MANUAL OF ROMAN EVERYDAY WRITING
VOLUME 1

Scripts and Texts

ALEX MULLEN & ALAN BOWMAN

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The LatinNow Project

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ISBN-13: 9780853583462

Acknowledgments

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Fig. 1: Photograph and drawings of tituli picti on a Dressel 20 amphora from the wreck of La Albufereta, Alicante, Spain. Photograph was taken just as it was lifted out of the water by CASCV. Courtesy of Asunción Fernández Izquierdo.

1. About this manual

The manual is split into two volumes. Vol. 1 prioritizes the reading and understanding of Roman cursive and the documents in which it is found. Vol. 2 provides an overview and catalogue of Roman writing implements, the main writing materials and accessories, and information about archaeological finds, photographs, drawings, and literary and iconographic testimony. It also presents a commentary on the social aspects of literacy and writing.

The Roman script used in everyday texts in Latin can seem like a mysterious code, whose secrets are only revealed to a select few. The script is Roman cursive, different from the more immediately familiar capital letters and is in fact the commonest writing in many types of text other than the so-called 'monumental' inscriptions on bronze and stone. Capital letters in Latin are easy for us to read since they are similar to our modern forms, whereas cursive requires specialised expertise, acquired by training and practice. It is traditionally classified into two types: Old Roman Cursive (ORC), attested primarily during the first three centuries CE, and New Roman Cursive (NRC), dominant from c. 300 CE.

The amount of material written in Roman cursive discovered and published in the past five decades has increased significantly and has transformed our knowledge of the documentation and palaeography of the Latin language. Some of the richest finds are the Vindolanda and Bloomberg writing tablets from the UK and the firing lists from the pottery kilns at La Graufesenque, France. This manual will act as a guide through the difficult and dispersed resources on Roman

Fig. 2: Example of the 'address script' (here a form of elongated cursive)
from a second-century CE ink-written writing tablet
found at Vindolanda, Tab. Vindol. 632. © The Vindolanda Trust.

handwriting and will provide the tools needed to approach some of the documents most revealing of daily life in the Roman world.

A guide is essential because the study of Roman scripts has until now been mainly confined to complex technical articles and monographs, predominantly written in Italian, and aimed at a relatively expert readership. Skills in reading cursive Latin are not widespread and not commonly taught to students, cultural heritage practitioners or researchers. The general guides to Latin epigraphy tend to concentrate on monumental texts on stone and bronze and do not give cursive Latin script any, or much, space. This manual attempts to fill a gap: we set out to cover everything from the basics to more detailed information about the latest digital techniques. We hope that the manual will encourage more people to read for themselves the fascinating material written by those living in the Roman world.

The study of Latin documents and palaeography extends well beyond the period of Classical Antiquity. In many respects, the richest handwritten material resources from the West derive from the post-Roman and mediaeval periods and are the domain of mediaeval

historians as well as theological and literary scholars. These are beyond the scope of this manual which focusses on documentary evidence from the Roman Empire and its immediate successors. With the exception of the Ravenna Papyri, the Tablettes Albertini and the Visigothic slates which are outliers chronologically (fifth century CE and later, from Italy, Algeria and Spain respectively) but crucial for understanding the later Roman evidence, most of the material considered here belongs to the first three centuries CE.

2. Introduction to everyday texts

The number of published so-called everyday texts has increased dramatically in recent decades. Whereas stone inscriptions have long been identified, preserved and studied, the texts on smaller and often more ephemeral objects have more often been recovered and successfully conserved in the last few decades with the benefit of modern archaeological and conservation techniques. Almost all the documents with which we are concerned here survive in archaeological contexts, interpreted in the widest sense to include structures above ground as well as material from sub-surface excavation. Many texts have made their way, sometimes through the antiquities market with no indication of original provenance, into the collections of museums, libraries, universities or similar institutions. Others reside in private collections and may be inaccessible or have been lost.

There has traditionally been an unwritten hierarchy of Latin non-literary texts, with the lapidary (stone) and rarer metal monumental inscriptions attracting the most attention. The texts on wood, pottery and other objects, including what are usually called *instrumentum domesticum* (items such as spoons but also others which are not strictly 'domestic' such as labels painted on amphorae), have generally taken a subordinate position and often remain unpublished. Many of these texts are written in cursive script, which is not used for monumental inscriptions. The Roman writing in capitals which is often so prominent in museums should therefore not be taken as the script which Romans would use on a day-to-day basis. For documentary texts cursive was the norm. The division between the use of capitals and of cursive is, however, not neat. Capital forms can be found in some documents which otherwise mainly use cursive, for example for headings, titles and addresses, though at Vindolanda addresses are written in large elongated forms better regarded as cursive rather than capital. Many inscriptions on ceramic are written in a script which displays characteristics of both capital and cursive writing.

Summary of the main Latin text types and their writing forms

It is surprisingly difficult to categorize the functions of our written remains from the Roman world and there is no standard modern practice (see Cooley 2012, 127–200 for a discussion of the issues). This summary gives a flavour of the contexts in which capital and cursive scripts are most likely to be used for writing Latin. Details of the writing equipment used, both implements and surfaces, can be found in Vol. 2.

In crude terms, there is one significant difference between the materials used in the West and the East: in the West wooden ink-written leaf tablets and stylus tablets are commonly employed for documents, whereas in the East the preference is for papyrus (more rarely, parchment) and ostraca (potsherds, see Caputo and Lougovaya 2020). However, in the West we have the unique find of three tattered papyrus fragments of a Latin private letter or account excavated at a villa in Brittany (Plouhinec, Mané-Véchen) and, in the East, occasional finds of wooden tablets.
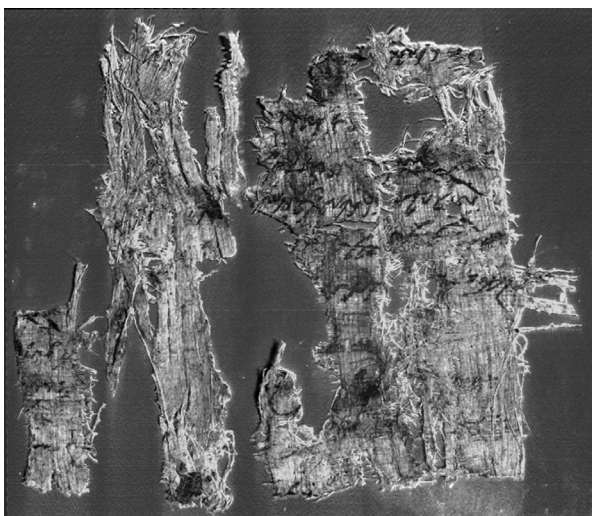
Fig. 3: Papyrus fragments, perhaps of a letter or account, from Brittany (Plouhinec, Mané-Véchen). Found on the site of a Roman villa with coins dating to 70–192 CE, the writing probably dates to the second or early third century CE. Photograph by David Howell, courtesy of CSAD.

Fig. 4: Bronze tablets set up in Lyon, France, in c. 48 CE recording the Emperor Claudius's desire to admit wealthy citizens from all of Gaul into the senatorial class. Rama, Wikimedia Commons, CC-BY-SA-2.0-FR.

Monumental: Monumental texts are normally carved into stone or sometimes incised into metal plaques, usually of bronze, and capitals are almost always employed. The texts are intended for public display and can be 'private' in function, e.g. funerary inscriptions and religious dedications, or 'public', e.g. milestones, building inscriptions and laws.

Literary: Literary texts were often written in scripts called 'bookhands', these were either capitals (the square capitals, *capitalis quadrata*, used for lapidary inscriptions, or, more commonly, rustic capitals *capitalis rustica*) or uncial (a rounded version of the capitals which developed from the second half of the third century CE); many fewer literary texts from the ancient world are attested in Latin than in Greek and most are found on papyrus and parchment. However, Latin literary texts are occasionally written in scripts which look more cursive than capital or have a mixture of cursive and capital forms. It seems likely that though some writers, especially those professionally trained, would know the conventions concerning script and genre, some would simply use the script(s) with which they were most familiar. The set of three literary texts published in Bowman, Thomas and Tomlin 2010, *Tab. Vindol.* 854–856, illustrates
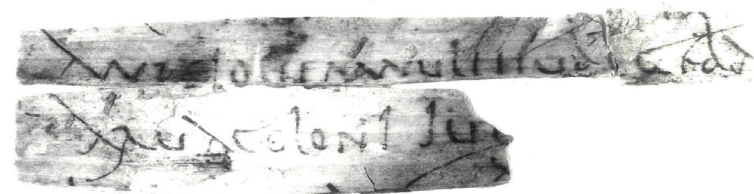
Fig. 5: Section of Vergil's Georgics (1.125), on 104–120 CE ink-written tablet, written in 'bookhand', Tab. Vindol. 854. © The Vindolanda Trust.
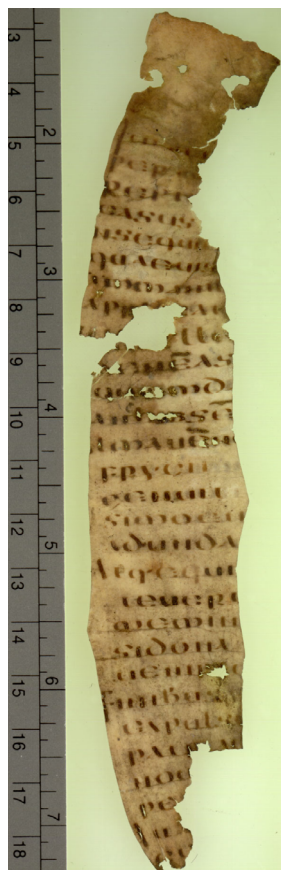
Fig. 6: Fifth-century parchment (P.Oxy.L 3553, 'flesh side'), with Vergil, Aeneid I 615–621, in uncial script. Courtesy of The Egypt Exploration Society and the University of Oxford Imaging Papyri Project.

the lack of firm boundaries between script types: 'in all three, the attempt to make a distinction between thick and thin strokes, and the regular use of hooks, serifs and finials on the uprights, serve to emphasise the literary style of writing; but features of Old Roman Cursive (ORC) are to be found in them all'.

Official/formal non-monumental, 'documentary': Latin official and public administrative documents, such as army strength reports, and everyday business documentation, such as receipts and contracts, are commonly written in cursive on wooden leaf tablets, stylus tablets and ostraca. Examples found on papyrus and the rarer,
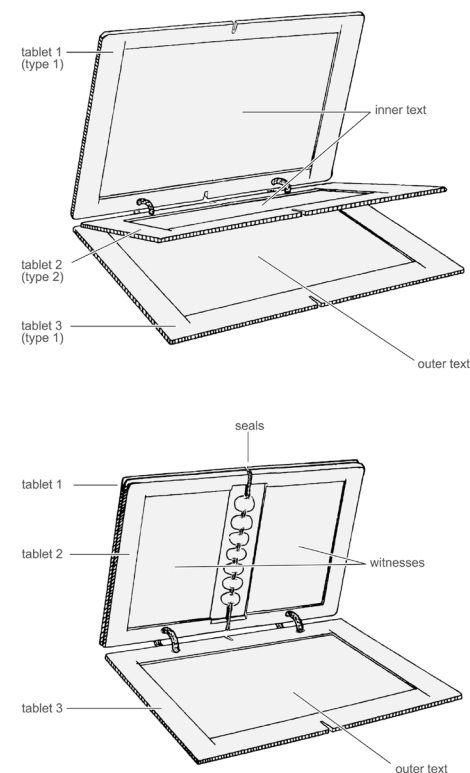
Fig. 7: Schematic reconstruction of a triptych used for legal documents. The outer two stylus tablets enclose a tablet designed to hold the seals of witnesses. The tablets were hinged together with thongs. Detail from Tomlin 2016 fig. 17. © MOLA/Bloomberg.

and more costly, parchment are fewer because, generally, given the provenance of these finds, the texts are more commonly in Greek. The majority of Latin texts of this kind on papyrus from the Middle East are generated by the army. Accounts and documents are often produced in distinctive formats, for example laid out in narrow columns. Sometimes several wooden leaf tablets are tied together into a set with thongs (Vol. 2, 45–46).

Correspondence: Latin letters are usually written on wooden leaf tablets, stylus tablets, papyri and ostraca in cursive script; use of parchment was not widespread in the early centuries of the Empire and was expensive. Letters on wooden leaf tablets are often found in diptychs, written in two columns, with spacing and indentation for the opening and closing greetings, then folded with the address on the reverse. The wood used is mainly birch, alder and oak.
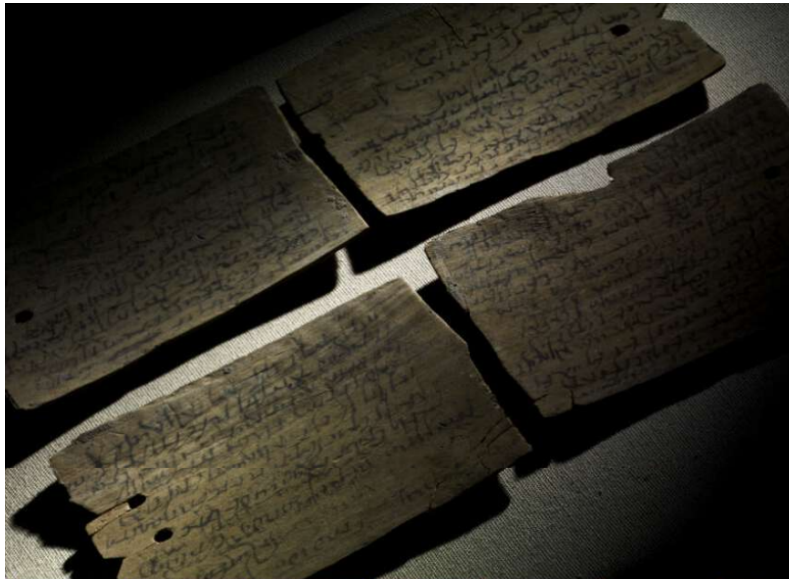
Fig. 8: Tab. Vindol. 343, a letter found at Vindolanda consisting of two diptychs which have been scored and folded, each has notches and tie-holes in the left- and right-hand margins. It dates to 104–120 CE. © The Trustees of the British Museum (CC BY-NC-SA 4.0.)

Graffiti: Graffiti come in all shapes and sizes and on various surfaces. Graffiti on buildings and walls, which are normally 'public' in an obvious sense of location and visibility, are often written in capitals, though cursive is also commonly found. These include election notices (*programmata*), advertisements and messages left in brothels. Inscriptions incised on ceramic are also often termed 'graffiti' and this tends to include everything from scrawled names to the administrative firing lists of the pottery kilns at La Graufesenque (which could be categorized in the 'documentary' category above). Names on pottery tend to be written in capitals, though sometimes forms influenced by cursive script are used. Generally longer texts on pottery, such as the firing lists, are written in cursive.

Fig. 9: Graffito 'FAVSTI' on the base of a ceramic vessel from the archaeological site of the sanctuary of Cybele at Lyon. Photograph by Morgane Andrieu.

Makers' or similar commercial marks: Impressions made by stamps were common on pottery, lead piping, tiles, sticks of eye-salve, barrels and even bread. We know that tags were also used, for example on bundles of clothing. Amphorae might have several texts on them: a stamp of the vessel maker and also painted texts concerning the contents/price/locations/people involved in the production/transport/sale. These commercial texts are found in both capitals and cursive, with a preference for capitals, particularly in shorter texts.

Fig. 10 and 11: Two oculists' stamps on green schist from first- to third-century CE Naix, Meuse, and Roman Biggleswade, Bedfordshire, with retrograde text on four edges with remedies for eye ailments. The Biggleswade example has additional writing on both faces to aid selection of the appropriate edge for stamping. © The Trustees of the British Museum (CC BY-NC-SA 4.0).

Curse tablets/defixiones: These texts are normally incised or scratched on thin sheets of lead which are rolled or folded and deposited in a place of religious significance which offers access to a divine power. The power is asked to provide redress against an alleged crime or offence or for help in affairs of the heart or the racecourse, for example. The sheets are normally rectangular and inscribed on one side only, many in cursive (Bartoletti 1990). There are over 300 published Latin curse tablets from the Roman world of which a significant proportion come from Britain, notably the Temple of Sulis Minerva in Bath and the shrine at Uley in Gloucestershire. Of the 111 tablets with texts from Bath, 29 are written in capital scripts, 64 in ORC and 18 in NRC; a few of these texts mix cursive and capital forms. Although the details of alleged crimes and offences may vary, these texts are highly formulaic.

Fig. 12: Uley (Gloucestershire) curse tablet, published as Britannia 51 (2020), 481, no. 13. Courtesy of R. S. O. Tomlin.

Writing aids: Under this category we can include the numerous examples of writing exercises and alphabets which were written on a range of materials from walls to tiles. Capital alphabets are more commonly attested than cursive and there are examples of mixtures of capital and cursive forms.

Fig. 13: An alphabet followed by a partial alphabet on an imperial-period tile from Châteaubleau (Recueil des inscriptions gauloises II.2 fig. 131 bis). Photograph by Margot Pilon, courtesy of the Association La Riobé.

3. Collections containing cursive texts

Our earliest examples of Roman-period cursive texts date to the end of the late Republic (first century BCE), though the vast majority are imperial. Most of our cursive collections date to the first and second centuries CE and there is a significant reduction in the second half of the third century which may simply be due to the vicissitudes of archaeological excavation and discovery. Ink-written cursive in Latin on papyrus is comparatively very rare: we have just a few hundred published examples for Latin and over fifty thousand for Greek. In what follows we tour the Empire and indicate where some of the important collections of texts in cursive Latin have been found.

Italy

Herculaneum wax tablets. Over 160 tablets dating to between 40/1 and 75 CE can be found in Camodeca 2017. Despite the remarkably homogeneous content, the tablets from Herculaneum contain writing in ORC by people from different strata of society.

Archive of the Sulpicii. 127 wax tablets in ORC largely written in Puteoli and found near Murecine, published in Camodeca 1999. They cover financial and juridical affairs.

Pompeian wax tablets. 153 texts written in ORC record the business affairs of L. Caecilius Iucundus, an auctioneer, and can be found in *Corpus Inscriptionum Latinarum* IV Supplement 1 3340, I–CLIII.

Fig. 14: Map of Roman Italy.

Wall graffiti from the Palatine ([Rome](#)*), Pompeii, Herculaneum and other locations.* Numerous graffiti scratched or painted on plaster and other materials are collected in various editions, including *Corpus Inscriptionum Latinarum* IV Supplement 3 and Väänänen *et al.* 1966 (*paedagogium* on the Palatine, second and third centuries CE), 1970 (*domus Tiberiana*, late first to second century CE). See also http://ancientgraffiti.org/Graffiti/ and http://www.ostia-antica.org/graffiti/graffiti.htm. Many are in capitals, but some are written in ORC.

[*Ravenna*](#) *papyri.* A collection of 61 documents in non-literary Latin dating between 433–700 CE edited in Tjäder 1954, 1955, 1982. These are written in NRC with the addition of opening sections in a script that Tjäder calls 'misteriosa scrittura grande', which has been linked to the *litterae caelestes* (see [below](#)).

Fig. 15: Line drawing representing a handwritten prayer to Venus from the first century CE (Corpus Inscriptionum Latinarum IV 10679), courtesy of The Ancient Graffiti Project. See http://ancientgraffiti.org/Graffiti/graffito/AGP-EDR140983. *Reproduction prohibited.*

Egypt

Mons Claudianus ostraca. The ostraca from <u>Mons Claudianus,</u> a military outpost in the eastern desert active between the first and third centuries CE, include administrative documents, writing exercises, and letters, both administrative and private (Bingen *et al.* 1992, 1997 and Cuvigny 2000). The vast majority of the nearly 900 published examples are in Greek, but a small percentage are in Latin.

Letters of Claudius Terentianus. 11 letters on papyrus written by the soldier Claudius Terentianus in Egypt in the second century CE to the veteran Claudius Tiberianus from <u>Karanis</u>. The texts are *P.Mich.*467–471, 476–480, inv. 5395, all of which can be found on the <u>Advanced Papyrological Information System (APIS UM)</u>. Six are in Latin and in cursive script.

Letters of Cutus. 9 Flavian-period ostraca with Latin texts found in a dump of the fort of <u>Didymoi</u> and attributed to a Thracian soldier named Cutus (Cuvigny 2012; Adams and Ast 2021). The script is

Fig. 17: Letter of Cutus to Drozeus on ostracon, Didymoi, Egypt, Flavian period. Photograph by Adam Bülow-Jacobsen.

described as 'idiosyncratic Rustic capital with cursive elements'. The language is that of 'learners' Latin' and may contain Thracian features.

Latin papyri. Cavenaile 1958 is a corpus of 345 Latin papyri (plus 28 bilingual examples in an appendix) both literary and documentary, most of which come from Egypt with a few from Syria and Palestine.

Military texts. Daris 1964 is a selection of 108 Greek and Latin documentary sources for the army in Egypt, mainly on papyrus.

Fig. 16: Map of Roman Egypt and North Africa, with direction marker to Dura Europos.

North Africa

Bu-Njem ostraca. In 1992, Marichal published over 150 ostraca from Bu-Njem (<u>Gholaia</u>), Tripolitania, a third-century military outpost, which are written with ink almost entirely in ORC (Marichal 1992). Nine of these ostraca are specifically dated to the period 253–259 CE.

Tablettes Albertini, wooden tablets. Dating to the fifth century CE, so strictly speaking from the Vandal period, these legal and financial documents are written in ink on around 50 slabs of wood in cursive Latin (NRC) and were found in north Africa on the Tunisian–Algerian border west of Gafsa (Courtois *et al.* 1952).

Ostraca. Texts are common on ostraca from north Africa. Bagnall (2011, 125) notes that there are many Latin texts on ostraca from north Africa awaiting publication. Amongst those published, apart from those from Bu–Njem, are 32 Latin ostraca from Carthage dating to 373 CE and concerning olive oil (Peña 1998). There is a helpful round–up of publications at the end of the chapter on the Jerba ostraca (mostly in Greek with two, possibly three, in Latin) (Várhelyi and Bagnall 2009).
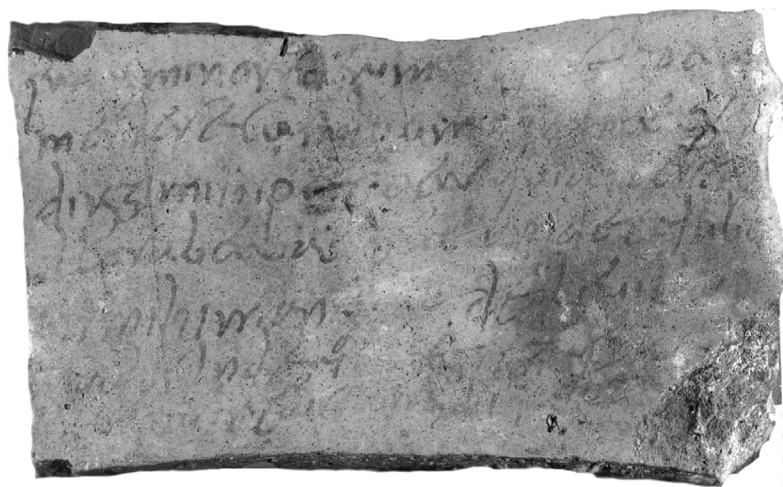
Fig. 18: Latin letter from Jerba on ostracon, late fourth to fifth century CE. Courtesy of Lisa Fentress.

Syria

Dura–Europos. The documents from this military outpost can be dated to between 208 and 255 CE, according to the information contained in several papyri, and are published in Welles *et al.* 1959. They shed light on the *Cohors XX Palmyrenorum,* as these documents, many of them official military records, were written by, or addressed to, personnel in this auxiliary unit. Though the majority are in Greek, the fact that they were written in the first half of the third century makes the 80 or so which are in Latin an extremely valuable source of evidence for the evolution from ORC to NRC (Austin 2010).
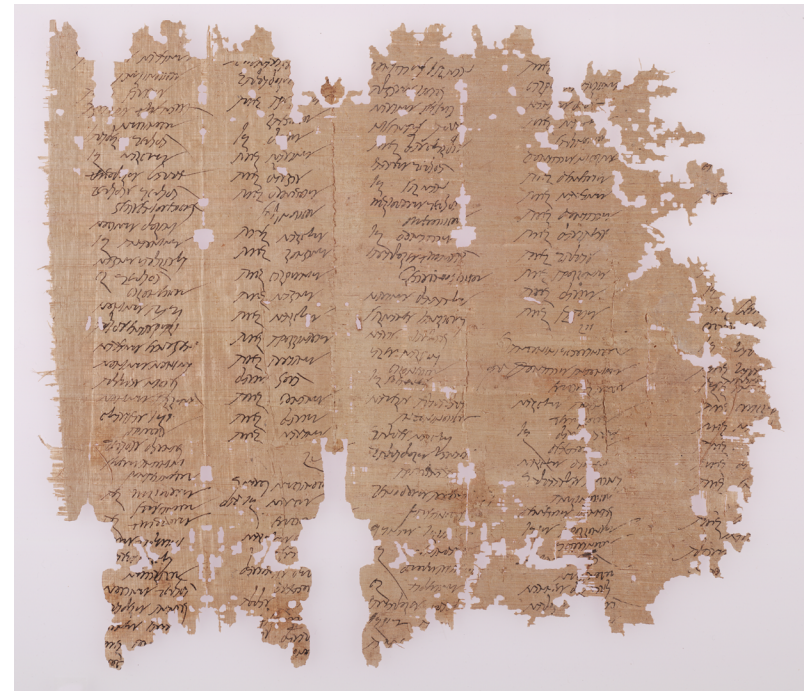
Fig. 19: Front of a papyrus from Dura–Europos, dating to c. 218 CE (P.Dura 98). It is a roster of centuries written in Latin and in ORC. Courtesy of Beinecke Rare Book and Manuscript Library, Yale University.

Hispania, Gaul, the Germanies

Roman-period texts from Hispania. Graffiti from Hispania and other texts in cursive script have not traditionally been the focus of systematic publication, but published finds often appear, for example in *Hispania Epigraphica.* An interesting series of *tituli picti* found in a cave in south-eastern Spain (Murcia) contains texts in a range of script forms including cursive (Stylow and Mayer 1996). Fabre, Mayer and Rodà 2002 have published the inscribed *instrumentum* from Catalonia. Publications which have been devoted to graffiti on ceramic from specific sites, such as the set of 243 from Segobriga (Abascal and Cebrián 2007), contain material similar to those from elsewhere in the Empire, that is very short texts, largely written in (sometimes cursive-influenced) capitals. Several collections of graffiti are currently being studied for publication, including those from Mérida.

The Visigothic slates. These Latin texts on slate have been found primarily in the northern Meseta of Spain in rural locations (Velázquez Soriano 2000). There are close to two hundred, dating to the fifth to eighth centuries CE. Their contents are administrative, legal, educational (including alphabets) and religious. Though later than the bulk of the material discussed here, the cursive script used is key for understanding the development of NRC into regional variants.

Texts from Gaul. Volume II.2 of the *Recueil des inscriptions gauloises (RIG)* contains *instrumentum domesticum* in Gaulish and in a mixture of Gaulish and Latin language, many written in ORC, largely dating to the early to mid-imperial period (for Gaulish, see Mullen and Darasse 2020). Latin graffiti from Gaul have not been systematically

Fig. 20: Map of Roman Hispania, Gaul and the Germanies.

collected or published, though increasing interest in the graffiti on ceramic has resulted in multiple geographically restricted publications, for example Andrieu 2017 (Autun, Chartres and Sens) and Sylvestre 2017 (Avenches). Although the vast majority of these graffiti are written in capitals, they are often cursive-influenced. At Avenches only 8 of over 1800 published graffiti (many illegible) are described as being written in cursive script.

La Graufesenque graffiti. Incised on samian ware these date largely from the Neronian to late Flavian period and are written in Latin, Gaulish, or a mixture of the two, in ORC. Robert Marichal's corpus of these texts (Marichal 1988) includes a detailed discussion of the cursive script used. They are largely firing lists recording pottery to be fired in the kilns at the vast production centre, which appears to have functioned bilingually (Mullen forthcoming).

Texts from the Germanies. There has been significant interest in publishing the graffiti from the Germanies inspired in part by the publication of 400 graffiti on Roman vessels from the military camp of Haltern (Galsterer 1983) and a similar number from the *Rheinisches Landesmuseum* in Bonn (Bakker and Galsterer-Kröll 1975). Large collections of graffiti have been published from, for example, Augst (Féret and Sylvestre 2008), Neuss (Kütter 2008) and Xanten (Weiß-König 2010), but, as at Avenches, the vast majority are not in cursive script.

Vindonissa stylus tablets. Speidel 1996 contains the stylus tablets from the legionary fortress of Vindonissa. They largely involve correspondence written in ORC from the legion garrisoned there between 30–101 CE and much of the legible text comprises addresses.

Mainz curse tablets. Blänsdorf 2012 presents 34 metal curse tablets incised in ORC and in capitals from the sanctuary of Isis and Magna Mater which was uncovered in the centre of Mainz in 1999.
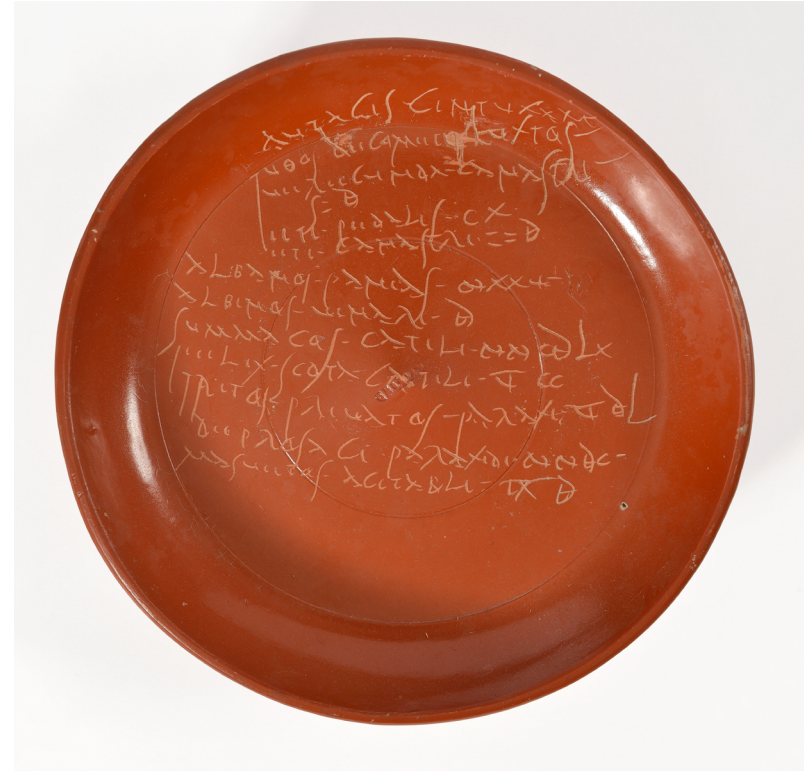
Fig. 21: Firing list on a samian ware plate recording vessels to be fired in a kiln at the production site of La Graufesenque (Aveyron) (Marichal 1988 no. 1). Written in ORC and Gaulish language. Courtesy of Céline Coste, Musée Fenaille.

Instrumentum inscriptum of the frontier zone (Latin *limes*). Pfahl 2012 catalogues the Latin and Greek items, but provides little information about the script used. Pfahl indicates, however, that most of the wax and curse tablets included are in ORC (9 of each, all dating from the first century to c. 260 CE).

Stylus tablets. Increased interest in wooden writing tablets since the publication of finds from Vindolanda and Vindonissa has encouraged investigation of museum collections and site finds for possible further examples. Surveys indicate that there are perhaps thousands of unpublished fragments of stylus tablets in particular, with concentrations in the Netherlands, Germany and Switzerland. Work is underway to assess whether literate marks can be identified, using RTI, and to publish as many as possible, but it is a complex and time-consuming task.

Britain

Bloomberg stylus tablets. Tomlin 2016 publishes the stylus tablets, plus two ink-written leaf tablets, found in the City of London during excavations for Bloomberg's European Headquarters. Around 80 stylus tablets out of more than 400 preserve legible traces. They date to the second half of the first century CE and are written in ORC. A pdf of the volume has been made freely available here. The texts can be found in digital, searchable format at: https://romaninscriptionsofbritain.org/tablondbloomberg/stylus-tablets

Vindolanda writing tablets. The Latin tablets discovered in excavations of the fort of Vindolanda in northern Britain, on the Stanegate, date to the late first to the early second century CE. These documents were written in ORC on very thin pieces of wood. The content is generated by the military and a few associated civilians, but it is

Fig. 22: Map of Roman Britain.

Fig. 24: Left-hand portion of one diptych of a double diptych letter relating to missing lances (lanciae), ink on wood, found at Carlisle. It was written by the decurion Docilis to his commanding officer, the prefect Augurinus, and can be dated to c. 100 CE. Tomlin 1998 tablet no. 16 lines 1–11. Image from CSAD.

Fig. 23: A reconstruction of how one of the Bloomberg stylus tablets (Tomlin 2016 no. 29) may have originally looked (fig. 9 from Tomlin 2016). © MOLA/Bloomberg.

important to note that many of the tablets must have been written in other locations. There is remarkable evidence of everyday life and a rare certain example of a female cursive hand (*Tab. Vindol.* 291). The few legible texts on some of the couple of hundred stylus tablets from the site remain mostly unpublished, though research is underway. The ink-written leaf tablets can be found in Bowman and Thomas 1983, 1994, 2003; Bowman, Thomas and Tomlin 2010, 2011, 2019 and in digital format at: https://romaninscriptionsofbritain. org/tabvindol/vol–I/preface

Carlisle writing tablets. These documents, written in ink on wooden tablets are also written in ORC and are similar in content to those found at Vindolanda (Tomlin 1998). The tablets, discarded as rubbish, were found in excavations of the Roman fort Luguvalium (Carlisle) and date to the 70s CE through to around 125 CE.

Curse tablets. Tomlin 1988 and 1993 contain the numerous curse tablets from the Roman-period sanctuaries at Bath (Somerset) and Uley (Gloucestershire). Smaller numbers of finds scattered across the country, many in cursive script, can be found in the annual round-up of epigraphy in the journal *Britannia.* New curse tablet editions, including a full edition of the Uley tablets, are awaited.

Instrumentum domesticum from Roman Britain. These have been extensively published in the multiple fascicles of *Roman Inscriptions of Britain volume II* (Frere *et al.* 1990–1995) and new examples are published in the annual survey of epigraphic finds in *Britannia.* These include several texts in cursive script, for example a few stylus tablets in *Roman Inscriptions of Britain, Volume II,* fascicule 4.

Noricum, Raetia, Pannonia, Dacia

Fig. 25 Map of Roman Noricum, Raetia, Pannonia and Dacia.

Instrumentum inscriptum. A large project, led by M. Hainzmann and started in the 1980s, has collected 15,000 'inscribed objects of everyday life' from Roman Austria: *Testimonia epigraphica Norica* (*T.E.NOR.*). The publications linked to this project can be found here.

Siscia lead tags. The largest collection of Roman commercial texts on tags has been published in two volumes by Ivan Radman (Radman–Livaja 2014). The collection comes from the Roman port of Siscia in Pannonia (modern day Sisak). There are nearly 1200 inscribed tags which contain personal names and information about merchandise. The texts are written in capitals, ORC or a mixture.

Alburnus Maior. A collection of stylus tablets and one ink leaf tablet plus fragments, from a mining area in Dacia, written in cursive Latin and dating to around the middle of the second century CE (131–167), see *Corpus Inscriptionum Latinarum* III^2, pp. 921–60 and Russu 1975.

Tasgetium stylus tablets. Hartmann 2011 publishes the over 50 stylus tablets from Roman Eschenz, of which 13 have legible, though fragmentary, text. These date to the first and second centuries CE and seem to contain correspondence and legal documents. The scripts used are ORC and address script, which combines ORC and capital forms in an elongated manner.

Fig. 26: External and internal faces of a stylus tablet from Tasgetium (inv. 1997.015.1090). The writing on the exterior is in so-called 'Address script'. Drawing and photograph: AATG Amt für Archäologie Thurgau, www.archaeologie.tg.ch.

Other Collections

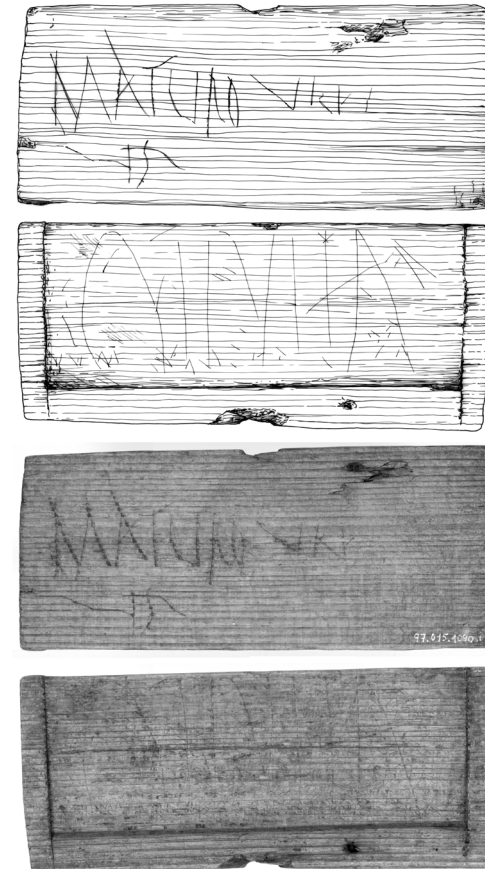Bartoletti and Pescini 1994: a selection of Latin documents on papyrus, parchment, writing tablets, metal and ceramic in chronological order spanning the seventh century BCE to the eighth century CE.

Bruckner and Marichal 1954—: a catalogue with transcriptions, commentaries and excellent photographs in multiple fascicles of Latin literary and documentary manuscripts on papyrus and parchment which date up to 800 CE. The catalogue is organized by country of current location not provenance.

Cugusi 1992: a collection of letters in Latin on papyrus, writing tablets and ostraca.

Fink 1971: a collection of 135 documents in both Latin and Greek generated by the Roman army, largely on papyrus but a small number are on parchment and ostraca. These date to the first to third centuries CE and three fifths are from Dura-Europos (Syria).

Kropp 2008 and Urbanová 2018: recent collections of Latin curse tablets, many of which are written in cursive script.

Lowe 1934–1988: a collection in 11 volumes, organized by modern geographical location, of all Latin literary manuscripts, including legal texts, dating up to 800 CE. Each entry is accompanied by a photograph and a palaeographic description.

Seider 1972: a three-volume compendium of Latin papyri, designed to offer quality images of the texts so that the handwriting can be compared in chronological sequence. The first volume is dedicated to documentary sources, largely from Dura-Europos, the second and third to Classical authors and then legal and Christian texts.

4. Cursive scripts

Overview of the characteristics of ORC and NRC

The cursive scripts in Latin documents from this period have conventionally been classified by palaeographers into two main categories: Old Roman Cursive (ORC), prevalent in the first and second centuries and late into the third CE, and New Roman Cursive (NRC) which is well attested from the fourth century CE but is thought to have its origins in the late third. ORC has more features in common with capital scripts, for example, its separation of individual letters and few ligatures between letters, though many of the letters are quite different from our own capital alphabet. Most of the vertical strokes tend to be roughly the same height and are set out within a layout of two parallel horizontal lines ('bilinear'). NRC is a lower-case script which is more rounded and joined-up, and the letters are of more mixed heights and sit within a layout of four parallel lines ('quadrilinear') in which vertical stokes of some letters are written above and below the central core of the script. In writing NRC the pen does not have to lift much from the writing material. Palaeographers have considered the writing techniques linked to these scripts in detail, for example the form of the writing implements used, the angle at which the pen was held and the *ductus* of the lettering, that is the number, sequence and direction in which the strokes of the letters were formed. It has been noted that NRC may not have been such a good choice for writing on wax tablets, since the stylus needs to be lifted from the wax surface relatively regularly. However, the fact that our evidence is so patchy probably gives us a distorted impression of a

significant disjunction between ORC and NRC forms and media: for example there is no substantial group of wooden tablets dating to the period between the stylus tablets from Alburnus Maior (Dacia, modern Romania) in the mid-second century CE and the ink-written Tablettes Albertini (north Africa) in the fifth century. If we were to have more evenly distributed evidence, filling gaps in the third and fourth centuries CE, we might see a more blended and complex development. Indeed curse tablets from Britain dating to the third and fourth centuries CE show mixtures of script forms, with NRC letters (especially the letter *m*) and even longer NRC segments occurring in otherwise ORC texts. This supports the suggestion of a blended and potentially lengthy, transitional phase between ORC and NRC.

Another script for which more evidence would be welcome is Roman shorthand, known as *notae Tironianae*, after Cicero's secretary Tiro (Boge 1973, Teitler 1985). In the current state of play the only examples from before 300 CE which are likely to represent the type that we know existed in the Roman world, thanks to literary references, are a few undeciphered fragments from Vindolanda. For the documentary evidence of shorthand, both from Vindolanda and later sources, see Bowman and Thomas 1994, 71–72.
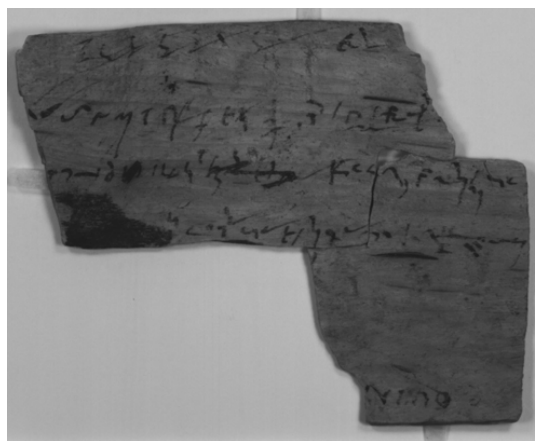
Fig. 27: A rare possible example of Roman shorthand, c. 100 CE, from Vindolanda (Tab. Vindol. 122). Image from CSAD.

The tables of letters (figs 28 and 29) illustrate the different forms in ORC and NRC: the first provides a characteristic set of forms for general orientation, the second is a composite table showing key forms from a range of different groups of tablets with their provenances and date ranges. It should be instantly clear that there is a great deal of variation, even within ORC and NRC. Certain individual letters have been identified as diagnostic for the particular characteristics of ORC and NRC. Those which have attracted detailed discussion are A, B, E, N and P. Several letters are often quite hard to distinguish, particularly I, P, and T. As can be seen from the illustrations of NRC documents, many of the letter forms look very different from ORC and the script in general is marked by much greater use of slope and ligatures between letters.

	OCR	NCR			OCR	NCR
a				m		
b				n		
c				o		
d				p		
e				q		
f				r		
g				s		
h				t		
i				u		
k				x		
l						

Fig. 28: Characteristic ORC and NRC letter forms (based on Bowman and Thomas 1983 fig. 10). The letter K is relatively rare, used most regularly in the abbreviation K/Kal(endae), and is sometimes left out of alphabets. The form drawn here for NRC is based on just two forms and should be treated with caution.

1 Pompeii *stylus*	2 London	3 Pompeii *walls*	4 Vindonissa	5 Vindolanda	6 La Graufesenque	7 Ostia	8 Dacia	9 Bu Njem	10 Bath	11 Bath	12 Imperial rescript	13 Meseta	14 Ravenna	15 Ravenna
c. 15–61	c. 40–70	Pre 79	I century	c. 90–130	I–II century	II century	131–167	III century	II–III century	III–IV century	V century	VI century	572	c. 600

(Chart of handwritten letter forms A–X across the fifteen documentary sources.)

Fig. 29: Letter forms from key sets of documentation in chronological order from the first to the sixth century CE. 1. Pompeii, stylus tablets (Thompson 1912, 335); 2. London, stylus tablets (Tomlin 2016, 21); 3. Pompeii, walls (Thompson 1912, 335); 4. Vindonissa, stylus tablets (Speidel 1996, 32–33); 5. Vindolanda, stylus tablets (Bowman and Thomas 1983, 58, 1994, 53); 6. La Graufesenque, ceramic (Lambert 2002, 370; Marichal 1988, 21–41); 7. Ostia, walls (http://www.ostia-antica.org/graffiti/letters.htm (Eric Taylor)); 8. Dacia, stylus tablets (Thompson 1912, 335); 9. Bu Njem, ostraca (Marichal 1992, 18–35); 10. Bath, metal sheets, Old Roman Cursive (Tomlin 1988, 92–93); 11. Bath, metal sheets, New Roman Cursive (Tomlin 1988, 94); 12. Imperial rescript, papyrus (Thompson 1912, 337); 13. Meseta, slate (Velázquez Soriano 2000, 29); 14. Ravenna, papyrus (Thompson 1912, 337); 15. Ravenna, papyrus, so-called 'misteriosa scrittura grande' (Tjäder 1955 Table 1 no. 3).

Other features of the script

Punctuation

There is often little or no spacing between words in ORC and NRC. In earlier documents interpunct at mid-height of the writing between words is quite common but it disappears after the early second century (Adams 1996; Wingo 1972). Medial points are commonly found after dates.

Apices and i-longa

Apices, resembling an acute accent, are now well attested thanks to the finds of recent decades. The use of the apex can vary between scribes; some employ it to mark the length of selected vowels, others for length on all vowels (Flobert 1990; Kramer 1991); for some writers it seems their training in Latin language is not sufficient to allow them to be consistent in their own usage.

I-longa is represented by an elongated letter i. In early official texts (such as the Claudian Tables and the inscription of the Augustan *Res Gestae* from Ancyra) it is used almost exclusively to mark long i vowels. At Pompeii it is used on tablets to mark both long and short i vowels and also consonantal i. At La Graufesenque it is employed to mark consonantal i (Marichal 1988, 60–65).

Ligatures

These are linking strokes between letters ('internal ligature' can also be used to refer to links between strokes of a single letter). It is a characteristic feature of the development of cursive writing that ligatures become gradually more common over time (De Robertis 2020b). Some NRC hands produce letters which are so ligatured that it may take some time to work out the letters involved. C, E and T often form ligatured combinations; final i is often ligatured in ORC as in *ei, ti* or *si*.

Preceding letter	Following letter																						
	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	Q	R	S	T	U	X	Y	Z
A	•	•	•	•	•	•	•	*			•	•	•	*	•	•	•	•	*	•	•	•	[•]
B	•	[•]	*	[•]	•		[•]		•		[•]			•			[•]	[•]	•	•			
C	•			•			•	•		•	[•]	•		•			•	•	•	*			
D	[•]		[•]	[•]	[•]			[•]	•		[•]	[•]	[•]	[•]	[•]		[•]	[•]		[•]		[•]	
E	•	•	•	•	•	•	•	*			•	•	•	•	•	•	•	•	•	•			
F	•			•	•			•			•		*	•	*		•	*		•			
G	•	[•]	[•]	*	•		•	*	•		[•]		•	•	[•]		•	[•]		•		[•]	
H	•	[•]			•			•					•	[•]				[•]					
I	•	[•]	*	[•]	*		*	[•]	[•]		[•]	[•]	•				[•]	•	•	[•]			
K	•																						
L	•			•	*			•		*		*	*	*	*			*	*				
M	•	[•]	[•]		•			•			[•]	[•]	[•]	[•]	[•]		[•]			[•]	[•]		
N	•			•	•	[•]	*	[•]	•				[•]	•			[•]	•	•				
O		[•]	•	•	•	[•]	[•]	[•]	•	•	•	•			•	•	•	*	*				
P	[•]			[•]	[•]			[•]			[•]	[•]		[•]			[•]	[•]	[•]	[•]			
Q																							
R	•	•		•	•	•	•	[•]	•		*	•	•	•	•		[•]	•	•	•		[•]	
S	•		[•]	[•]	•	[•]	*		•			•	[•]		[•]	[•]	•	•	•		[•]		
T	•		•	•	*	•	*	•	•			•	•	[•]	•		•	•	•	•			
U	•	[•]	•	[•]	•	[•]	•		•			•	•	•			•	•	•				
X	[•]		[•]					•					•	[•]	[•]							*	
Y												*		[•]			[•]						
Z	[•]																						

• Combinations attested during the third to fifth centuries
[•] Combinations attested during the third century only
* New combinations attested for the fourth to fifth centuries.

Fig. 30: Combination of letters in ligature: third–fifth century CE (corpus of 251 documents), after De Robertis 2020a fig. 5.6.

Abbreviations

These are common (Gordon 1948; Marchioli 1993) and occur with dizzying variation. A set of standard abbreviations used in epigraphy generally can be found in Appendix 2 of Bruun and Edmondson 2015. Abbreviations are usually just shortened versions of the word, often unmarked but sometimes indicated with a superscript bar, a high diagonal stroke above the letter or just after, a medial point following or suspension of the final letter above the line. Contraction, i.e. the missing out of letters mid-word, is almost never used. Some common abbreviations in documentary texts include:

Common abbreviated words: h(omines), m(ilites), m(odius), n(oster), n(umerus), p(ondo), sal(utem), s(emis), s(umma), ual(e)

Names and titles: Aug(ustus), coh(ors), co(n)s(ul), dec(urio), leg(io), praef(ectus)

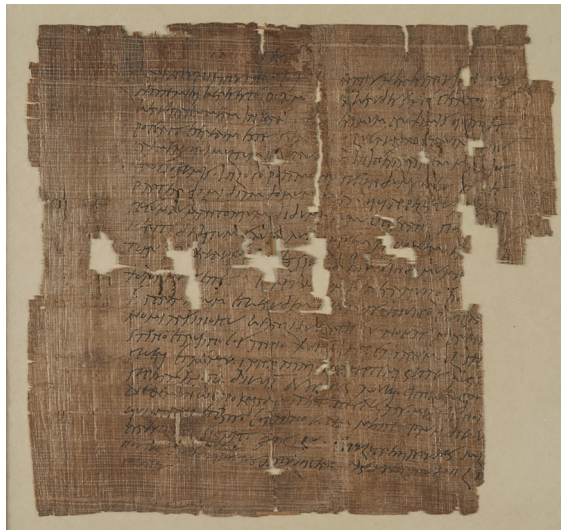Dates: id(es), k/kal(endae), non(ae), pr(idie)

Fig. 31: Copy of the opening of a will of Lucius Ignatius Rufinus from Antinoopolis dating to 211 CE (Chartae Latinae Antiquiores XLVII 1403, P.Diog. 10). © The British Library Board.

Abbreviations are prolific in formulae in legal texts such as contracts and wills on stylus tablets. We find numerous examples, for instance, in the copy of a will from Egypt in the collection of the British Library (Bowman and Thomas 1977). It opens with *exempl testa*, an abbreviation for *exemplum testamenti* 'copy of the will' and the next line continues with *t f* short for *testamentum fecit* 'made this will'. Other abbreviations in the will include *o b m, c o* and *s d m* which resolve as *omnium bonorum meorum* 'all my property', *ceteri omnes* 'all others' and *sine dolo malo* 'without wrongful deceit'.

Symbols

Symbols occur relatively regularly in some military texts and in administrative records, such as the accounts from Vindolanda and the firing lists of La Graufesenque. It is not possible in the current state of knowledge to present a straightforward and comprehensive list of symbols and their meanings. We have incomplete resources at our disposal, usage can be inconsistent within records from single sites and practice is certainly not the same everywhere in the Empire. For example the system used for indicating fractions of currency, e.g. the *denarius,* will differ between the texts from the north-western provinces and the papyri from Egypt, since the latter reflects a distinctive practice using the local unit of currency, the obol. We present some of the commonly occurring symbols in *fig. 31* to alert readers to possible examples in their texts, based primarily on the records from Vindolanda (Bowman and Thomas 1994, 54–55, 2003, 54). This carries a warning: readers of new cursive texts are encouraged to look at contemporary and, ideally, local corpora to help them decide what the symbols might represent. No interpretation of the symbols should be taken for granted: Fink (1971, 556) in editing the Roman military records on papyrus even went as far as suggesting that abbreviations and symbols 'were devised by the clerk on the spur of the moment to suit his own convenience'.

centurio / centuria	
denarius	
half-denarius	
quarter-denarius / quadrans	
eighth-denarius /octans	
as	
half-as	
quarter-as	
semis *arguably an abbreviation, though often employing an oversized letter, used to indicate half of various weights and measures*	
sextarius	
'theta nigrum' *used to refer to the deceased (sometimes spelt out as thetatus)*	

Fig. 32: Some commonly occurring symbols in cursive texts.

Numerals can be found in Appendix 6 of Bruun and Edmondson 2015. Numerals are often marked out with a superscript line so that forms such as *C (100), L (50), X (10), V (5), I (1)* are not mistaken for their respective letter forms. Numerals are composed in two main ways: 'subtractive', e.g. IX for 9, and 'additive', VIIII for 9. Marichal (1988, 41–46) describes the complexities of the developments, which seem to see a preference for additive forms developing in inscriptions and eventually winning out also in documentary texts during the third century CE.

5. Fact-file on cursive scripts

- The origins of ORC are obscure (see below).

- ORC scripts from the first to third centuries CE are broadly one family containing many variants for individual letter forms, whose characteristics are fairly consistent across the Empire.

- ORC is written in ink and on tablets in basically the same scripts but with differences because of the nature of the writing implement (broad, soft reed versus pointed stylus) and surface (wood/papyrus versus wax/metal) (see Vol. 2).

- Variants of the same ORC letter form can be used interchangeably by the same scribe and within a single document and even word.

- During the first and second centuries CE the script is in a phase of expansion in which moves are being made towards increased ligaturing and speed. Significant changes take place in the early second century CE, displaying some features which foreshadow the later development of NRC.

- The script known as NRC is attested from the second half of the third century CE. In the second half of the third century, a key phase for understanding the developments of the scripts, very few NRC documents are attested and we have virtually no ORC texts any later than *c.* 260 CE. We cannot yet precisely define the relationship between ORC and NRC and their development over time (see below).

- In the case of the many documents which are not firmly dated by textual or archaeological evidence, the classification of the script has often been identified by editors as a dating criterion

so that anything written in NRC is likely to be after 250 CE. This step should not be taken without caution and should not be used with circularity of argument to date the scripts.

- A mixture of capital and cursive writing, frequently in a single document, is well attested and warns against making strict distinctions between use of bookhands and documentary hands. Different scripts and variations, including 'address script', used by the same individual writers occur in same documents.

- Very many individual hands are represented in the surviving groups of texts which only contain a few cases of more than one document attributable to the same hand within relatively uniform literate practices, with impressive consistency of layouts of texts, abbreviations, formulae etc. Dictation and use of scribes are also common.

- In 367 CE a rescript of the emperors Valentinian and Valens states that *litterae caelestes* (possibly referring to an elaborate late form of ORC) should be reserved for the imperial chancery with other bureaucrats needing to use *litterae communes* (probably NRC). This passage is discussed further [below].

- NRC was the platform for the development of Caroline/Carolingian minuscule in the eighth century which became the calligraphic standard for manuscripts, mainly literary, in western Europe and is the ancestor of modern minuscule writing.

6. Debates about cursive scripts

Evolution of cursive writing

In this section we will go into some detail about the nature of the differences between ORC and NRC and the scholarly debates about how the development from ORC into NRC occurred. It is important to recognise that our understanding of the history of writing in Latin in the Roman period depends on limited evidence which is widely scattered in time and place. We therefore have to visualise it as a series of spotlights and dark intervals rather than an evenly illuminated landscape. It should also be emphasised that the roots of our understanding are to be found in scholarly literature from the first half of the twentieth century and are therefore based on a much more restricted amount of evidence than has become available in the past six decades, particularly from north Africa and northern Britain. This new material has been particularly valuable in shedding light on documentation from the early second and mid third centuries, that part of the landscape which lies between the predominance of, respectively, ORC and NRC.

The broad pattern may be summarised as follows. ORC (sometimes called cursive majuscule) covers the family of scripts of which the earliest examples can be found on papyri and stylus tablets in Latin from the late Republic (first century BCE) up to about the middle of the first century CE. This was plausibly believed to have had its origins in capital bookhands, but it is a belief not underpinned by any firm evidence of the 'how' and 'why'. There are numerous references in classical authors to literary texts and somewhat fewer to everyday writing (notably Plautus, *Pseudolus* 21–30). It is clear from inscriptional and other evidence of the second century BCE from Egypt and Delos, for example, that Romans and

Italians were engaged in military and commercial activities across the Mediterranean and must have been thoroughly familiar with documentary material written in cursive Greek scripts. Roman officials and traders must therefore have been used to dealing with, and producing, Greek documents written in cursive hands, which may have contributed to the development of such writing practices in their own language. It is important to realise too that the evidence from the earliest period (*c.* 30 BCE–50 CE) comes exclusively from papyri and stylus tablets, the latter showing a somewhat 'stiffer' style of writing than we find on leaf tablets, due to the nature of the wax surface and the writing implement (a metal stylus). It is much closer to bookhand or capital script, with individual letters tending to be more upright and separate than the later second–century ORC letter forms.

Even before the discovery of the ink-written leaf tablets at Vindolanda and Carlisle (*c.* 70–130 CE) it had been proposed that there were certain developments and changes in the character and style of the scripts in the early second century which are important both intrinsically and in relation to the later appearance of NRC. Specifically, a slope to the right, a more fluid, continuous style (termed 'strisciato' in Italian) with greater use of ligature and a change in the angle at which the pen was normally held by the writer; this latter feature has been regarded as crucial by some, but not all, palaeographers. Leaving that latter point aside, it is fair to say that the ink tablets from the late first and early second centuries support the view that there were significant changes in the style and pattern of ORC scripts in this period.

This brings us to the vexed question of the relationship between ORC and NRC, specifically whether the latter developed directly from the former, which we cannot answer definitively given the present state of knowledge. As early as the 1950s it was believed that the angle at which the pen was held is crucial and attempts were made to determine whether certain NRC letter forms could, or could not, have evolved from earlier ORC forms. There is a complete spectrum of palaeographical views. At one extreme was

Calidorus: Cape has tabellas, tute hinc narrato tibi quae me miseria et cura contabefacit.
Pseudolus: Mos tibi geretur. sed quid hoc, quaeso?
Cal. Quid est?
Ps. Vt opinor, quaerunt litterae hae sibi liberos: alia aliam scandit.
Cal. Ludis iam ludo tuo?
Ps. Has quidem pol credo nisi Sibulla legerit, interpretari alium posse neminem.
Cal. Cur inclementer dicis lepidis litteris lepidis tabellis lepida conscriptis manu?
Ps. An, opsecro hercle, habent quas gallinae manus? nam has quidem gallina scripsit.

Calidorus: Take these tablets, and read for yourself the misery and worry that are wearing me down.
Pseudolus: I'll do as you ask. But what's this, please?
Cal. What do you mean?
Ps. The letters seem to be trying to make babies: they are mounting one another!
Cal. Are you joking again?
Ps. I'm telling you, unless the Sibyl reads this, no one else can make sense of it.
Cal. Why are you being rude to these charming letters written on charming tablets by a charming hand?
Ps. Seriously, do chickens have hands? It looks as if some chicken has scratched these.

Fig. 33: Pseudolus passage recreated in Old Roman Cursive font (after http://guindo.pntic.mec.es/jmago0042/LATIN_PALEOGRAPHY.pdf, p. 15), followed by transcription and translation. Note that literary texts are not generally attested in this form of script, and that the use of a computer font, with spaces, makes this easier to read than examples from the ancient world.

the view that certain NRC letters (particularly B) **could not** have developed from the ORC form (e.g. Mallon 1952), at the other an unqualified judgment that NRC **must have** developed from ORC (e.g. Schiaparelli 1921). In between, there are more subtle and nuanced matrices, with scholars arguing for 'official' and 'unofficial' (*scrittura normale* or *commune*) forms of ORC in use at the same time, with the 'unofficial' or 'common' use forms exercising a predominant influence over the development into NRC and the 'official' ORC almost entirely disappearing from view in the second half of the third century (e.g. Cencetti 1950; De Robertis 2020a).

Even if we cannot confidently accept or dismiss any of these views, we can have some confidence in stating that, if there is some relationship between ORC and NRC, we should be able to see ORC scripts of the first two centuries using letter forms which were critical for the development of NRC. In the 1980s this appeared to be so and small but significant items of evidence since that time support the case: in particular supposed NRC forms of A, B and E which had not previously appeared in an ORC context (for example the 'Frisian ox sale' tablet contains As and Bs of NRC type in an otherwise early sample of ORC script) and *Tab. Sulis* 65 (Tomlin 1988), identified as NRC but with a mixture of ORC forms, including a B. However, the shift of the bow or loop of B from left– (ORC) to

Fig. 34: A section of an ink-written wooden tablet containing an account of barley and wheat allocated to turmae, written in a single column across the grain of a long strip of wood, which was then scored three times, folded upon itself and secured by means of a hole punched in one corner. Found at Carlisle, dating to c. 100 CE, and published as Tomlin 1998 tablet no. 1A lines 4–20. Image from CSAD.
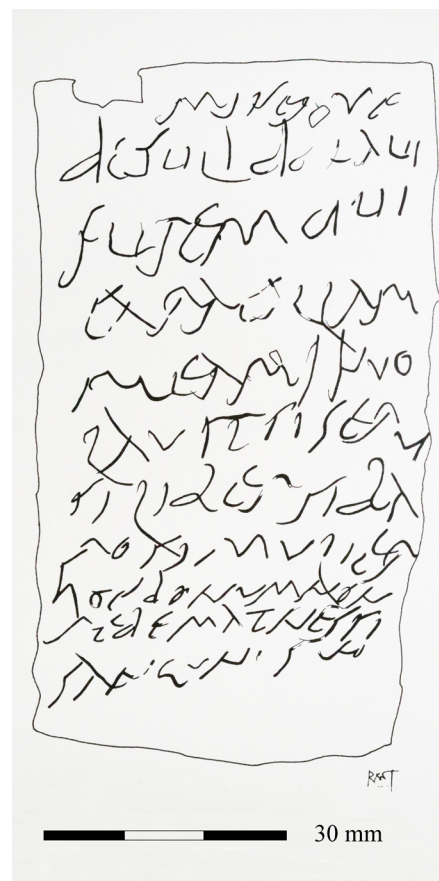

Fig. 35: Bath curse tablet number 65, showing a mix of NRC and ORC forms (Tomlin 1988). The text dedicates the thief of a stolen hooded cloak to Sulis Minerva, declaring that 'he is not to buy back this gift unless with his own blood'. Drawing by R. S. O. Tomlin.

30 mm

right-facing (NRC) still lacks a universally accepted explanation (Marichal 1953). Despite the uncertainties, the evidence which has steadily accrued has tended to suggest that the move to NRC was an evolving process in the second and third centuries, rather than a change in which stylistic canons were imposed—in other words more of a continuum, though a continuum whose apparent uniformity across the Empire is striking.

Interestingly there *is* evidence from the fourth century of script forms being subject to official policies that were sometimes enforced. The use of NRC in provincial chanceries appears to have been enforced by an imperial edict of Valentinian I and Valens in 367 CE.

> 'Emperors Valentinian and Valens Augustuses to Festus, Proconsul of Africa. Our Serenity has observed that the practice of imitating Our **celestial imperial letters** (*litterae caelestes*) has arisen from the fact that the office of Your Gravity, in composing references of cases to the Emperor and reports to Him, uses the same kind of script as that which the bureaus of Our Eternity use. Wherefore, by the authority of this sanction, We command that hereafter this custom, a teacher of forgery, shall be abolished and that everything which must be written either from a province or by a judge shall be entrusted to **commonly used letters** (*litterae communes*), so that no person shall have the right to appropriate a copy of this style, either privately or publicly. Given on the fifth day before the Ides of June at Trier in the year of the consulship of Lupicinus and Jovinus'

(*Codex Theodosianus* 19.19.3, translation, Pharr 1952, 241)

Some have argued that the *litterae caelestes* cited here refer to a late form of the 'official' ORC that developed in the early centuries of the Empire. If correct, perhaps the policing of the use of that script had been so successful that it almost entirely vanishes from our evidence from the second half of the third century CE onwards and perhaps was indeed only employed in very narrow, formal contexts. A flavour of what these *litterae caelestes* might have looked like can
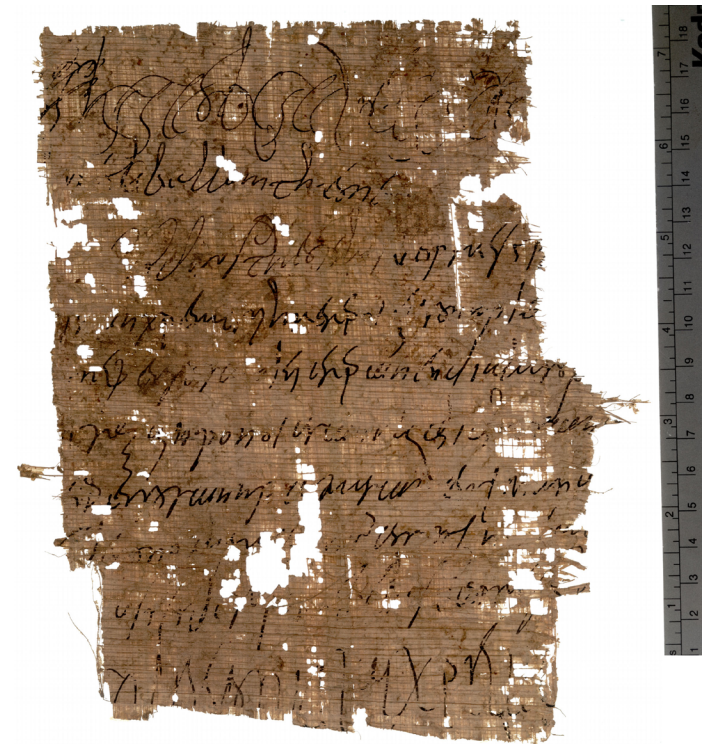
Fig. 36: Judicial record concerning debt, from Oxyrhynchus, dating to 434 CE. It opens with what has been taken to be a late form of ORC. P.Oxy. XVI 1879 = Chartae Latinae Antiquiores XLVII 1409. Courtesy of The Egypt Exploration Society and the University of Oxford Imaging Papyri Project.

be seen in later pieces of evidence, for example an imperial rescript from the fifth century CE, and perhaps in parts of documents of legal proceedings from Egypt and the opening sections of the Ravenna papyri, which may show *litterae caelestes* influenced by NRC forms (Tjäder's 'misteriosa scrittura grande') (Manservigi and Mezzetti 2016). The *litterae communes* in the edict of Valentinian I and Valens ought to refer to NRC which was then the main script used in both personal and official documentation. But a Roman will, probably from north Africa to judge from the names, has recently been published (Rothenhöfer and Blänsdorf 2016), and complicates the picture. It was written in ink on a wooden stylus

tablet in 340 CE and in ORC, which is very unusual for its fourth century date. Finds such as this remind us of the partial nature of the evidence and the extent to which new finds may force us to rethink or qualify our analyses.

Our analysis of NRC in the context of the documentation of the western Empire from 300 CE is necessarily less rich than for earlier ORC. This is because virtually all the earliest, fourth-century examples are on papyri deriving from the eastern half of the Empire. The only substantial collections from the West are the Ravenna papyri, dating from the mid-fifth to the seventh century and largely relating to ecclesiastical property in Italy; the Tablettes Albertini, about 50 wooden tablets with ink writing dating to the Vandal period in north Africa (Algeria) containing contracts for the sale of slaves and property; and the Visigothic slates from the fifth to eighth century northern Meseta. Beginning to fill the gap in the earlier period of NRC are the lead curse tablets sometimes written in NRC or a mixture of ORC and NRC.
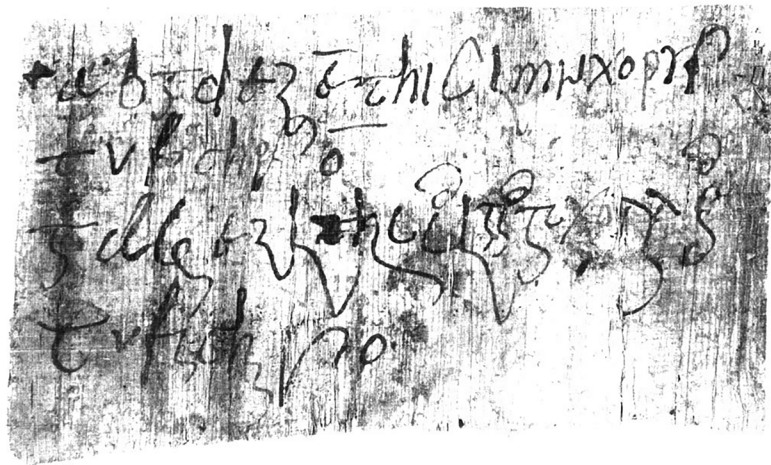

Fig. 37: Papyrus from the first half of the fifth century CE showing two alphabets, the first NRC, the second perhaps a late form of ORC. P.Lugd. Bat. XXXIII 11 = P. Worp 11.

Learning how to write cursive in Antiquity

We know very little about the practicalities of education beyond references in literature to schools or home schooling, where the focus is almost always on the elite. Although there was no systematic and widespread formal education in the Roman world, we know that formal education *was* accessed by some people of lower social status. Certain occupations required it such as scribes, whether in the samian ware production centres (e.g. La Graufesenque) or on the staff of provincial governors. In some cases they would have been trained in formal contexts such as schools, in other cases they would have learnt on the job. We find evidence of writing exercises, such as repeated alphabets and the copying out of literary lines, especially from Vergil, from military sites such as Vindolanda (e.g. Tab. Vindol. 118, 854) and on pre-fired tiles (Charlier 2004). The variety of different handwriting in our collections of texts shows that writing skills penetrated widely across society even if the total numbers and percentage of literates were relatively small (Bowman and Woolf 1994; Cooley 2002; Kolb 2018; Mullen 2021).

Our evidence indicates that the military context is important for the inculcation of writing and literate practices and we might speculate that the military may be involved in the origins and reasons for the changes in style and practice in writing which can be observed over the centuries. But in fact whether and how changes of fashion might have been based in the military context and/or dictated 'from the top' is unclear, with the edict of 367 CE being an unusually clear example of intervention. The more evidence we find from across the Empire, the clearer it is that the boundaries between various different styles and types of writing were not impermeable and we should be thinking of evolution in a mixed environment of literary texts, official documents, writing exercises, and personal correspondence rather than chronologically

segregated sequences and sudden change. What is clear is that the characteristics of cursive and 'bookhand' writing as practised by the literate minority in the first three centuries CE were broadly similar across the breadth of the Empire, whether inculcated in formal schools, military *scriptoria*, 'on the job' or 'at home'.

Fig. 38: Writing exercise using a quotation from Vergil, on papyrus from Oxyrhynchus, dating to the second half of first century CE. P.Oxy.L 3554. Courtesy of The Egypt Exploration Society and the University of Oxford Imaging Papyri Project.

7. How to read everyday texts

There is no one way to approach reading cursive Latin texts. For difficult texts the process can be rather like code-breaking and every code-breaker or crossworder has a different method, even though many of the elements involved may be similar. Although there are several studies from the beginning of the twentieth century onwards on the palaeography of Greek and Latin cursive writing, experts have rarely explained how they go about deciphering and reading the scripts. A notable exception was H. C. Youtie (1963, 1966) who attempted to describe the visual, cognitive and interpretative processes involved in the task. Often, however, cursive Latinists learn through working with colleagues and by trial and error (see Tarte 2014; Terras 2006 for some of the cognitive processes involved).

Step-by-step guide

Here are some steps that may help:

1. Try to find someone to collaborate with you in the reading and interpretation.

2. If you have direct access to the original artefact, consider the nature of the object you are treating. Is it fragile? Is it hazardous, for example made of lead? Should you wear gloves? How can you minimize handling the object to avoid damaging it?

3. What do you know about the object and its context? Make notes about the fabric, shape, measurements and layout of the text, for example whether in columns or broad lines, on both sides etc. Is it complete and, if not, which part of the text might you have? If pottery, has it been incised before or after firing? Consider what assumptions you have already made about the possible function of the text and therefore content. These might help you to understand the text, but could equally lead you astray if you have not correctly identified the function of the document.

4. Would any of the technologies outlined in this manual help in reading more of the text? It is important to start with the object itself if you can, but if digital images can be used, these may mean less manipulation of the object after the initial autopsy and imaging, and can uncover features not clear to the naked eye. Enhancement software may allow the useful manipulation of the image, for example to remove the effects of wood grain. Digital files can also be shared so that those without access to the object can contribute to its study.

5. Try to identify literate marks on the object, using raking light and applying a pitch–and–yaw motion and with the aid of magnifying glasses, if necessary. This might sound easy, but, depending on the cleaning/conservation process that has been applied after excavation, there may still be environmental remains on the object and, even if not, often objects contain ancient and/or modern non–literate scratches or wood grain which can be easily confused with letters.

6. Make a drawing of the individual letters you think you can see and begin to identify them, with the aid of the script tables if necessary. One thing to consider is what type of cursive you are dealing with, whether ORC or NRC, but remember that sometimes individual hands contain forms from both ORC and NRC and that the letter tables simplify variation. If you have a substantial text you may find it helpful to try to create a document–specific alphabet based on the forms you can identify, which you can refer back to and improve as you progress along the steps.

7. Starting with the letters which you are more confident you have accurately identified, write your transliteration onto the drawing of your text underneath the characters.

8. Which languages are likely to be in play? Remember that sometimes languages other than Latin, for example Greek, Gaulish and Celtiberian, are written in Latin script. Watch out for changes of language, which may even happen mid–phrase.

9. Begin trying to identify words where you can. This is no easy task if there are no clear spaces, or only very small ones between words. Some readings may fall into place quickly, others will need to be considered over a period of time, particularly ones where damage to the object means part of the word/letters may be missing.

10. Start to assign meanings to words, phrases, sentences and, eventually, the whole text. If in Latin, knowledge of the Latin language and similar documents will help you to work out possible or likely interpretations: some combinations of letters are more common than others for example *u* always follows *q* unless it is an abbreviation; certain syntactical structures follow specific words, though of course the writer may not have had control of the standard language, and some formulaic language can be expected, for example for dates or opening and closing greetings in correspondence.

11. As the text, hopefully, becomes clearer, reconsider the readings and, if necessary, check your early decisions on what might count as a literate scratch (step 5) and go through steps 6–10 again. Deciphering complex cursive texts is an iterative process.

12. Ideally share what you have with others who may help you by challenging your readings or making new suggestions.

13. When you come to releasing the text, make sure you follow epigraphic conventions (Cooley 2012, 352–355; Dow 1969) and standards of editing and be forthright about what seems secure and what is ambiguous and open to different readings and interpretations. Future users of the text may not have access to the object or digital files and we must be cautious not to make insecure readings canonical through lax presentation of the issues involved in deciphering the text. Underdotting letters because they are incomplete or ambiguous is critical: for the user of the text, dots signal the editor's uncertainty as to the reading.
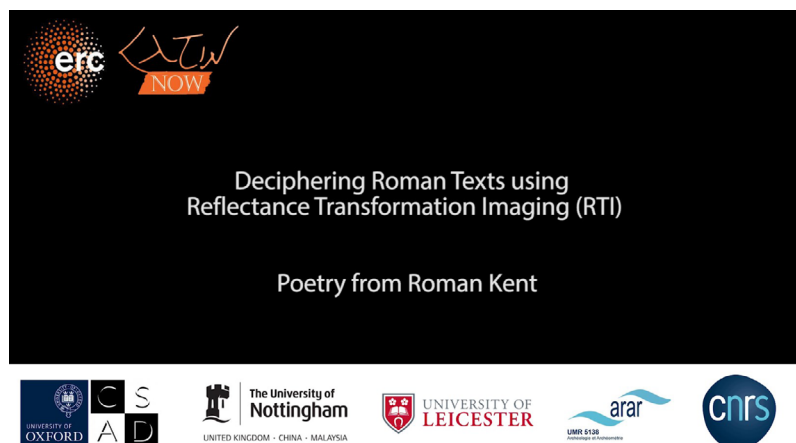
Video 1: Deciphering Roman Texts using Reflectance Transformation Imaging (RTI). Poetry from Roman Kent. LatinNow, 2021. Watch online here.
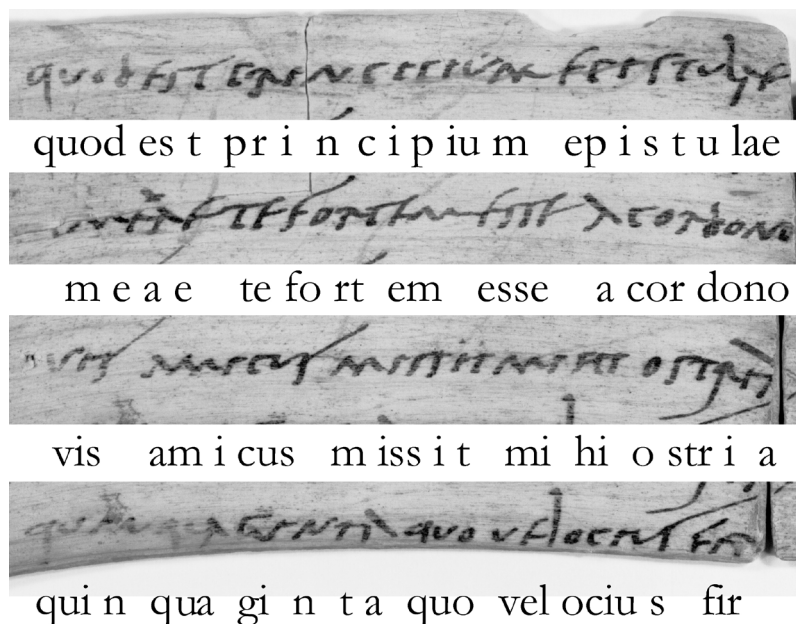

quod es t pr i n c i p i u m ep i s t u lae

m e a e   te fo rt em esse   a cor dono

vis   am i cus m i ss i t mi hi o str i a

qui n qua gi n t a quo vel oci u s fir

Fig. 39: Text and transcription of Tab. Vindol. 299.

Traps and pitfalls of reading cursive texts

Even the most experienced scholars make mistakes in their transcription and interpretation of cursive Latin texts. Some of the most famous examples will remind us to think through all our decisions carefully as we work on this sometimes tricky material.

Case-study 1: a fatal mistake

A famous epigraphic error was committed by the Librarian of the Bodleian Library in Oxford, Edward Nicholson (Tomlin 1994). In 1900 and again in 1904 he took on holiday photographs of one of the earliest inscribed metal sheets uncovered from the Roman sanctuary of Sulis Minerva in Bath, intent on deciphering its mysterious incisions. The great scholar of Roman Britain, Haverfield, thought that the tablet was not inscribed and Nicholson was determined to prove him wrong. Nicholson triumphantly declared that the text was the earliest written evidence for Christianity in Britannia and produced a pamphlet in 1904 entitled *Vinisius to Nigra: a 4th cent. Christian letter written in south Britain and discovered at Bath.* Nicholson had created a bizarre Latin text with several abbreviations and his translation struggled with numerous uncertainties and desperate interpolations. The script Nicholson identified was a mixture of majuscules and minuscule with ligatures, with the worrying feature that the same letters often had quite different shapes. Some degree of inconsistency of letter forms can be expected, but a high degree should have rung alarm bells.

In 1979 many more texts were found at the same sanctuary which are published in Tomlin 1988 as prayers for justice to the goddess of the spring following thefts. These are commonly called 'the Bath curse tablets' and some are on display in the Roman Baths Museum. Many of them contain formulaic phrases. The Christian text that Nicholson deciphered turned out to be 'just' another one of these. Nicholson had made no egregious errors in his attempts at understanding the letter forms and content, he had just made one fatal mistake: he read the text upside-down.

| Nicholson's upside down version, text of side 1:	Tomlin's text of side 1:
Nigrae Uini(s)iu(s) *(?Gratia) dni Ihcv Xti & tvis. mariti* *uitia Uinisia (memo)ravit* *Simili Vili. (?tu uale in IHcu &) oni ui* *(?tva i contra). ni iustis arenis* *(?vita abundius invidias)*	*si puer si puella* *si uir si femina qui hoc* *inuol[a]uit non ei remit-* *tatur nis(i) innoc{s}en* *tiam ALE..... ..* *(traces)*
Translation:	**Translation:**
'Vinisius to Nigra (?The grace) of the Lord Jesus Christ to thine also. (They) husband's faults Vinisia has related to Vilius's Similis. (?Do thou be strong in Jesus and) with all thy strength (?in thee go counter). Unless in just conflicts (*lit.* arenas) (?avoid jealousies more abundantly).'	'Whether they be boy or girl, whether man or woman, for-giveness is not to be given to the person who has stolen this unless […] innocence.'
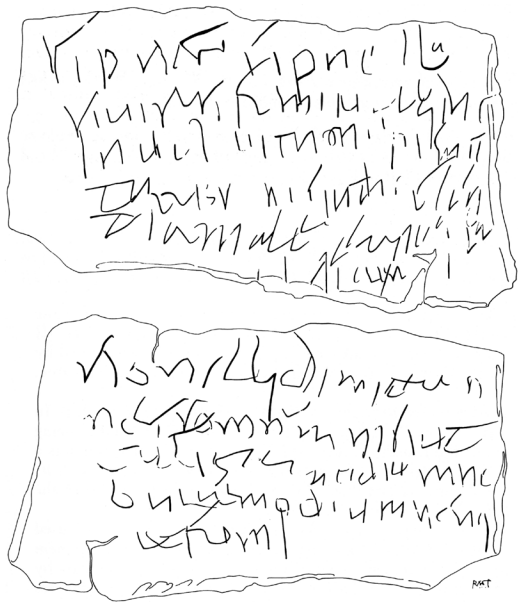
Fig. 40: Bath curse tablet no. 100, written in NRC, also known as 'Vinisius to Nigra' following Nicholson's upside-down reading. Drawing by R. S. O. Tomlin.

Case-study 2:
more contextual information changes everything

In the first edition of the Vindolanda corpus (Bowman and Thomas 1983), one of the ink-written texts on wooden leaves, *Tab. Vindol. 247*, dating to 97–105 CE, was transcribed as *c...io inmatura ad metalla.* This was in no way a bad interpretation of the partially faded letters and some sense could be made of the text: it was perhaps something to do with people being condemned to working in the mines (Bowman and Tomlin 2005, 7–8). But there was nothing else quite like it in any of the other Vindolanda texts and matters were not helped by the fragmentary nature of the tablet.

Fig. 41: Vindolanda letter dating to c. 100 CE with the correct reading in red (Tab. Vindol. 247). Photograph by CSAD and Francesca Cotugno.

As more texts from Vindolanda were found and read, more of the details of the documentation of the military site and the characters involved became clear. Since the wife of Cerialis had been identified as Lepidina, the editors returned to this fragment and realised that it was in fact part of a leaf containing the foot of the right-hand column of a letter to Cerialis and revised the reading to *Lepidinam tuam a me saluta* 'greet your Lepidina from me' (Bowman and Thomas 1994). The editors noted that: 'The evidence relating to Cerialis' wife Lepidina and the pattern of expression in 291 and 244 make it clear that the reading of line 1 in the ed. pr. was wide of the mark'. This epigraphic episode reminds us that the process of reading these difficult cursive texts may take many years and can be improved by new finds, context and linguistic knowledge.

Case-study 3: digital techniques reveal a disappearing ox

A tablet found in Tolsum in Friesland in the Netherlands in 1914 attracted attention as the 'Frisian ox sale' after it was published in Vollgraff 1917 as a contract for the purchase of an ox (see Galestin 2009/2010 for its archaeological context). This was a source of local pride since here was a Roman contract found beyond the frontiers of the Roman Empire and – highly appropriate for an area renowned across the world for its cattle – concerned an ox.

There were lingering doubts about the text and even the authenticity of the object, however. Various emendations were proposed to the legal formulae and a carbon 14 test was eventually undertaken which set the date for the object at some time in the first three centuries CE. In 2007 a team from the Centre for the Study of Ancient Documents looked again at the tablet using the latest digital techniques and republished it as part of a loan note for a sum of money dating to 29 CE (Bowman, Tomlin and Worp 2009). Key to the new interpretation was the correction of the reading of the letter b (*bovem*) to d (*ad*): in line 4 Vollgraff's phrase *uti l(icet) bovem* 'the ox, as is permitted' was replaced by the more banal *aut ad quem* 'or to whomsoever'. Sadly, the famous Frisian ox had completely disappeared.

Fig. 42: RTI images showing the so-called 'Frisian ox' tablet, zooming in on the disappearing ox section. Images from CSAD.

8. Modern technologies for reading everyday texts

The use of modern technology to read ancient texts allows us:

1. to uncover a text which is difficult to read with the naked eye;

2. to preserve digitally the textual remains, allowing researchers to manipulate images of the documents rather than the sometimes fragile items themselves;

3. to analyse a text and object which may not be directly accessible;

4. to collaborate with other palaeographers/epigraphists simultaneously in different locations.

The most valuable technologies currently in use for reading difficult cursive texts are multispectral imaging for ink-written documents and RTI for incised texts.

As technologies are proliferating and improving, reading of new texts and reassessment of previously published materials can sometimes lead to significant changes to our historical and linguistic understanding. But it is clear 'that the historian acts out a perceptual–cognitive task of transforming often noisy and impoverished signals into semantically rich symbols that have to be set within a cultural and historical context' (Brady and Bowman 2005, 1). Technologies are an aid but do not replace the difficult work of the human interpreter of the texts. Cursive handwriting can be ambiguous and hard to decipher in any language, even one you are familiar with, and much harder when your knowledge is partial. The colleagues of the palaeographer M. R. James, whose handwriting

was challenging for readers, had a head start in trying to decipher an invitation from him to dinner, given that they knew what the content of the text was likely to be, but even then they struggled: 'we guessed that the time was 8 and not 3, as it appeared to be, but all we could tell about the day was that it was not Wednesday' (Bowman and Tomlin 2005, 12).

Photography, digital manipulation and tools to aid the epigraphist

Simple techniques of visual perception have long been applied to the decipherment of illegible writing: invitations from Lady Colefax apparently could only be read whilst running past them once they had been pinned to the wall (Bowman and Tomlin 2005, 13). Photography has supported humans in the reading of ancient writing nearly from its inception. Macro photography has been helpful in reading documents of all kinds and has allowed scholars to discern literate versus non–literate marks and to zoom in on letters to help decide how they might have been formed. For an overview of different techniques used before the 'digital age', see Fink–Errera (1962) and Pratesi (1977). More recently various software tools, for example Adobe Photoshop, have allowed users to manipulate images in increasingly sophisticated ways, for instance to lighten or darken them, change the colour tone or add filters or effects. One method which has been explored with some success is the removal of wood grain from stylus tablets. The faint scratches of writing which have made it through to the wood which survives after the wax has been lost are hard to see with the distraction of the natural wood grain. By using a filtering technique, the grain can be removed and the images reassessed (Brady *et al*. 2005).

Digital annotation can helpfully be employed when working on difficult texts, not least stylus tablets. Stylus tablets were originally covered in wax, but the inscribed wax has almost always perished and what remains, if anything, are the often very faint scratches
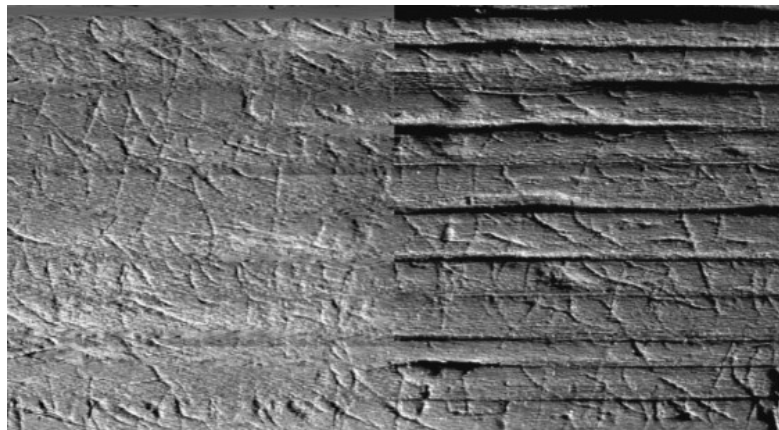
Fig. 43: Image showing experimentation with wood-grain removal (left) from a stylus tablet. Image from CSAD.

consuming process (Brady *et al.* 2005) and has not been exploited significantly since. New more powerful computers, advances in Artificial Intelligence and larger digital corpora of Latin epigraphic texts might make this worth revisiting.

on the wood beneath. The design and manufacture of these tablets allowed them to be reused and this can lead to multiple scratched texts on one surface, known as a 'palimpsest'. When the epigraphists have identified one text it can be marked up in colour on a digital image and then filtered out. Software has been developed, for example the Oxford RTI viewer (OxRTIViewer), which allows sharing, annotating and viewing of files created using the latest RTI teachniques (MacDonald *et al.* 2019).

Computer-aided reading of the characters seen through digital imaging has also attracted some interdisciplinary work with information engineers and others outside Classics (Terras and Robertson 2004; Terras 2006). The computer is first programmed to find the incised strokes of the stylus, and where there are gaps in the characters to fill these in. These gaps may coincide with the wood grain or with places where there might not be sub-surface incision at all if the writer has pressed less deeply into the, now perished, wax coating. It is then taught how to recognise what the letters might be, based on a corpus of Latin characters and words. The technique yielded some success in reading a small section of a Vindolanda stylus tablet but it turned out to be an extremely time-
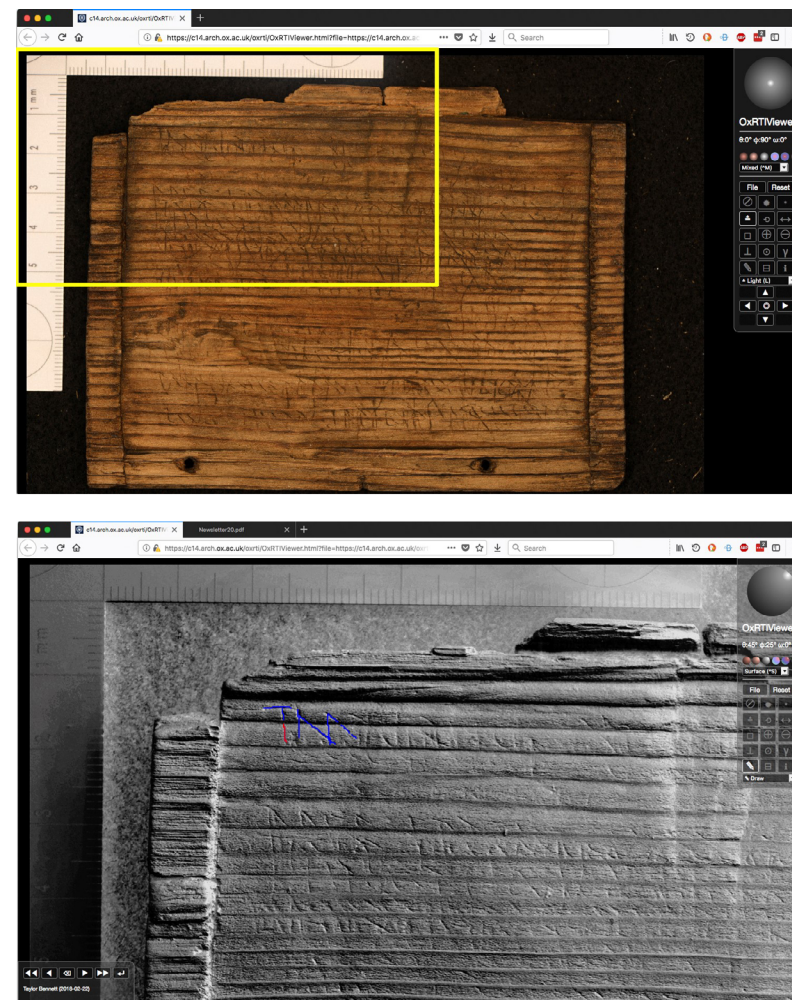
Fig. 44: Images of Bloomberg stylus tablet Tomlin 2016 no. 28 in the OxRTIViewer with and without annotation (coded using Scalable Vector Graphics (SVG) by Christopher Ramsey). Photographs by Taylor Bennett.

Multispectral imaging

The use of filters and ultra-violet and infra-red lights as tools for reading ancient documents, especially manuscripts, has a long history (Haselden 1935) and has been successfully used in reading papyri (Reggiani 2017) and Roman ink-written tablets which are written on wafer-thin slices of wood. The most famous collection of Latin ink-written tablets is from Vindolanda. The ink traces had been preserved for about two thousand years, but once the first finds were dug out from their anaerobic conditions and opened, the ink was visible for about fifteen minutes before it faded in the air (Birley 1977, 134). A way of conserving the subsequent finds of wooden tablets and their ink traces was developed at Vindolanda. The best way to read these tablets was found to be through infra-red technology: Robin Birley used infra-red equipment from a local police station when the first Vindolanda tablets were recovered (Blackshaw 1974; Bowman and Thomas 1983) and later the Vindolanda team worked with experts in medical photography to improve their technique, using sophisticated infra-red cameras. Practitioners are working on the possibility of combining multispectral imaging within the RTI Dome set-up.
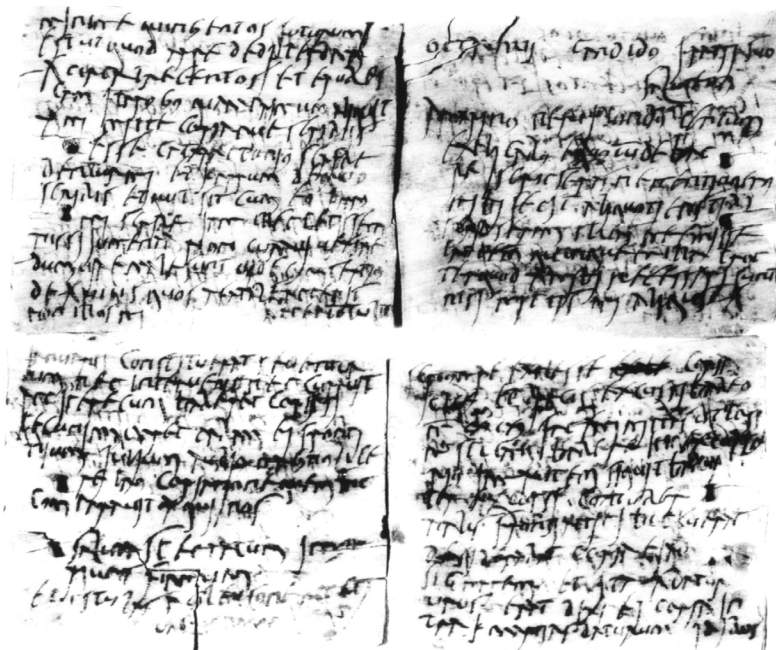

Fig. 45: The early second-century letter of Octavius to Candidus found at Vindolanda (Tab. Vindol. 343). The image here is taken using infra-red photography (cf. fig. 8). © The Vindolanda Trust.

Video 2: Revealing the Vindolanda Writing Tablets. Vindolanda Trust, 2021. Watch online here.

Reflectance Transformation Imaging (RTI)

Summary

Reflectance Transformation Imaging (RTI), also known as Polynomial Texture Mapping, uses computational photography to create images of the shape and colour of the surface of objects which allow us to access information about the finer details of the texture of the object's surface not fully disclosed by direct unaided human examination. The files generated allow interactive re-lighting of the images of the object from multiple directions. This is valuable for epigraphists as it allows the user to recreate the lighting conditions crucial for the location, enhancement and interpretation of surface modifications on artefacts, such as inscriptions.

More detail

RTI creates a computerised virtual lighting model of an object's surface using multiple photographs captured with light shining at different angles onto the object. The multiple images are combined into a single file using free RTI builder software: either a .rti file, which uses Hemispherical Harmonics (HSH), or a .ptm 'Polynomial Texture Map' (PTM). The RTI combines the information about the lighting for each image taken with the image itself, each of which contains slightly different highlights and shadows, and creates a mathematical model of the surface of the object. The pixels of RTI images encode information not just about colour but also about the 3D shape of the object. The RTI images are 2D, but what is seen appears to be 3D (2D+ or 2½D!). When the RTI image is viewed with the RTI Viewer each pixel reflects the virtual light projected onto it by the user as it detects how the light was reflected by the object. Since the RTI method applies mathematical transformations to the surface as well as the RGB colour information, this allows the user to explore several enhancement tools (also known as *rendering modes*). For more detail on how RTI works and for videos of some successful applications, see the CHI website and, for further information and case-studies, see Historic England's documentation.

Ancient world applications

The technique was originally created in the HP Labs and its application for cultural heritage has been pioneered by teams at various institutions such as the Centre for the Study of Ancient Documents (see Bowman, Brady and Tomlin 1997 for an account of early work and Earl *et al.* 2011 for the work undertaken in the AHRC RTISAD project to develop RTI capture systems and to spread use) and by the group at Cultural Heritage Imaging (CHI) where the RTI software and a community of users are accessible.

The manipulation of the lighting conditions in some sense replicates the use of moving raking light which has been a stock-in-trade for epigraphists for centuries. The RTI technique has some desirable advantages for ancient world applications, including allowing just one or two people to create RTI files of fragile objects in museums or reserves for long-term documentation but also to send them to researchers around the world where they can manipulate the colour and lighting without disturbing the object itself. RTI has shown its value in particular in assessing the cursive texts on Roman stylus tablets (wooden) and curse tablets (metal), both of which are often extremely difficult to decipher. RTI works well for these documents as it helps to reveal the subtle surface details which would be difficult or impossible to see without this technique.

There are two main RTI methods used in the imaging of cultural heritage: one which uses a cheaper and more readily portable solution, the 'highlight kit', and one which uses a bespoke dome, which is particularly useful for imaging multiple small objects of similar depth.

RTI highlight kit

This method is particularly good for larger objects and for objects *in situ*, for example rock art in caves or graffiti on walls (see Dibiasie–Sammons 2018 for the pros and cons of the technology for the analysis of wall graffiti at Herculaneum). Much of the kit needed to undertake this method is often already owned by museums and other institutions so it is a cost effective option. The technique does not require the camera to be above the object, but the camera can be positioned to the side or beneath. The position of the light source is worked out by the software through the reflections from a reflective target positioned near the object to be captured and included in each image. For the method to work both the object and the reflective target, usually a glossy black sphere, must not move during capture. The distance between the light source and the object is kept the same by using a piece of string to measure the distance each time the light source (e.g. camera flash) is moved. The main items required are: camera, flash transmitter, wireless flash, macro lens, SD card, tripod, colour chart, black backdrop, and the RTI starter kit which includes reflective spheres of various sizes. A full kit, excluding the camera, might cost c. £1000–2000.

The RTI basic capture, processing and viewing is not complicated to learn. The technical wizardry which creates and allows viewing of the RTI files is built into the software. When more calibration and manipulation are required the process can become more complicated and training and advice can be sought through the non-profit CHI.
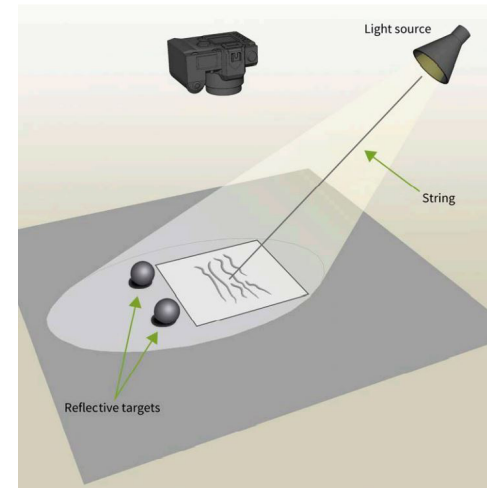

Fig. 46: Diagram of the RTI highlight kit set up. © Historic England, illustrated by John Vallender.

Video 3: Reflectance Transformation Imaging (RTI) with the Highlight Kit, Reading Tombstones. LatinNow, 2021. Watch online here.

RTI dome

This system consists of a black plastic dome measuring around one metre in diameter within which numerous LEDs are mounted onto its interior surface (models have as many as 128 or more). A camera is suspended from a frame over the opening in the apex of the dome, capturing images at high resolution. Objects are carefully moved into place under the dome directly below the camera's lens and then raised up to the level of the focal plane. The photography involves a sequence of multiple shots, each taken with a different LED turned on. Such a sequence may last for a minute or two depending on the number of LEDs in the system. The capturing of the images is controlled from a computer using RTI capture software. As with the highlight–RTI the camera and object must not move. After capture some processing must be done before the same RTI builder and viewer, available free of charge from CHI, can be used, as with the highlight method. Again the RTI basic capture, processing and viewing are not complicated to learn, though the calibration and fine-tuning require some experience. If the dome is well set up it is a more accurate method than the highlight-RTI as there is less human involvement in the capture process.
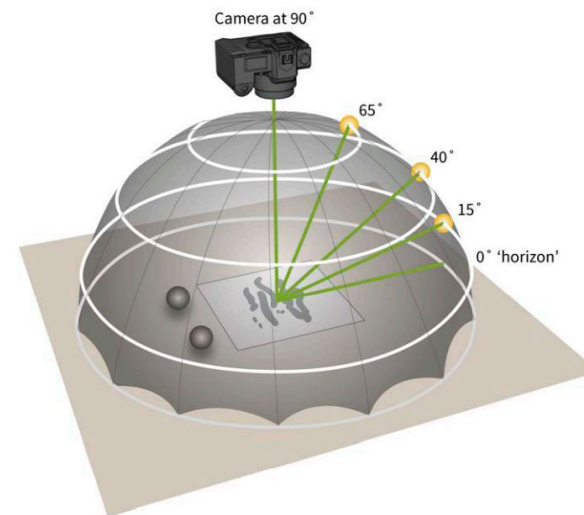

Fig. 47: Diagram of the RTI dome set up. © Historic England, illustrated by John Vallender.

Video 4: Reflectance Transformation Imaging (RTI) with a Dome, the Vindolanda Stylus Tablets. LatinNow, 2021. Watch online here. **Warning: flashing lights at 4.04–4.15 minutes.**

9. Next steps

'Everyday' textual sources are essential for our understanding of the Roman world. We have a large, and increasing, number and they often illuminate areas about which the literary sources are quiet. Through them we can access different strata of society and find out about the economics, politics, administration, social dynamics and lived experience in Rome and its provinces. It is not just the explicit content which can help us: subtle sociolinguistic and palaeographical analysis can shed light on educational practices, linguistic contacts and identities. As our sets of handwritten documents grow, we can more accurately understand the development of the types of scripts (bookhands, ORC, NRC) and their likely dating can be refined, which in turn will help us to date, with caution, collections whose dating cannot be fixed by other means. Since the 1980s, with the publication of La Graufesenque graffiti, Vindolanda and Bloomberg tablets in particular, our knowledge of ORC across the provinces has been dramatically improved. In the coming decades we hope to have more finds and publications of (ethically sourced) texts written in NRC, since our existing coverage is very patchy.

One exciting area for the future is the continued development of techniques for reading texts which are not visible, for example inside rolled up scrolls or tablets, or only partially visible to the naked eye, for example stylus tablets. For carbonised rolls, current techniques include refining a combination of machine learning and X-ray phase-contrast tomography which can pick up the differences in signal between carbonised scroll and ink and analyse them. The technique is revolutionary because it allows scientists to study the fragile rolls without trying to unroll them. Work on a small part of charred papyrus from one of the Herculaneum scrolls used the

particle accelerator called Diamond Light Source (Oxfordshire), a state-of-the-art synchrotron that can probe objects with beams of X-ray light 100 billion times brighter than the Sun, and demonstrated that the method can recover letters. The Herculaneum scrolls may contain valuable new literature from the ancient world, perhaps including Latin texts in bookhands and cursive.

Fig. 48: An RTI Dome being used to study a lead curse tablet from Roman Britain. Work continues to develop techniques such as RTI for reading texts on Roman artefacts such as stylus tablets and lead sheets. Image from CSAD.

Video 5: Decoding Herculaneum Papyrus Scrolls using the Diamond Light Source. Science and Technology Facilities Council, 2019. Watch online here.

Glossary

bookhand: a term for the scripts used for copying out literary texts. For Latin texts these comprise capitals and uncial.

capitals: capitals for Latin include square capitals, *capitalis quadrata,* and rustic capitals, *capitalis rustica*. The former is characteristic of monumental inscriptions, the latter commonly used for literary texts, but both are used on a variety of writing materials.

cursive script: a script in which most/all of the strokes that compose letters and/or the strokes shared by adjacent letters are linked by a single movement of the writing implement on the writing surface.

diptych/triptych: the names for the form of wooden stylus tablets composed of two/three tablets.

ductus: the number, sequence and direction in which the strokes of the letters are formed, therefore the movement of the writing process.

epigraphy: the discipline which studies the texts, together with their media and context, which are 'written on' things in the ancient world. Usually papyri are taken separately under 'papyrology' and coins under 'numismatics', though there is clearly overlap between the disciplines.

ligature: the linking of two or more strokes within a letter (internal) or between letters (external).

litterae caelestes: term used in the edict of Valentinian I and Valens to refer to the script to be employed in the imperial chancery. Scholars think this may refer to a late form of 'official' ORC script.

litterae communes: term used in the edict of Valentinian I and Valens to refer to the script to be employed in provincial chanceries. It refers to NRC.

majuscule: majuscule scripts for writing Latin comprise capitals, uncials, and early cursive scripts. The letters mainly lie between two parallel lines.

minuscule: the term minuscule covers scripts, such as NRC, with letters which sit within four parallel lines.

New Roman Cursive (NRC): the modern designation for the type of script used to write cursive Latin from around the later third century CE onwards. It is distinguished from ORC by its increased use of ligatures and more rounded letter forms.

Old Roman Cursive (ORC): the modern designation for the type of script used to write cursive Latin mainly from the late Republic to the first half of the third century CE. Some scholars argue that it split into two main variants, 'official' and 'common', the latter developing into NRC.

ostracon (plural ostraca): potsherds used as writing equipment.

palaeography: the study of scripts, letter forms, handwriting and formats of documents.

palimpsest: a palimpsest is created when writing surfaces are reused and there is a resultant layering of texts. This happens commonly with the wooden panels of stylus tablets which are often designed to be reused repeatedly.

Roman shorthand: a shorthand system, known as *notae Tironianae* after Tiro, Cicero's personal secretary, existed in the Roman world, but the only direct evidence of it to date comes from a few of the Vindolanda tablets and it has not been deciphered.

tituli picti: painted texts, often commercial, e.g. on amphorae.

uncial: a rounded version of the capitals used for bookhand which developed from the second half of the third century CE.

Online resources

The **American Society of Greek and Latin Epigraphy** collects a series of online epigraphic resources, including a list of abbreviations generated by Tom Elliott
http://www.asgle.org/epigraphers-bookshelf/

The **Ancient Graffiti Project** provides a digital resource of the graffiti from the cities of Pompeii and Herculaneum
http://ancientgraffiti.org/Graffiti/

Archetype is freely available software 'for the online presentation of images with structured annotations and data which allows users to search for, view, and organise detailed characteristics of handwriting or other material in both verbal and visual form'. It was originally developed within the DigiPal project (funded by the European Research Council) for medieval manuscripts and is being expanded to work for material from a range of contexts, including from the ancient world
http://www.digipal.eu/
https://github.com/kcl-ddh/digipal

The **Centre for the Study of Ancient Documents** provides a home for major epigraphic projects and was an early pioneer of imaging techniques. The website provides links to projects and other resources
https://www.csad.ox.ac.uk/

The **Dartmouth Ancient Books Lab** provides a how-to website for making your own scroll, codex, writing like a Roman as well as historical background
https://sites.dartmouth.edu/ancientbooks/

The website of **Ductus** – *Association internationale pour l'étude des inscriptions mineures*
https://www.unil.ch/ductus/home/menuinst/presentation.html

The **EAGLE Europeana project** was European Commission-funded and collected inscriptions from the Graeco-Roman world. It provides various services including a platform to access material from different projects from across the epigraphic community
https://www.eagle-network.eu/

Epigraphy Enchiridion is a helpful list of Open Access materials for teaching and research on Greek and Roman inscriptions compiled by Sarah Bond
https://sarahemilybond.com/2016/03/10/epigraphy-enchiridion-a-list-of-open-access-books-for-teaching-greek-and-roman-inscriptions/

Juan-José Marcos' *Fonts for Latin Paleography* has information for buying computer fonts specially designed to match a range of scripts from the history of Latin, but the document itself is a great source of information on the different scripts up until the fifteenth century with useful illustrations
http://guindo.pntic.mec.es/jmag0042/LATIN_PALEOGRAPHY.pdf

Index Grafik hosts a video from 1976 of Latin palaeographer Jean Mallon explaining the evolution of Latin scripts based on the formation of letters (*ductus*)
http://indexgrafik.fr/ductus-formation-de-lalphabet-moderne/

The European Research Council-funded project **LatinNow** produced this *Manual of Roman Everyday Writing*. The project website provides blogs, publications and educational resources on everyday writing from the Roman west in Latin and local languages
https://latinnow.eu/

The **Ostia graffiti**, many captured by Eric Taylor, can be found at
http://www.ostia-antica.org/graffiti/graffiti.htm

The **Roman inscriptions of Britain Online** currently provides digital versions of the Vindolanda and Bloomberg tablets and the *Roman Inscriptions of Britain* volumes I and III, including the introductions to these corpora with information on letter forms
https://romaninscriptionsofbritain.org/

TheDefix is a website of published curse inscriptions from the ancient world, in all languages, including Latin
https://www.thedefix.uni-hamburg.de

The **Vatican Library** has produced a useful resource by A. M. Piazzoni on Latin Paleography from Antiquity to the Renaissance, which provides short explanations and links to stunning digital versions of manuscripts
https://spotlight.vatlib.it/latin-paleography

Suggested reading

There are no existing comprehensive and accessible modern introductions to Roman everyday writing. The following are important publications in English, French and Italian. Some are now a century old and should be read with awareness that several important provincial writing corpora have been found since their publication. Not all of these publications are suitable for the beginner. The beginner might find it useful to start with chapter 4 in Bowman and Thomas 1983 and 1994.

Bartoletti and Pescini 1994; Battelli 2002; Bischoff 1989; Bowman and Thomas 1983, 1994; Bowman and Woolf 1994; Casamassima and Staraz 1977; Cavallo 2008; Cencetti 1997; Cherubini and Pratesi 2010; Cooley 2002 and 2012; De Robertis 2020 and 2020b; Mallon 1952; Marichal 1988; Renberg and Saba 212; Thompson 1912; Tomlin 2016; Van Hoesen 1915.

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Note on abbreviations

Abbreviations of publications of papyri follow the conventions of the Checklist of Editions of Greek Latin, Demotic, and Coptic papyri, ostraca and tablets at: https://library.duke.edu/rubenstein/scriptorium/papyrus/texts/clist.html

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