add. 12150, dated 411. Specific studies on parchment used for Syriac manuscripts do not exist; scholars usually refer to the Coptic and/or Greek use of this material as a suitable and reasonable parallel (see for instance Meščerskaja 1987, 109–110). With the introduction of paper in the tenth century, the use of expensive parchment gradually decreased, being in the end restricted to texts of particular value and sometimes decorated and illustrated, such as Bibles and lectionaries. The most recent dated Syriac manuscript on parchment was written in the Near East (perhaps in Ṭūr ʿAbdīn) in 1567/1568 (Hatch 1946, 6, pl. 94: Berlin, Staatsbibliothek, Cod. Syr. 20 (Sachau 236)) and contains the *Ḥudrā*, hymns for the celebrations of the whole year. Already in the thirteenth century the use of paper had come to predominate. In the collection of dated Syriac manuscripts compiled by Hatch (1946, 6), among sixteen manuscripts written in the twelfth century, eleven are on parchment; but among the twenty-seven of the thirteenth century, only nine are on parchment. Two thirteenth-century parchment manuscripts deserve to be mentioned: both are large-size New Testament lectionaries, related to the monastery of Mor Hnanio (Dayr al-Zaʿfarān) and Mardin, both written by Bishop Theodore Dioscorus (Leroy [Jules] 1964, 371–389, pls 127–140). In more recent times (early seventeenth century), parchment was used in Rome to copy a Syriac manuscript: Florence, BML, Or. 47 (Eusebius of Caesarea's *Letter to Carpian*, the Eusebian Canons, two *Genealogies* of Christ, and the *Doctrina Theophili*); copied by Rabban Adam, an envoy of the Nestorian patriarch, active in Rome from 1610 to 1614.

Palimpsests are numerous in the Syriac tradition (Schmidt [A.] 2009) and are an invaluable source of information because they preserve texts otherwise lost. Among the more important palimpsest manuscripts is the so-called *Codex Sinaiticus Syriacus* (Monastery of St Catherine), which dates back to the fourth century, containing the oldest extant copy of the Syriac Gospels according to the *Vetus Syra* translation, over which lives of saints and martyrs were copied in the eighth century (Bensly et al. 1894). Syriac palimpsests are interesting in a comparative perspective because they are evidence of contacts with other

* The authors are grateful to Margherita Farina for her help in collecting material for the preparation of this chapter.

traditions of eastern Christianity; often the upper and lower layers are both in Syriac, but there are several cases in which the languages of the layers differ and the Syriac text is superimposed over Greek (for example, London, BL, Add. 17210; Add. 17211; Add. 14665; in St. Petersburg, RNB, Gr. no. CXIX, the opposite occurs), over Coptic (London, BL, Add. 14631; Add. 17183; Add. 14665), over Arabic (London, BL, Add. 17138), or over Latin (London, BL, Add. 17212). Recently (in 2003) a Greek fragment of Menander has been identified in palimpsest leaves of a Syriac manuscript in the Vatican Library (Vat. sir. 623, dated 886; van Lantschoot 1965, 151–153).

The oldest dated Syriac palimpsest, in which both texts are in Syriac, is also the oldest dated Syriac biblical manuscript. The upper text, a liturgy for major holidays, is written in western tenth-century *serṭā*, the lower layer being Isaiah in the Peshitta version, in *ʾeṣtrangēlā*: the lower text on one of the leaves is dated to 459/460 (London, BL, Add. 14512; Tisserant 1911; Hatch 1946, 5).

Other important palimpsests preserve otherwise lost biblical translations and also secular texts. This is the case with the eleventh-century Melkite liturgical text copied over a Syriac translation from Greek of Galen's *De simplicium medicamentorum temperamentis et facultatibus*, probably by Sergius of Reš῾ayna, dating perhaps from the ninth century.

Also double palimpsests exist, containing three layers of text, sometimes in different languages. Specimens are in London, BL, Add. 17212; Add. 17136; Add. 14665.

11.1.3. Paper

Scholars have not paid particular attention to the paper used for Syriac manuscripts. The only contribution that contains a systematic study in this field is by Nina Pigulevskaja (1960, 154–156; see also Meščerskaja 1987).

The oldest Syriac manuscript on paper is a dated copy of the *Book of the Ḥimyarites* finished in April 932, transcribed in Qaryatēn (published by Moberg 1924).

The Syriac manuscripts produced in the Near East, the Levant, and, to some extent, in the Byzantine area, are written on paper that does not differ from that used for Islamic manuscripts.

From the fifteenth century onwards, watermarked paper produced in Italy begins to be attested in Syriac manuscripts. Comprehensive studies on the watermarks of Syriac manuscripts are nearly absent. Information about watermarks can be found in the catalogues, but in general without illustrations and almost always limited to brief descriptions.

The main reference for watermarks is even now the catalogue by Pigulevskaja (1960). According to her research, mainly on manuscripts preserved in Russia, above all in St Petersburg, watermarks in Syriac manuscripts from the late fifteenth century onwards point for the most part to paper of Italian, in many cases Venetian, production. The most frequently represented watermarks are: (1) an anchor in a circle (possibly topped with a trefoil, as in the case of Venetian paper of the late sixteenth century; in older paper, the anchor is topped by a star and a cross); (2) a crown topped by a star (Italian); (3) a pot with handle (French); (4) crescent moon, in two variants: (4a) three crescents (the so-called *tre lune* paper, produced in Italy for the Levant in the seventeenth and eighteenth centuries; this variously imitated and forged watermark can also be found at the beginning of the nineteenth century); and (4b) a single crescent (western France).

Syriac manuscripts produced in Italy in the late sixteenth and early seventeenth centuries, preserved mainly in Florence and Rome, show a wide sampling of well documented watermarks, including for example: (5) anchor ending in a ring, in a circle surmounted by star; (6) five-pointed crown, possibly topped by a star, a cross or a monogram M; (7) M monogram topped by a star in a coat of arms; (8) monogram F over three hills in a shield.

11.1.4. Other writing supports

Nothing is known about the use of any wax tablets in the Syriac tradition. As for wooden tablets, one single example is attested: Manichaean Syriac-Coptic glossaries are written on two wooden tablets of the fourth century found in Egypt, Dakhleh Oasis (Franzmann – Gardner 1996, 101–126).

Syriac *ostraca* were found in Mesopotamia (Kamil 1957; Hunter 1998) and Central Asia, in the old Sogdian city of Panjakent, now in Tajikistan (Pajkova – Maršak 1976; Pajkova 1979). The *ostraca* from Mesopotamia are dated from the fourth to the seventh centuries; Panjakent's *ostracon* is dated on 'archaeological, historical and palaeographical' grounds to the late seventh or early eighth century. The text

reproduces some lines of two Psalms; some features of its spelling allow one to suppose that the piece was written as a school exercise by a Sogdian copyist with imperfect practice with the Syriac script.

11.1.5. Inks

Various recipes (see (Desreumaux forthcoming; Daccache – Desreumaux forthcoming) for the preparation of ink (Syriac *dyawtā* or *ḥebrā*, or *mayyā da-ḥrātā* 'water of vitriol') are handed down in annotations on Syriac manuscripts. The ink is usually a compound of gall nut (*ʿapṣā*) with the addition of vitriol (ferrous sulphate; Arabic/Syriac *zāk*), water and gum arabic (*ṣamgā ʿarabiyyā*) as a thickener (cf. the recipes in Wright 1870–1872, II, 580–581, London, BL, Add. 14632, two recipes in Syriac by two different hands; according to the first, which refers to the way the 'Egyptian fathers, who live in the desert of Scetis' prepare their ink, the bark of a desert plant (Arabic *arṭay*) may be used instead of gall nuts, and wine and vinegar are also employed as an additional tannic element; Wright 1870–1872, III, 1085, London, BL, Add. 14644, a recipe in Arabic and *garšūnī*, probably from the ninth century (Briquel-Chatonnet et al. 2006); Wright 1870–1872, III, 1207, London, BL, Arund. Or. 53; Wright 1870–1872, III, x–xi). Soot (Syriac *samāmā*) was also used (Land 1862, 58; Hatch 1946, 11).

11.1.6. Pigments and dyes

In a Syriac context, Ephrem the Syrian (d.373) seems to evoke the practice of dyeing parchment purple (*Parainesis* 48: *chartokokkina ergazē? Analogisai tous lōrotomous*, 'Do you make coloured parchment? You are like a leather worker'). However, no Syriac parchments of this type are preserved, nor are they mentioned by other sources.

Recipes for silver and golden inks are found in treatises on alchemy/chemistry, in Syriac or Arabic *garšūnī* (Berthelot 1893, 203–205). Chrysography is documented by literary sources and by some splendid manuscripts (e.g. fig. 1.11.1). We know, for instance, of John of Mardin (d.1165), who wrote 'four Gospels in gold and silver' (Assemani 1721, 225), and of the Syriac-Orthodox patriarch Michael (1126–1199), who 'did take care of the copy of a magnificent Gospel book written in gold and silver, and adorned with pictures; its cover was on both sides decorated with silver and gold' (*Anonymi auctoris chronicon ad annum Christi 1234 pertinens*, ed. J.-B. Chabot 1954, 314–315). Specimens of such luxury Gospels dated to the twelfth and thirteenth centuries still exist (see Ch. 1 § 11.5.2); chrysography was adopted for writing certain passages to be read on the most important holidays of the liturgical calendar.

However, a single East Syriac witness to a different use of chrysography, MS Vatican City, BAV, Vat. sir. 622, is a small book (180 × 130 mm) in which the four Gospels are written in golden ink on paper that was dyed blue. According to the colophon, it was finished in March 1298 for 'Sarah … sister of … George … king of the Öngayyē'. This information refers to a Central Asiatic region (today Inner Mongolia), inhabited in the thirteenth and fourteenth centuries by Turkic people called Önggüd. This unique example of Syriac chrysography could thus originate from Mongolia; but the location of the discovery (Diyarbakır), and other clues, does not exclude the possibility that the manuscript was produced in North Mesopotamia (Borbone 2003).

There are no written sources about the use of colours and pigments in the Syriac manuscript tradition. Observations confirm the use of red lead (*siriqōn*) in rubrications and decoration (see below). Yellow, green, purple, pink, black and brown are also widely used, but blue only very seldom.

On the occasion of preservation measures undertaken on a lectionary (London, BL, Add.

Fig. 1.11.1 London, BL, Rich. 7174, dated 1499, Four Gospels, ff. 94v-95r.

7170, paper, about 1220), some archaeometric analyses of the pigments were carried out (Clark – Gibbs 1998). The manuscript contains sixty miniatures, most of them seriously deteriorated. The damage affected in the first place the surfaces covered with white pigment, which turned black (Leroy [Jules] 1964, pl. 82:1, 83:1, 3), but also the ink that was used for a large part of the text had corroded the paper. The analysis revealed the presence of the following pigments: red–vermilion (mercury sulphide), which was also found in red ink; blue–lazurite (extract of lapis lazuli); yellow–orpiment; orange-yellow–realgar and para-realgar (the latter extremely rarely used); white–lead sulphite, in its pure form, and mixed with red, blue, purple and brown (the black compound, causing deterioration of the miniatures, was identified as lead carbonate).

11.1.7. Writing instruments

Information about the writing instruments used by Syrian copyists has been collected on the basis of some notes preserved in Syriac manuscripts (Duval 1881, 2–3; Hatch 1946, 23–24; Wright 1870–1872, III, xxvi; Land 1862, 56–58). The Syrian copyists used both the quill and the reed pen. The earliest mention of the former (*ʾebrā d-pāraḥtā*) is found in a manuscript dated 509 (London, BL, Add. 14542, f. 93v); a reference to the same instrument occurs in a marginal note in London, BL, Add. 17185, f. 61r: *nusāyā d-ḥeṣrā d-gelpānā* ‘quill test’. Land and Duval assume that the oldest Syriac manuscripts were written with quill pens. Wright suggests that Syriac references to quill pens are merely repetitions of Greek formulas, because in his opinion the Syriac copyists wrote only with reed pens. According to Land, the reed pen (*qanyā*) was not used before the twelfth century, but Hatch puts the date as early as the tenth or the eleventh century, referring to information in London, BL, Add. 17128, f. 180v. In any case, the reed pen was apparently known in Syria, as written evidence indicates: Isaac of Antioch, in the fifth century, speaks of the ‘Spirit’s reed’ (*qanyā d-ruḥā*), and in the ninth century, Thomas of Marga, the abbot of the monastery of Beth ʿAbe, describes a vision of a reed writing on the wall of his cell. The reed pen was already well known to Jews, Greeks, Copts, and Arabs. Some manuscripts from Central Asia and China could have been written with a brush, as was certainly the case for the Syro-Turkic inscriptions found in Inner Mongolia, Hohhot, in the ‘White Pagoda’ (Borbone 2013); cf. the bifolium in Dunhuang, Historical Museum, Mogao Ku B 53:14, and the fragment from Qara Qoto no. 123 (Yoshida – Chimeddorji 2008, 9; Muto 2013).

11.2. Book forms (PGB–FBC)

11.2.1. The roll and the rotulus

No horizontal rolls are known in the Syriac book tradition. The vertical roll form (also called ‘rotulus’) is not attested at the beginning of the Syriac book tradition, but it was adopted for certain uses later on, after the codex was already in general use. Thus there are large liturgical vertical rolls, mainly in the Melkite tradition, and small ones containing magical texts and charms. The oldest Syriac magical rolls date back to sixth or seventh century (Gignoux 1987), but most of them are quite recent (eighteenth and nineteenth centuries) and of East Syriac provenance (as is the case of the rolls kept at Harvard and at Oxford (Goshen-Gottstein 1979; Hunter 1999, 161–172)). For both categories, both parchment and paper were used. Among the liturgical rolls, particular mention deserves to be made of the Liturgy of St John Chrysostom (Moscow, Institut Vostokovedenija, Lichačev S. II, n. 3), and among magical rolls, Yerevan, Matenadaran, Collection of Manuscripts in Foreign Languages, 72 (a, b) (Meščerskaja 1987), and Avignon, Bibliothèque municipale Ceccano, 3858 (Lebanon, sixteenth century (Desreumaux – Gorea 2003), B16-17).

11.2.3. The codex

In Syriac, various terms indicate the codex and its parts. The codex is called *ṣḥāḥā*; the quire *kūrrāsā*; a single leaf *dappā* (the word also means ‘board’, ‘tablet’, and then ‘wooden altar/mensa’); two opposite pages of a book when it is open *ptāḥā* ‘opening’ (Wright 1870–1872, III, xxvi; Hatch 1946, 23–24).

11.3. The making of the codex (PGB–FBC)

The structure of the quires in Syriac books is remarkably uniform and stable over time, for all geographical areas in which Syriac manuscripts were produced. They are mainly composed of quinions, both of parchment and of paper (Mundell Mango 1991; Briquel-Chatonnet 1998b). The quires were made by stacking individual bifolia (usually five) and not by folding a sheet twice the size of a bifolium (or larger).

Syriac parchment books do not follow Gregory's Rule. Throughout the entire chronological span of production of Syriac manuscripts, small variations in the composition of the quires are documented: quaternions and senions are found. For example, the first two quires of Paris, BnF, Syriaque 27 (699, parchment) are quaternions; Florence, BML, Or. 230 (1278, paper) is composed of 21 quinions, two senions and two quaternions. Manuscripts produced in Rome from the sixteenth century onwards are still composed of quinions, such as Florence, BML, Or. 2 and 3 (1606, respectively 39 and 27 quires, all quinions), but also of quaternions (for example, Florence, BML, Or. 4, of 1610/1611: 40 quires, 38 of which are quaternions, one a quinion and one a ternion).

A unique example of a Syriac manuscript written in the form of a Chinese book is Manchester, John Rylands Library, Syriac 4 (Peshitta Institute shelfmark: 18-8dt1; Coakley 1993, 120–123): it contains parts of the Old Testament Peshitta, copied not long before 1725 by a Chinese copyist, reproducing the Syriac script 'stroke for stroke so as to produce an exact facsimile' of a much older manuscript. Its leaves are folded, in Chinese fashion, at the fore-edge and are written only on the outer sides. Binding is by a cord through four stab-holes. The copyist reproduced also the quire numbers and their simple decoration, although they are unnecessary in this book form.

11.3.1. Pricking and ruling

Pricking is found applied in parchment manuscripts. Most frequently, the pricking is made at the four corners of the writing area, which may be laid out in two or three columns. Ruling is most frequently used only for the vertical bounding lines, and sometimes also for the top margin, or both top and bottom. Ruling is made by means of a sharply pointed instrument for parchment, with a blunt point or a plummet being used for paper and sometimes also for parchment. The leaves of very few manuscripts were ruled with ink. Only from the twelfth century onwards was ruling used also for the lines. For dated examples of pricking and ruling, see Mundell Mango 1991. The ruling board, called in Arabic *misṭara*, was also used by Syrian copyists; examples date from as far back as the thirteenth century until modern time.

11.3.2. Ordering systems

Quire signatures

Numbering of quires is standard in Syriac books. The numbers are written on the first and the last page of each quire, in the bottom margin. A quire number in the upper margin never occurs, nor do bifolium signatures. Very often, the first quire of a book bears no number at the beginning, because the recto of the first leaf is left blank; in Syriac manuscripts, the text usually begins on the verso of the first leaf. In some of the oldest manuscripts (for example, Paris, BnF, Syriaque 341 (eighth century?)), the quire numbering is a later addition. In some old manuscripts, the quire numbers are placed only at the beginning of a quire, in the bottom inner margin, as in Florence, BML, plut. 1.56 (Rabbula Gospels, 586), where the numbers are Syriac arithmetic numerals (for a list of such figures, see Land 1862, pl. 25, and Duval 1881, xv (pl. 3)), above which Syriac letters with the corresponding numeric values are written. This method is the most ancient device used for numbering quires. Over time, the use of letters with their numerical values completely supersedes the use of Syriac numerals, which are not found after the ninth century (Brock 2010a). At the same time, numbering both the beginning and the end of a quire becomes standard practice, with placement of the number at the centre of the bottom margin. Sometimes Armenian, Greek and Coptic letters are employed as quire numbers (Wright 1870–1872, III, xxvi; see also Hatch 1946, 23). Occasionally the quire numbers were written vertically (for example, Jerusalem, NLI, Or. 63 (tenth century?), f. 42v).

The script used for quire numbers very often changes, by the alternating use of different Syriac scripts, *serṭā* and *ʾesṭrangēlā*. But exceptions do occur: for instance, London, BL, Add. 14548 (790), f. 33r, beginning of the fourth quire, shows the numeral *d* = 4, in *ʾesṭrangēlā* script, written twice in the lower margin, once at the centre, and again to the right, the latter numeral being more prominently decorated (Tisserant 1914, xxiv and 28).

Headings, or running titles, are seldom used, but they appear already in the oldest manuscripts, such as the Rabbula Gospels, where they are written in red in the top margin of the verso of the fifth leaf (i.e. at the central opening of a quinion). In other cases, as in Florence, BML, Or. 230 (Bar ʿEbroyo's *ʾAwṣar rōzē*, 1278), the rubricated headings are written in the top margin of all leaves on the recto. In this case they serve the needs of the reader, and were perhaps added after the copyist finished his work, either by him or by owners/users of the book.

Catchwords

The use of catchwords is not attested in older manuscripts; apparently, it first appears in sixteenth-century manuscripts copied in Europe (for example, Florence, BML, Or. 3, Or. 10, Or. 183, Or. 195 (written in 1585 by Moses of Ṣawro/of Mardin)). The catchwords are placed horizontally or obliquely, upwards or downwards, under the last text line, on the verso in the lower margin on the left side of the page, referring to the first word written on the facing recto (fig. 1.11.2). Some practices should be seen as the idiosyncratic initiative of the copyist, for example Moses of Ṣawro, who writes catchwords vertically (Florence, BML, Or. 185; Vatican City, BAV, Borg. sir. 60; also in Arabic manuscripts copied by Moses: see Vatican City, BAV, Vat. ar. 83). Later on, especially in manuscripts of the East Syriac tradition, the use of catchwords becomes quite frequent (see Vatican City, BAV, Vat. sir. 653 (1820), and Vat. sir. 283 (nineteenth century?)).

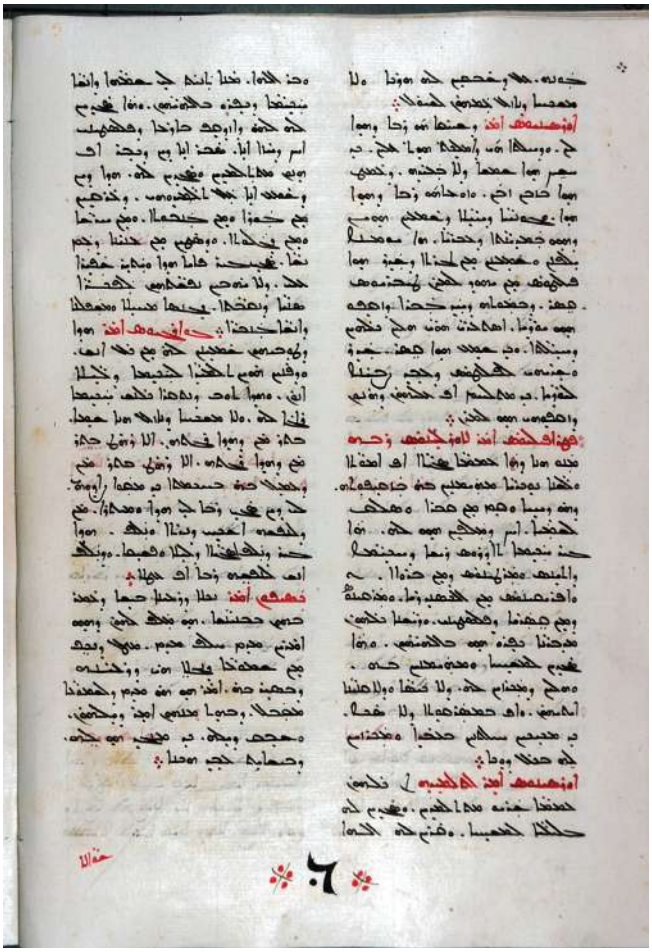

Fig. 1.11.2 Charfet, Bibliothèque patriarchale syro-catholique, Rahmani 79, 1901, f. 40v, courtesy of Bibliothèque patriarcale syro-catholique, Charfet, Lebanon.

Foliation, pagination, column numbering

Foliation began to be used quite late (for example, in the 'Williams Manuscript', written in 1471 in Hasankeyf: Hall 1886; now New York, Utica Public Library, 13501), where leaf numbers in Syriac letters are written in the top margin, perhaps added later), and never developed into pagination, except in very recent manuscripts. Complete foliation is often found in the frequently consulted manuscripts, such as those used in liturgy or in scholarly work, and was added by readers (for example, Florence, BML, Or. 230, finished in 1278, paginated with Arabic numerals in the sixteenth century by its owner, Patriarch Naʿmatallah (d.1587), who also wrote a table of contents on the recto of the first leaf, which had as usual been left blank).

A sign, which we may call the 'quadruple-dots mark', is commonly placed on the verso of each leaf, in the right-hand corner of the top margin, at the level of the first text line (fig. 1.11.2). Its form differs in the West Syriac and East Syriac traditions. Since the colour of the mark usually corresponds to the colour of the first words in the first text line, one may suggest that the mark was written by the copyist when making the copy. In the West Syriac tradition, the mark consists of four dots arranged in a lozenge. In the East Syriac tradition, the three upper dots of the lozenge are separated by a serpentine stroke; this element reveals that the marker is a stylized abbreviation of the divine name, ܝܗ. (*yh*). The marker could also have a practical secondary function, namely the identification of the tops of the bifolia. Such a hypothesis would assume that the copyists wrote on quires that were already made up, but not yet sewn. The 'quadruple-dots mark' does not occur in all the Syriac manuscripts: some bear it only desultorily, in others it is entirely absent. It is found in the eighth century in London, BL, Add. 17170 (774/775), but it is absent in some seventh-century manuscripts (for example, Vatican City, BAV, Vat. sir. 111 (522), 110 and 114 (523), 112 (551), 113, (552); Florence, BML, plut. 1.56 (586)). Later on, this practice becomes widespread, but still there are recent manuscripts that are free of the mark, or nearly so (for example, Vatican City, BAV, Vat. sir. 165 (1663)). The fact that at times the 'quadruple-dot-mark' is written also on the recto, in the same position, and that in some manuscripts written in three columns per page it appears at the beginning of each column (as is the case in portions of Milan, Biblioteca Ambrosiana, B 21 inf., seventh century) could suggest that it marks the beginning of a new work, as a kind of *basmala*.

11.4. The layout of the page (PGB–FBC)

The Syriac written tradition about book production is scant: we are able to mention only one reference to a book format. Patriarch Timothy I (780–823) mentions a 'Nisibene format' (*mšuḥtā nṣībaytā*) when asking for a copy of the Syro-Hexapla (Berti 2009, 293). This format seems related to a book produced for use in the school, like that of Nisibis, or for scholarly use.

The common large format of Syriac parchment manuscripts is *c*.360 × 280 mm, which is the size of the oldest dated manuscript and the standard format for Gospel manuscripts of the sixth to eighth centuries. Only three dated parchment manuscripts copied before the twelfth century survive that are larger than this format: Dublin, Chester Beatty Library, Syr. 701: East Syriac *Ṭeksē* (*d-qaššišā*), a liturgical book dated 719/720, measuring about 430 × 320 mm; Jerusalem, St Mark's Monastery, cod. 25, *c*.440 × 300 mm; London, BL, Add. 12165, dated 1015, 410 × 300 mm (festal and other discourses by various authors). Such very large size parchment books of over 400 × 300 mm reappear later, mostly as Gospel lectionaries measuring *c*.420/450 × 320/350 mm. In these luxury examples made for liturgical use and public display, the easily readable, large and sometimes decorated *ʾesṭrangēlā* script is combined with chrysography (see above). All these books pertain to the Syriac-Orthodox milieu. One lectionary, dated 1227, is still in the region of Ṭūr ʿAbdīn (reproduced in Brock et al. 2001, 184; Leroy [Jules] 1964, 411–413, pls 149, 1–3; and Hunt 2001). The most recent dated Syriac manuscript on parchment, Berlin, Staatsbibliothek, Sachau 236 (1567/1568), is also one of the largest, measuring 440 × 320 mm; it is a liturgical book executed in a Syriac–Orthodox milieu. The use of very large Gospel lectionaries, lavishly decorated and partly chrysographic, was popular also in the Church of the East; some such books are preserved, dating back to the sixteenth to eighteenth centuries. They are often labelled as 'Gospel lectionary for the Sundays and the Holidays according to the ritual of Mosul'. They are written on paper, and their size is in some cases even larger than that of the Syriac-Orthodox lectionaries: Vatican City, BAV, Borg. sir. 169, sixteenth century (Leroy [Jules] 1964, 404–408, pl. 145), is 570 × 385 mm; eleven similar manuscripts are listed by Leroy [Jules] 1964, 406, as preserved in Tell Kef, Alqoš, Rabban Hormizd, Notre-Dame des Semences, Aqra. One of them, in the church of Tell Kef, is described by Foumia 2013, 68.

Among a group of 354 Syriac manuscripts on parchment and paper, dated from the fifth to the sixteenth centuries, the majority (291) measure between about 200 × 130 mm to about 280 × 200 mm. As for the proportions, a 'narrow' format, characterized by a width slightly more than half the height, seems to be typical of the Mosul region (Barṭelli, Bet Ḫudaida (Qaraqosh)) in the thirteenth century (see Florence, BML, Or. 208, 220 × 120 mm; Or. 230, 210 × 120 mm; Dublin, Trinity College, MS 1504, 240 × 160 mm; Cambridge, University Library, Add. 2003, 232 × 122 mm).

Besides the East Syriac Gospel lectionaries already mentioned, and the manuscripts Oxford, Bodleian Library, MS Huntington 1 (about 540 × 350 mm), and Diyarbakır, Meryem Ana Syriac Orthodox Church 1/1 (475 × 305 mm), the largest manuscripts on paper are those written in Europe (Rome) in the sixteenth and seventeenth centuries (for example, Florence, BML, Or. 2 and 3 (1606; Bar Bahluls' *Dictionary*), 420 × 275 mm; Or. 4 (1610/1611, Syriac New Testament with *garšūnī* Arabic translation), 420 × 290 mm). The standard size of the paper accessible in Rome, and the type of text, influenced the choice for these manuscripts of large *in folio* format.

Few dated small-size manuscripts (less than 150 × 110 mm) are preserved, the oldest dating back to 883/884 (London, BL, Add. 18819, 135 × 96 mm). Two others of about the same size, probably from the ninth century, are preserved in Paris, Bibliothèque nationale de France (Briquel-Chatonnet 1997 (manuscripts 389 B 7 and B 3)). In most cases, such small formats do not antedate the eleventh century. The very small (105 × 70 mm) format of a breviary in Florence (BML, Or. 436, written in 1554/1555 in Rome by the Maronite Bishop Šimʿun) suits a type of book meant for private use quite well.

11.5. Text structure and readability (PGB–FBC–EBW)

11.5.1. Writing (PGB–FBC)

The oldest dated Syriac manuscript having the text in a single column was written in Mabbug in 510/511 (Hatch 1946, pl. 8). Previously, layouts in three or two columns were used. The three-column layout fell out of use and after the seventh century is found only very rarely (Vatican City, BAV, Vat. sir. 177, twelfth or thirteenth century; London, BL, Add. 21580, 1478). Some very rare examples of four-column layout exist: Diyarbakır, Meryem Ana Syriac Orthodox Church 1/1 (miscellaneous: Bar ʿEbroyo's scholia, Old

Testament and New Testament, Clement's *Octateuch*, 1496), and Oxford, Bodleian Library, MS Huntington 1 (a collection of works by Bar ʿEbroyo, 1491); these two manuscripts are among the largest Syriac paper books, and it is striking that they were both produced in the 1490s, probably in the same region. The two-column layout is the standard for the large Four Gospels books of the sixth and seventh centuries. In some cases, the number of columns changes in the book, but such examples are quite rare (see Hatch 1946, 14; for example, London, BL, Add. 12151 (804) and Add. 21580 (1478)). The number of columns may change on a single page: in Florence, BML, Or. 298 (*Liber causae causarum*, ff. 105r–139r), in a text plainly copied in two columns, two pages are irregular, f. 105v (half of the page in one column, the rest in two) and f. 107r (a third of the page in one column, the second third in two columns, and the last third again in a single column).

Generally the text begins on the verso of the first leaf, the recto being left blank; at times, f. 1r is now filled with ownership notes, prayers, *probationes calami* and other notes of various kinds. A 'frontispiece' does not occur in Syriac books, where the work's title (and author) is mentioned among customary formulaic *incipit*s. The text typology affects the structure and the layout of the page. Bilingual texts are written in two columns (for example, Florence, BML, Or. 86 (1278, Syriac translation by Bar ʿEbroyo of Avicenna's *Kitāb al-išārāt wa ʾl-tanbīhāt*), where the Arabic text runs parallel in a column next to the Syriac version). An interesting case is the copy of Bar ʿEbroyo's *Metrical Grammar* in Florence, BML, Or. 298 (1360), where the main poetic text is written in the centre of the page, leaving wide margins for the author's scholia (in later manuscripts, the *Metrical Grammar* is copied in two neat and parallel columns). The antigraph was probably the author's copy, which the copyist decided to reproduce as faithfully as possible also in its layout. Melkisedeq of Hasankeyf had the same aim when he made a copy of a manuscript of the *Divisions of Porphyry's Isagoge* (copied by Moses of Ṣawro in 1585 and preserved in Florence, BML, Or. 209) as an exact facsimile (Florence, BML, Or. 458). One can also mention manuscripts containing chronographies (for example, Elias of Nisibis's) and chronicles, with parallel columns for ecclesiastical history, civil history and other events. A similar layout was applied in the manuscript of the *Chronicle* by Patriarch Michael the Great preserved in Aleppo and faithfully reproduced in Chabot's edition (1899; facsimile edition, Gregorios Y. Ibrahim 2009).

For poetic works, the strophes may be written continuously in a one- or two-column page layout or in a one-column layout where each verse occupies a separate line. In both cases, the beginning and the end of each verse is marked by a red dot, and red and black dots, respectively. Thus a page of poetry in one column may show, in the left margin, a vertical line of red dots, and in the right margin, a vertical line of alternating red and black dots (for example, Vatican City, BAV, Vat. sir. 174 (sixteenth century, some poems by Patriarch Nūḥ the Lebanese, Bar ʿEbroyo and ʿAbdišoʿ of Nisibis)). An example of a continuously written poetic text is represented by Florence, BML, Or. 298 (poems by Bar ʿEbroyo). It should be noted that the one-column layout with alternating red and black dots is used also in regions as far from the centre of Syriac tradition as China: evidence is a bifolium from a Psalter recently found in Dunhuang (Gansu, China; Duan Qing 2000, 2001: Dunhuang, Historical Museum, Mogau Ku B 53:14). The paper and the script of the bifolium testify to a local production; the red dots appear at the end of each verse, and the letters are not elongated.

The persistence of the characteristics of the Syriac manuscript book even in remote areas far from the centres of the Syriac culture is remarkable: a manuscript written in South India (Vatican City, BAV, Vat. sir. 22, copied in Craganore, 1301) does not differ in format and structure from the manuscripts written in Syria. The same is true of manuscripts produced in Central Asia, although since they are fragmentary, the similarities are mostly discernible only in the page layout, rubrics and decoration. One can observe that they conform to the standard established within the East Syriac tradition, but also follow scribal practices of West Syriac scriptoria (such as the above mentioned Mogau Ku B 53:14). In the matter of script, manuscripts written in Central Asia and China display a specific ductus, and particular shapes of some letters (such as *alaph*), that could be a result of the use of a brush instead of a reed pen. In more recent centuries, also in India the East Syriac script took on a specific *ductus*, a phenomenon that seems to be an autonomous development of the peculiarities of this script (Briquel-Chatonnet – Desreumaux 2010).

11.5.2. Decoration (EBW)

The elements embellishing the manuscripts belong to two categories, scribal decoration and painted (or drawn) decoration (Balicka-Witakowska forthcoming b). To the first group belong the elaborate script,

punctuation, attention marks, denotations and text dividers. They are highlighted by rubrication or coloured inks (figs. 1.11.1, 1.11.2) and turned into adornments by the addition of dots, dashes and small arabesques. The second group comprises the bands and squares filled with interlace and sometimes figural motifs, as well as the thematic miniatures (or drawings) usually with figural representations. Whether the miniatures are pure decoration or illustrations depends on their placement in the manuscript and relationship to textual content.

The common method for turning the script into ornamentation was to enlarge the normal characters, writing them in coloured inks and refining them by gilding or silvering. In some manuscripts, the letters emerge from a coloured background. Although initials do not exist in the Syriac script, often the beginning letters and their diacritics were stylized and ornamented (Balicka-Witakowska 1998).

Fig. 1.11.3 Kaslik, Ordre Libanais Maronite, 983, dated 1673, lectionary, f. 93r, detail.

Punctuation marks written with black and red inks often function as adornments, the simplest being single or double points, the more elaborate being rosettes. In several manuscripts, a black quadruple-dots-mark, customarily placed in the upper right corner of the recto pages, has evolved into a decoration composed of geometric and vegetal elements. The line-fillers are formed of red-black dots, strokes, small crosses, rosettes and tiny floral arabesques. Such adornments also flank the highlighted titles, elongating them from the inner to the outer margin and rounding out the final columns to the level of previous ones, thus retaining the visual balance of the page.

The common scribal decoration makes ornaments out of small text units, such as notes, comments and corrections. Outlined in a coloured ink, they are often furnished with floral appendages. Another way to enhance the decorativeness of the written text, usually applied for the ending pieces and final notes, is to form a text unit onto a geometrical figure and adorn it with scribal flourishes.

The numeration of text units, such as *incipit*s and *desinit*s, chapters, paragraphs, important verses and pericopes, has usually been converted into decoration. The numerals may be marked by coloured inks or gilding and additionally highlighted in decorative script and embellishments. The quire numbers too were often turned into ornamentation (fig. 1.11.2). The simplest examples combine dots, strokes, vegetal motifs and geometric figures, while more complex examples take the form of interlaced roundels, crosses and stars (for example, Berlin, Staatsbibliothek, Sachau 304, twelfth/thirteenth centuries, fig. 1.11.5). There are also quire-number decorations shaped as birds, fanciful quadrupeds or objects (London, BL, Add. 14601, ninth century; Diyarbakır, Patriarchate Library, now Meryem Ana Syriac Orthodox Church, 00083, written 1540).

The beginnings of text units or headings, written in decorative script, are often preceded by an interlaced band, square or rectangular. From the thirteenth century onwards, the main text sections were usually introduced by the so-called 'gate-ornamentation' shaped like an inverted U or a Greek Π. Very commonly, a miniature might serve as a heading. The text endings were also made clearly visible and aesthetically appealing. The closing sentences or even the whole last columns were highlighted by red ink and supplied by the decorative line- and column-fillers. Quite often, the very end of a longer text unit was written in the form of an inverted pyramid. Closing miniatures are not uncommon. As the heading and ending of the entire book there may be a full-page miniature of a cross or cruciform rosette presented within a frame. Miniatures of

Fig. 1.11.4 Dublin, Chester Beatty, Syr. 3, eleventh century, Four Gospels, ff. 2v–3r.

this kind were mainly used in the twelfth- and thirteenth-century lectionaries, where they also introduce the tables of lections (London, BL, Add. 7169, ff. 1v–2r, 14v–15r, 248r). The cross miniature has a variant called the 'carpet-page', containing a decoratively treated cross emerging from a background entirely covered by ornament (Diyarbakır, Meryem Ana Syriac Orthodox Church, 339, f. 9r, see also fig. 1.11.3).

The 'indexes' of readings from the Old and New Testaments for the liturgical year were customarily presented in ornamented tables and placed at the beginning of a manuscript. This system had developed as early as in the sixth century out of the simple list of readings put in grids and framed by stylized architectural elements (London, BL, Add. 14445). In the twelfth and thirteenth centuries, particularly in the *de luxe* Gospels, it was replaced by sets of joined or interlaced geometrical figures.

According to a custom well documented in the east and west, the Eusebian Canon Tables were traditionally presented in grids drawn inside architectonic decorative frames imitating *aediculae*, flanked by plants, animals and birds. In Syriac manuscripts, the Canon Tables were most often displayed on nineteen pages and never ended with the so-called 'tempietto-miniature' typical for other traditions. This system, adopted for the Peshitta version about 450, was gradually abandoned after the seventh century, the last known examples dating to the eleventh century (Dublin, Chester Beatty, Syr. 3; see fig. 1.11.4). The most sumptuously decorated set, but at the same time exceptional, is preserved in the Rabbula Gospels: *aediculae* are surrounded by vases with flowers, plants, fountains, and several species of birds and quadrupeds. Scenes from the lives of biblical figures and of Christ are depicted in the inner and outer margins, and portraits of the evangelists accompany Canons VII and VIII.

Miniatures in Syriac manuscripts either occupy an entire page or share a page or bifolium with text and/or other miniatures. In the latter cases, the pictures may occupy the spaces within the text units and extend to the margins. The full-page miniatures, irrespective of whether they contain one or more scenes or figures, are presented within a frame that is either very simple or ornamented. Such miniatures were usually placed at the beginning and/or end of the manuscript, functioning as the sumptuous opening and closing of the book. Manuscripts with miniatures distributed throughout the text, situated near the textual episode they illustrate, are rare and relatively late; so, for example, in the thirteenth-century lectionaries: London, BL, Add. 7170 (48 miniatures); Vatican City, BAV, Vat. sir. 559 (54 miniatures; de Jerphanion 1940) (on both see also Leroy [Jules] 1964, 280–320, pls 70–100); Jerusalem, St. Mark's Monastery, cod. 28 (8 miniatures; Hatch 1931, 121–129). Most of the intertextual miniatures are framed, creating clearly visually independent entities which may serve as dividers of the text into sections. Their size was not determined by a disposition of a page or bifolium, but depended on the importance, for instance liturgical, of the illustrated text unit.

Fig. 1.11.5 Berlin, Staatsbibliothek, Sachau 304, thirteenth century, Four Gospels, f. 90v.

The miniatures distributed in the margins decorate a limited group of the manuscripts, primarily the Gospels with embellished Eusebian Canons (fig. 1.11.4). These miniatures, not framed, form instead a kind of frame for the adjoining text. Although related to the text, they do not function as illustrations. Strongly abbreviated, with figures and details kept to a minimum, they serve as pictorial bookmarks assisting the reader to locate particular passages of text (for example, the Gospels, Homs, Patriarchate Library, f. 244r, executed in 1054; Leroy [Jules] 1964, pl. 61.2).

The miniature may or may not be subordinated to the division of the text into columns. Consequently, on a page written in two columns, a miniature may extend from the inner to the outer margin (fig. 1.11.5) or be only as large as one column. There are also examples of miniatures simultaneously arranged horizontally and vertically (in the form of a reversed L), thus occupying unequal parts of two columns. Designed in this way, the pictures create for the beginning of text both a heading and a kind of frame (for example, Berlin, Staatsbibliothek, Sachau 304, f. 90v, thirteenth century; Leroy [Jules] 1964, pls 125.3, 126.3).

In some manuscripts, the miniatures with figural scenes (all or just a selection) do not follow the horizontal direction of reading, which is also the way the manuscript is bound, but are turned 90° (Berlin, Staatsbibliothek, Sachau 220) in some cases even 180° and 270° (London, BL, Or. 6673, written in 1802; Balicka-Witakowska 2008). A similar phenomenon appears in Manichaean manuscripts (Gulácsi 2005, 47). To date, no satisfactory explanation for this practice has been found.

In manuscripts with precisely planned page design, the pictures do not extend beyond the space defined by the text unit. In books made with less care, they may extend into the margins, the space between the columns, and be squeezed between the text sections or lines. All these shortcomings can be partly explained in economic terms: a wish to save valuable parchment and the lack of rich sponsors. The introduction of paper partly changed the situation, and the layout of the manuscripts written on paper, particularly recent ones, is generally better balanced than that of those on parchment (for example, the Gospels, Beth-Zabday, St. Mary, executed in 1851; Hollerweger 1999, 274).

Very little is known about the techniques practised by the painters of the manuscripts. Judging from unfinished pieces, the motifs were first sketched with ink and then covered with colours, often applied in layers (Berlin, Staatsbibliothek, Sachau 220, f. 43r; London, BL, Add. 7154, f. 2r, executed in 1203).

11.6. The scribe, the painter and the illuminator at work (PGB–FBC)

11.6.1. Persons, places and methods

Syriac manuscripts were produced in scriptoria connected to scholarly centres (Edessa, Nisibis), monasteries, towns or villages, usually by professional copyists who in ancient times (the last quotation is dated 817) sometimes called themselves an ‘Edessene scribe’, regardless of where they were in fact working.

The majority of the Syriac copyists were clergymen: priests, deacons, monks (at times also stylites—in the sense that the copyist *had been* a stylite). Scribal activity was considered to be a spiritual exercise

that also provided expiation of sins (for the copyist himself, for his relatives and for the patron). Several bishops devoted their time to copying books (for example, the Syriac Orthodox Patriarchs Michael the Great, d.1199, and Nūḥ, d.1509). In recent times, whole families have been involved in scribal activity, such as the Shikwana, numbering seven generations of copyists, from the late seventeenth to the twentieth century), and the Nasro, both from Alqoš. Few old manuscripts survive that are the work of a single copyist. Exceptions are three Old Testament manuscripts copied by the deacon Saba of Rešʿayna between 724 and 726 (London, BL, Add. 14430 (724), Add. 12135 (726) and Add. 14428 (no date)). Female copyists were also active; for example, in 1701 a learned daughter of a priest copied the Maronite ordination services in a village in northern Lebanon.

In the colophons of manuscripts from the fifth and sixth centuries, the towns of Edessa (seven times), Mabbug (twice) and Amida (once) are named as the places where the manuscripts were written. Nisibis and Tell Dinawar (then in the Sassanian empire) appear in two colophons of the seventh century. Several manuscripts are related to monasteries the locations of which are mostly unknown. Edessa and other towns in Syria were the main places of production of the about 30 extant Syriac manuscripts dated from 650 to 900. In the eighth century, two manuscripts (dating to 760 and 768) were written in Egypt, but the first book copied in Dayr al-Suryān dates to 927. From the tenth century, some originate from the monasteries flourishing in the region of Malatya. It seems that the Monastery of the Syrians became a more important centre of manuscript production in the eleventh century, albeit extant eleventh- and twelfth-century Syriac manuscripts are not numerous. The situation changes for the twelfth and thirteenth centuries, the period called the 'Syriac Renaissance'. Besides the manuscripts copied in the region of 'the mountain of Edessa', Upper Mesopotamia, books were also produced in Iran (Sigistan, Urmia, Maragha). Scribal activity took place also in the villages in the Mosul region (for example, Alqoš and Barṭelli). After a cultural breakdown in the fourteenth century and in the first part of the fifteenth, an increase in production is noticed, mainly in Ṭūr ʿAbdīn. In the following century, several East Syriac monasteries are mentioned as places of book production: Mar Aha and Mar John the Egyptian (Gazarta); Mar Awgen (near Nisibis) and Mar Jacob the Recluse (near Siirt); Rabban Hormizd (near Alqoš); among the West Syriac centres, the monastery of Dayr al-Zaʿfarān flourished, and again the region of Ṭūr ʿAbdīn, which remained most productive in the eighteenth and nineteenth centuries. From the seventeenth century, the scribal activity of Alqoš is particularly extensive. Besides the Near East (to the places already mentioned, also Lebanon and Jerusalem should be added), Syriac manuscripts were produced in every place where the Syriac Churches were established (India, Central Asia, China), or where the presence of Syriac people aroused interest in their culture (for example, Italy and France, from the sixteenth century onwards).

Out of forty illuminated Syriac manuscripts listed by Brock (Brock et al. 2001, 240–241) and dating from 586 (the Rabbula Gospels) to 1851, twenty-nine are Gospels or Gospel lectionaries, two contain the Old and the New Testaments (Paris, BnF, Syriaque 341, and Cambridge, University Library, Oo.1.1.2), one the New Testament alone (Paris, BnF, Syriaque 30), while the remaining eight contain liturgical, homiletic and philological works. Quite another genre of illustration in Syriac manuscripts is represented by the images in small books of charms (Gollancz 1912; Balicka-Witakowska 2008 (London, BL, Or. 6673)).

It is unusual that a colophon mentions the manuscript painter, an exception being the thirteenth-century Gospel lectionary Paris, BnF, Syriaque 356, which contains a prayer for Īšōʿ, 'who painted and wrote'. It seems thus that in some cases the copyist also decorated the book. Another important example is BnF, Syriaque 355, also a thirteenth-century Gospel lectionary, containing a long note (f. 1r) giving the full list of the images and attributing them to the deacon Joseph of Melitene. The note gives information also about the cost of this lavishly decorated book (quoted in French by Leroy [Jules] 1964, 272–273). A third example is Venice, BNM, Or. 60 (Cod. X in Assemani's Catalogue (1787, 8), dated to 1572/1573), written by a copyist who worked in a monastery of Mount Athos: on f. 130v he says: 'The miserable Yohanninos drew (or: painted, *ṣār*)'.

11.6.2. Colophons

Syriac copyists usually wrote a colophon after they had completed copying the text and customarily placed it at the end of the manuscript. Although numerous colophons are preserved (their number corresponding approximately to the number of dated Syriac manuscripts, see above), in the majority of manuscripts they are missing, due to their placement on the final leaves, which like the first leaves of a codex were easily lost. In general, the colophon is clearly separate from the main text: in old manuscripts, besides some

simple decorative lines between the text and the colophon, it was also distinguished by use of a different, smaller and/or cursive script, as in London, BL, Add 14542, copied in 509. The same phenomenon is observed in the Rabbula Gospels, from 586, where the large *ʾeṣtrangēlā* of the Gospel text is coupled with a cursive script used for the colophon and the notes at the end of each Gospel. Otherwise, when the script of the main text does not differ from that of the colophon, the colophon is framed and/or has a rubricated beginning. At times the colophon is shaped as an inverted triangle, as in Arabic and Persian manuscripts (for example, Vatican City, BAV, Vat. sir. 282; Mundell Mango 1982; Briquel-Chatonnet 1998b).

Some colophons contain plenty of information about the book, the copyist, his milieu, donors, etc.; others state only the copyist's name (for example, Florence, BML, Or. 209, f. 19v: 'Finished. Moses, poor and a sinner, stranger in Rome'), or a date (for example, Paris, BnF, Syriaque 377, indicating only the year, 2166 AG = 1854/1855 CE). The curses sometimes added to the colophons inform us about the perils the books might face: we learn, for instance, that it is forbidden to borrow a book from the library, or when the borrowed book is not returned, the borrower is put under the curse; a curse may also be put on users who rip out sheets, even blank ones. Some colophons mention the collation of the book against its antigraph, which may have been made by the copyist himself just after the transcription was finished, or sometime later by some other person.

The colophon begins with the verb *šlem* 'to finish, complete' ('Ended is [this book]' etc.), often followed by the mention of the help and the strength granted to the copyist by God. Similarly, an invocation may also open a book ('Through the strength of God, we begin to write'). The copyist often includes self-effacing comments about his own person, his unworthiness and lack of talent, and asks forgiveness for his mistakes. There are recurrent formulae adopted by the copyists, such as 'unworthy, priest/monk only by name, but not in deeds', the mechanical use of which at least once produced an interesting inversion, when the copyist Melkisedeq of Hasankeyf called himself 'a priest in deeds, but not by name' (Florence, BML, Or. 49, f. 13r). The copyist may write his name with the so-called 'Bardaisan's alphabet': for example, London, BL, Add. 14431 (the Old Testament Books of Samuel, copied before 545), where the name George, *gywrgy*, appears in the enigmatic form *zṣdšzṣ* as encoded according to the correspondences of 'Bardaisan's alphabet' (see Duval 1881, 13).

A comprehensive collection of Syriac colophons does not exist, but the authors of catalogues of Syriac manuscripts mostly quote them *in extenso*.

A very interesting colophon from a comparative perspective is that of the manuscript Florence, BML, Or. 81 (a Persian *Diatessaron* written by a Jacobite copyist in Hasankeyf, in 1547, for the Armenian catholicos). The codicological features of this book combine Syriac and Armenian characteristics, in particular in the colophon's structure and content (Messina 1951; Piemontese 1989, 104–108). One can also mention the colophons of Paris, BnF, Syriaque 51, and Lyon, Bibliothèque municipale, 1, both copied in Jerusalem in 1138, which give comprehensive information about the situation of the eastern Christians in the Latin Kingdom of Jerusalem, and some important colophons of manuscripts originating from the monastery of Dayr al-Suryān (Van Rompay forthcoming).

11.6.3. Duration of copying

When they exist, notes written between two texts—a sort of 'intermediate colophon'—give information about when the first part of the book was finished and the next part began to be copied, thus indicating the duration of the copying. For example, the first part of Paris, BnF, Syriaque 370 (96 leaves), was finished on 9 July, the second part (ff. 97–173) on 22 July, information which allow us to calculate that approximately six leaves per day were written. In Paris, BnF, Syriaque 398 I, three such notes suggest an average of three or four leaves being written per day (Briquel-Chatonnet 1998a).

11.6.4. Dating systems

The most common dating system in Syriac manuscripts is the Seleucid Era, the beginning of which corresponds to 1 October 312 BCE, mostly designated as 'Greek', 'of the Greeks' (who may at times be qualified as 'blessed', 'crafty' or 'cursed') or 'of Greece', but also as 'Alexander's' or, less frequently, 'of Seleucus'. In fifth- and sixth-century manuscripts, other dating systems occur, for instance, local eras (of Antioch, of Apamea, of Bosra) and the 'indiction', borrowed from the Byzantine tradition (a fifteen-year tax cycle, still used, albeit very rarely, in that Arab period: the most recent example is dated 1177); in two manuscripts written in the Sassanian Empire, the regnal year of the king appears (Khusraw II, 591–628). Occasionally

the Era of the Martyrs, the Byzantine World Era (in the late Melkite manuscripts) or, the World Era of Adam are mentioned. In the Arab period, the Hegira Era is used (the era 'of the Arabs/Muslims' (*ṭayyāyē*)), most often accompanied by other dating systems (Brock 2005). The use of the Christian Era (*da-mšīḥā*, *mšīḥāyā* 'of the Messiah', 'messianic' (Kaufhold 2008)) is very late, used especially, but not only, in manuscripts produced in the west or for western patrons. In manuscripts written in Kerala, India, a local era called *kullam* (beginning in 824/825) is also found (for example, the manuscript Kottayam, SEERI, 8).

Dating according to several eras or concordances (sometimes wrong) also occur (Briquel-Chatonnet 1998a). The Rabbula Gospels are dated according to the Seleucid Era (897 AG) and the Indiction (fourth indiction). The manuscript Vatican City, BAV, Vat. sir. 148 (of liturgical content), is dated according to three different eras, the third one being the Turkic calendar of the Cycle of the Twelve Animals. The colophon mentions the dates 30 *Tammuz* 1578 AG (1267 CE, July), *Ḏū ʾl-qaʿda* 665 AH, and the 'year the hare of the Mongols (Tatars), in the month called *itinč ai* ('seventh month' in Turkic)'. It must be pointed out that the words 'hare' and 'seventh month' are written by another hand, in spaces purposely left blank; perhaps the copyist, unsure about the exotic date, or unable to write the Turkic words correctly, asked for help from somebody.

11.7. Bookbinding (EBW)

The available information on Syriac bindings is scant, practically restricted to two contributions dealing with the Armenian book and using Syriac examples (ninety-six Syriac manuscripts from fourteen different collections) as comparative material (Merian 1993 and 1998), except for a first study on Syriac bookbinding with special reference to the collection of manuscripts of Charfet, Lebanon, Library of the Syro-Catholic Patriarchate (Dergham – Vinourd forthcoming). Information can be found in manuscript catalogues, but in general they do not give detailed descriptions of bindings.

As a rule, no old, original Syriac binding is preserved in western collections, where the manuscripts were mostly bound anew upon their arrival. For instance, in the relatively small collection of the Biblioteca Medicea Laurenziana in Florence (seventy manuscripts), only one manuscript shows an original binding (sixteenth century?), while about ten were bound in the sixteenth century (in the Levant, with 'Islamic' bindings); the rest of the collection received a standard western full-parchment binding in the eighteenth century. About thirty manuscripts with Syriac bindings are found in Paris, Bibliothèque nationale de France: one-third of them date from the sixteenth to eighteenth centuries, for example, Syriaque 438 (see the *e-ktobe* database at <http://www.mss-syriaques.org>). But there are exceptions: portions survive of the original binding of London, BL, Add. 17124 and Or. 8729, dated to 1230 and written in Edessa and probably also bound there.

Several manuscripts preserved in Near Eastern libraries (for example, Baghdad, Library of the Archbishopric of the Church of the East, or Charfet, Lebanon, Library of the Syro-Catholic Patriarchate) and in India (Thrissur) are still in their old bindings.

Fig. 1.11.6 Jerusalem, Biblioteca Generale della Custodia di Terra Santa, Syr. 6, seventeenth century.

In Syriac binding, the wooden boards (of variable thickness, from 4 to 10 mm, and cut with a vertical grain) prepared for sewing were supplied with one drilling for each sewing station, all fully visible on both sides of the boards. The text block was sewn separately, probably with an unsupported link-stitch sewing, then it was securely attached to the wooden boards, using a cord wound into the holes in the boards. After the text block was attached to the boards, the spine was lined with a piece of cloth (either cotton or linen). The spine lining covered one-third to one-half of the wooden boards, onto which it was pasted. Quite frequently, multiple

layers of cloth were pasted on (so in the majority of manuscripts examined by Merian). The end bands were raised, with the tie-downs attached to holes drilled into the boards. The book was next covered with leather and might be left plain or blind-tooled (so Paris, BnF, Syriaque 438 (Maronite Missal, eighteenth century)), or the leather cover might be decorated in relief, obtained by inserting moulded cords between the wooden board and the leather (so Thrissur, Syr. 76, with a mixture of relief and blind-tooled decoration). In some cases, instead of the leather cover a cloth cover, multicoloured or monochrome, is used (so Diyarbakır, Meryem Ana Syriac Orthodox Church, 99; 8/19 (1477); 60; 1/28 (1583); Paris, BnF, Syriaque 377 (nineteenth century)). The inside boards were sometimes lined with cloth (so Vatican City, BAV, Vat. sir. 622: red cotton cloth).

Apparently in the nineteenth century, perhaps under the influence of the Armenian communities (see Ch. 1 § 3.7), some manuscripts, mostly highly valued liturgical books that were placed on display for the congregation, were supplied with metal, decorated covers. Such a cover is a revetment of the original binding, added either to an old manuscript or to a newly produced one. In most cases, these covers are silver plaques, fastened to the front and to the back cover by small nails and held together by a metal spine and metal clasps at the front. The plaques were decorated with a variety of motifs (both aniconic and figural) executed by means of different techniques: repoussé reliefs, gilding, chasing, filigree and cloisonné work. Usually they are special donations ordered from silversmiths and occasionally commemorated by inscriptions added to the decoration. Some good examples are to be found in Ṭūr ʿAbdīn, around the Midyat region, which was known for its silversmith craftsmanship (for example, the Gospels of Invardi, Habsus, Hah, Beth Sbirino: Hollerweger 1999, 122, 137, 168, 257). In the same way, two white metal plaques bearing inscriptions were attached to the old binding of Vatican City, BAV, Vat. sir. 622, in 1950, when the book was sent as a gift to Pope Pius XII by the Chaldean Patriarch of Babylon, Joseph VII Ghanima.

References

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