

MANUAL OF ROMAN EVERYDAY WRITING
VOLUME 2

WRITING EQUIPMENT

ANNA WILLI



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Anna Willi

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The LatinNow Project

Manual of Roman everyday writing
Volume 2
Writing Equipment

Anna Willi

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Fig. 1: Sales scene on the altar of Atimetus and Epaphra from Rome (Italy), late 1st–2nd century CE. [CIL VI 16166](#), Vatican Museum, inv. 9277. © Photo Scala, Florence.

1. Introduction to writing equipment

Writing equipment is key for the comprehensive study of Roman handwriting, non-monumental inscriptions and literacy. Cost, material and design of the equipment and how it was used had an impact on many aspects of writing such as letter shapes, document layout and who was writing. Importantly, the equipment also has an impact on what kinds of ancient handwritten texts have survived and therefore on our understanding of writing in antiquity. However, for a long time, research paid little attention to Roman writing equipment. One reason for this neglect is that finds of writing implements are often difficult to recognise and can end up labelled incorrectly or undetected with other small finds. Styli have been mistaken for hairpins, spindles or nails, spatulas and penknives have been categorised as razor knives, inkwells as pyxides and seal boxes as anything from jewellery to salt and pepper shakers (see e.g. Božič and Feugère 2004; Furger et al. 2009, 17). What is more, instruments such as spatulas and tools with a metal point are far from monofunctional and can often only be identified as writing implements through context and associated finds.

Despite such difficulties, the study of ancient writing equipment has seen increasing and sustained interest over the past four decades. Collections of writing implements were highlighted and described (e.g. Bilkei 1980), typologies were made (e.g. Gaitzsch 1984), and some objects were newly associated with writing equipment (see the important publications by Božič and Feugère).



Fig. 2: Wall paintings from Pompeii (Italy) showing still lifes with various writing implements, 1st century CE. Museo Archeologico Nazionale di Napoli, inv. 4675, 8598, 4676, 9819. By permission of the Ministero per i Beni e le Attività Culturali e per il Turismo – Museo Archeologico Nazionale di Napoli. Photos by Giorgio Albano.

As a result of such studies, the importance of writing implements for our knowledge of Roman literacy and writing culture is increasingly recognised and archaeological evidence has begun to be incorporated in studies of ancient literacy. An aspect that was picked up by scholars with particular enthusiasm is the potential that finds of writing equipment have as a proxy for the presence of literacy (e.g. Derks and Roymans 2002; Hanson and Conolly 2002). Statistical analysis of find numbers is always skewed by the biases of archaeological research and publication and it is problematic to use find numbers without the relevant data on factors such as the extent of excavations, which is rarely available. Nevertheless, the study of writing equipment is promising, and can even be used as a proxy for Latinization, particularly for areas without local non-Latin epigraphies. The way forward is careful contextualisation of finds and the consideration of social contexts, such as the development of settlement or mobility (see Mullen 2021b, drawing on the work of the [Rural Settlement in Roman Britain project](#)).

Another approach emerging in recent research highlights the materiality of writing. Avoiding problematic quantification, this approach focuses on such aspects as design, material, size, portability or availability of writing instruments (Swift 2017; Eckardt 2018). It explores the impact of these aspects on how, what and where people wrote in the Roman empire and has achieved a more nuanced and balanced understanding of Roman writing culture and the people involved in it.

In order to provide the readers of this manual with the means to consider the material aspects of Roman handwriting, this second volume introduces instruments used for handwriting cursive and capital letters by incising and scratching or with ink, as well as relevant accessories and surfaces commonly written on. In each case important finds, as well as research publications, will be included to provide an entry-point for more in-depth study of the topic. Sections on the social aspects of writing, on writing techniques and on the evidence that we can use to research such topics will provide a context for the items discussed in the catalogue.



Fig. 3: Writing equipment found in a grave (tumulus 26) in Berlingen (Belgium), around 80 CE. Gallo-Roman Museum Tongeren, inv. 69.B.26 10,37a–b and 38a–d. © Gallo-Roman Museum Tongeren.

2. Social aspects of literacy and writing

Who wrote in the Roman world? The current discussion surrounding this question still largely happens in reaction to Harris' seminal book on ancient literacy from 1989. His estimate that a maximum of 10% of the population was able to read and write, even in the most 'Romanized' areas, was largely based on lapidary epigraphic and literary evidence and on the lack of infrastructure such as an institutionalised school system. Considering the wealth of non-lapidary and archaeological evidence for writing, many scholars now think that while Harris' observations about high levels of illiteracy remain relevant, his vision downplays the widespread nature of literacy in the Roman world. The more recent scholarly discussion has moved away from trying to quantify literacy and on to exploring different kinds and standards of literacy and their place within society (e.g. Woolf 2015).

The great variety of texts that survive from Roman antiquity reflects the different kinds of writing that happened in different environments and for different purposes – much as is the case today: it ranges from composing literature to copying or writing down dictated texts such as letters, writing for record-keeping, reporting and accountancy, for labelling goods, for everyday use such as shopping lists or jokes (see Volume 1). Researchers agree that writing touched almost all aspects of life in the Roman empire in one way or another. Even for the illiterate this will often have happened through economic activities (handling coins for example) and the bulk of writing must in fact have been produced in military, administrative and economic contexts.

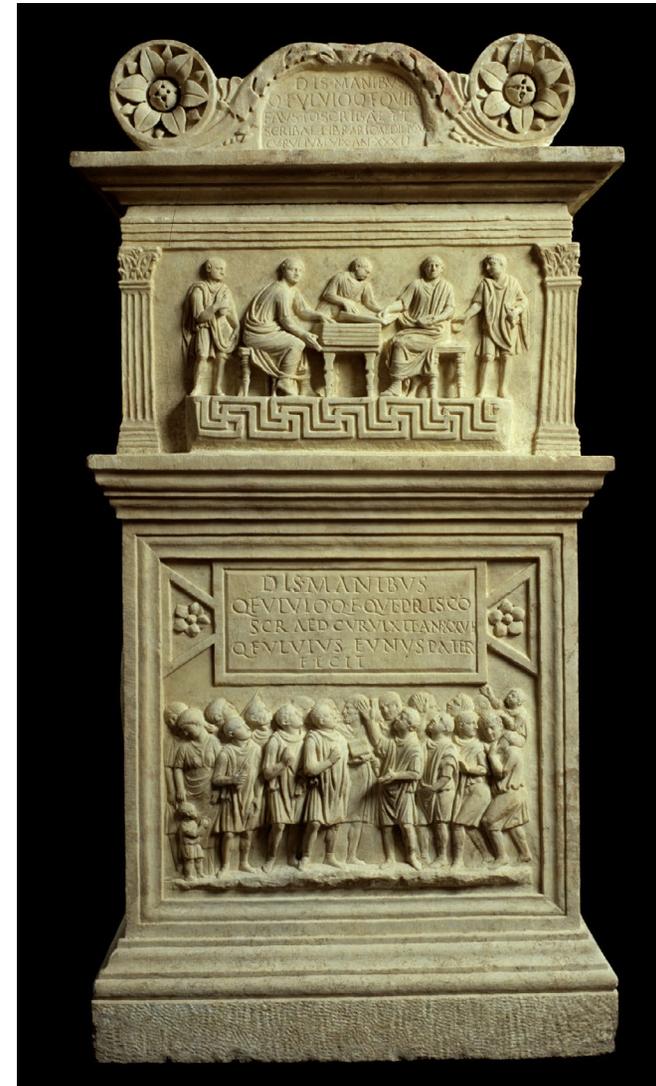


Fig. 4: Professional scribes: so-called 'ara degli scribi' from Rome (Italy), early 1st century CE. *AE 2014, 109*, Terme di Diocleziano, inv. 475113. By permission of the Ministero per i Beni e le Attività Culturali e per il Turismo – Museo Nazionale Romano.



Fig. 5: Roman tombstone of a boy that shows him holding writing equipment, Metz (France). *Carte archéologique de la Gaule* 57.2: Metz, 2005, 185. Musée de la Cour d'Or, inv. 75.38.53. © Laurianne Kieffer, Musée de La Cour d'Or, Metz Métropole.

Different kinds of writing are often associated with different social status. The kind of writing most readers of this manual will have encountered first and most extensively are literary texts and thus writing in the sense of composing. This kind of writing represents only a small portion of writing in the Roman period and, in most cases, it happened in a specific, well-educated and high-status environment. Children of the upper social strata, boys and girls alike, were commonly educated to read and write with proficiency but for the majority of the population the availability of such education varied greatly across the empire and was dependent on opportunity and financial means.

Writing documents involved a second person who was writing down what was dictated, often a slave or a freedman. *Scribae* in public administration and teachers were often of similar social status. The apparent contradiction of low status and a skill considered to be empowering has drawn much attention to the role of the *scribae*, the great potential for upward social mobility it entailed and the influential individuals it created (see e.g. Hartmann 2020). Similarly, in the military, literacy offered a clear advantage with regard to career prospects (e.g. Haynes 2013, 323–328).



Fig. 6: Funerary relief from Rome (Italy) showing a butcher's wife, presumably engaged in bookkeeping, 140/150 CE. *Skulpturensammlung Dresden*, inv. Hm 418. © *Skulpturensammlung, Staatliche Kunstsammlungen Dresden*, photo by H.-P. Klut / E. Estel.



Fig. 7: Grave goods of a female burial (burial 11) from Nijmegen (*The Netherlands*) that included a bronze inkwell, three iron stili, an iron knife and remains of an iron wax spatula, 95–110 CE. From Koster 2013, 65 fig. 38. © Collection Museum Het Valkhof, Nijmegen.

The overall picture thus associates writing with status and prestige, and this is supported for example by iconographic evidence, where writing equipment and the action of writing are depicted on funerary reliefs as status symbols (Eckardt 2018, 139–153).

It is more difficult to assess the importance of writing for craftsmen and rural communities, for example, but it is worth looking for literacy beyond spheres more obviously connected to power and status. Writing equipment is often found in contexts related to trade and commerce (Schaltenbrand Obrecht 2012, 237–238) and while

urban and military settlements and centres of trade and production usually yield a larger amount of evidence for writing than rural areas, graffiti that imply an educational or educated environment are also found in villas (e.g. Scholz 2015, 79–83). Finds of writing equipment in spaces related to crafts and trade, in addition to rural and production sites, show that writing played a role in the lives of the non-elite population, possibly to a higher degree than literary and lapidary epigraphic evidence suggests.

It is important to consider different levels of literacy. Marks and notes related to the production and trade of goods show that writing was involved in a variety of crafts and production at various stages. For the manufacturers and workers this may only have involved a basic degree of literacy sufficient to make and read the relevant comments and marks, but not enough to write a coherent text. For more complex texts, many people will have made use of literacy through others.

Literary and iconographic evidence shows writing as a predominantly male activity. Literate women had an ambiguous status in ancient Rome (Hemelrijk 2015), oscillating between the ideal of the educated *matrona* and licentiousness and the stigma of paid work. The well-known depictions of women holding styli and writing tablets in wall paintings from [Pompeii](#) may show Muses (Meyer 2009) or evoke the ideal of a well-educated *matrona* rather than showing real women who wrote as part of their daily life. But examples such as the [letter](#) signed by Claudia Severa found at [Vindolanda](#) or evidence for women as teachers, writers or accountants show that this is not the whole picture. Such evidence is scarce but important and can be complemented by archaeological finds. Writing equipment is found in a larger number of female burials than one might expect (e.g. Eckardt 2018, 155–165).

3. Roman writing techniques and materials

There are two basic Roman handwriting techniques: scratching into a surface and writing onto it with ink or paint. Usually, pen and ink are associated with papyrus, parchment and wooden leaf tablets, while scratching with a stylus or other pointed objects was predominantly used for wax tablets, ceramics and soft metals. However, it is common to find ink and paint inscriptions as well as scratched inscriptions on ceramics, and the occasional ink writing on metal is also found. Painted inscriptions are best known on pottery and walls.

Researchers distinguish different techniques used to write on these various surfaces and the results by using specific terminology.

For writing scratched into a surface that was not intended primarily for that purpose, researchers generally use the term ‘graffito’. Graffiti are usually short, and they can include drawings as well as writing and can combine the two. They are, for example, found on tiles and pottery (often *post cocturam*, after firing, but also *ante cocturam*), on stucco covering walls, on wooden barrels or on the stone steps of a theatre. Their contents range widely and include owners’ marks, votive inscriptions and the accounts of sexual encounters.

Dipinto or *titulus pictus* refers to an inscription made with ink or paint, usually with a brush and again usually on surfaces not primarily intended for writing. The best-known kinds of *dipinti* are commercial information on amphorae but also voting recommendations on the



Fig. 8: Graffito on Samian ware from Lyon (France), showing a drawing of Mercury along with the inscription *Mercurio* (‘To Mercury’). Lugdunum Musée & Théâtres Romains. © Morgane Andrieu.

walls of [Pompeii](#), for example suggesting that a certain Cn. Helvius Sabinus and M. Samellius Modestus would make great *aediles* ([CIL IV 6616](#), see Kruschwitz 1999).

When broken ceramic vessels or sherds were repurposed for writing the term used is *ostraca*, referring to the objects rather than the writing mode. The use of this term is not always consistent, but it can be used for sherds with both writing in ink and scratched writing. Inscriptions on *ostraca* can be just a letter or two, but they include long texts such as a military report on an attack written on a broken amphora from [Krokodilo](#) (Egypt, [O.Krok. 1.87](#)).

Writing could also be formed with a number of small holes or indentations made with a pointed object into a surface such as lead, copper-alloy or leather. Researchers refer to these as ‘punched’ inscriptions. They can be found on labels and various metal objects and this technique is frequently used for owners’ marks and votive inscriptions.

Which objects and materials were used to write on in Roman antiquity depended on factors such as purpose and content of the text, availability, cost and opportunity. It is useful to consider the varying environmental conditions in different parts of the empire and which materials would lend themselves to them or be more or less readily available in certain places. Papyrus, for example, was used for almost any kind of document from letters to tax returns in Egypt, but outside Egypt it had to be imported and other materials seem to have been employed for certain text types. In the northwestern provinces, contracts and other legal documents



Fig. 9: Tituli picti on an amphora from Mainz (Germany), detailing the content, *mur(ia) ant(ipolitana)* ('fish sauce from Antipolis/Antibes'), the amount and the abbreviated names of the distributor and the buyer, late 1st century CE. From Ehmig 2018, 291 fig. 1 and 2. © Ulrike Ehmig, reproduced with permission of Landesarchäologie Mainz.

are commonly found on wax tablets while ephemeral texts, such as drafts and letters, are more common on wooden leaf tablets. Labels for goods, on the other hand, were often written on metal sheets which could easily be cut to the right size and would endure transport and handling better than softer materials. At the same time, people often simply used what they had: texts that we would

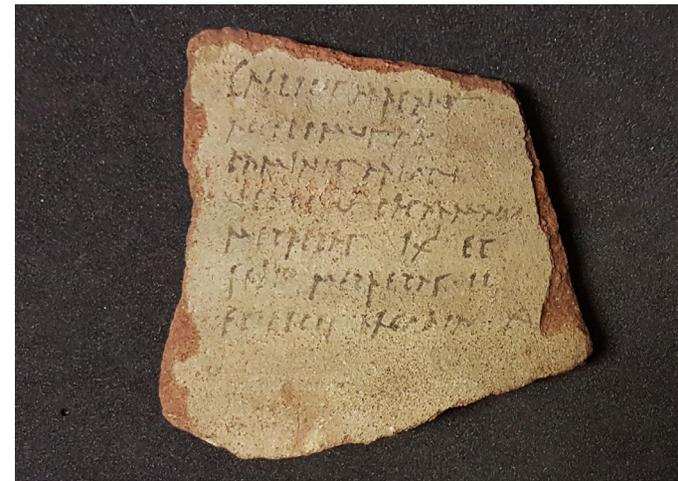


Fig. 10: Ostrakon from Egypt with Latin inscription: a receipt by Cneius Arpenus for grease and tar supplied by Apion, 30 BCE – 1st century CE. British Museum, registration no. 1898,0312.153. © Trustees of the British Museum.

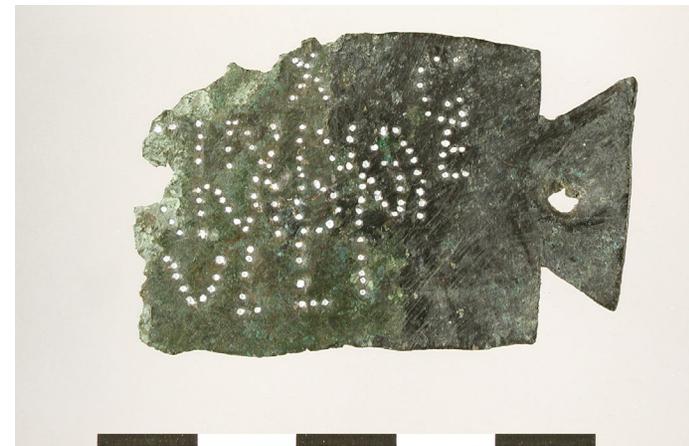


Fig. 11: Owner's label from Nijmegen (The Netherlands) with punched inscription *[(legionis)] X G(eminæ) / [C(enturia)] Cinnæ / Amoni / Iulli* ('[belongs to] Amonius Iullus of the Centuria of Cinna in the tenth legion Gemina'), late 1st/early 2nd century CE. © Collection Museum Het Valkhof, Nijmegen.

expect on papyrus, parchment or wooden tablets, such as letters and reports, are sometimes found on pottery sherds – maybe because papyrus or wood was not available.

In fact, Roman handwriting can be found on a plethora of surfaces, including those not necessarily meant to be written on. Much as is the case today, some people in antiquity liked to doodle and scribble onto walls and pavements and marked various objects such as plates or bowls as their property.

4. Evidence for Roman writing equipment

The most obvious kind of evidence for Roman writing equipment are archaeological finds, but both depictions and written descriptions of the act of writing and of writing paraphernalia are also preserved. Archaeological, iconographic and literary evidence all come with their own scope and limitations, which will be addressed briefly in this section.

Finds of Roman writing equipment can be contextualised with associated objects and within a given site, and they can, to a certain extent, be analysed in terms of use/wear and production. As mentioned in the introduction, there are a number of problems with the identification and quantification of finds of Roman writing equipment. An overarching problem are biases of survival, excavation and publication of archaeological materials and the level of awareness of writing equipment which varies greatly from region to region, resulting in very patchy evidence. Nevertheless, a few general observations can be made.

In general, archaeological finds of writing equipment are known in greater numbers from urban and military sites than from smaller settlements or rural sites. This corresponds to our traditional expectations of higher levels of literacy and more frequent use of writing in such environments. However, more recent research has stressed that, while rural sites do feature fewer finds, they might be more common than expected following Harris' pessimistic view (Hanson and Conolly 2002), and also that the simplified categories

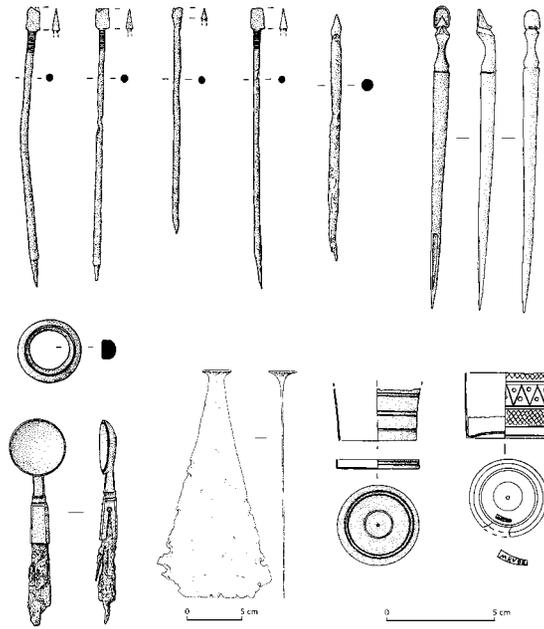


Fig. 12: Writing equipment from a grave at S. Egidio, Aquileia (Italy), late 1st/early 2nd century CE. From Fünfschilling 2012, 170 fig. 4 (after Božič and Feugère 2004, 26 fig. 21), courtesy of Augusta Raurica.

of 'rural' vs. 'urban' needs to be differentiated more carefully (Mullen 2021b).

Writing equipment is found in various contexts, both in sets of different combinations and as isolated finds, for example deposited in graves or dropped and lost in public and private spaces such as roads, habitations and workshops (see e.g. Schaltenbrand Obrecht 2012, 219–233 on the distribution of styli in [Augusta Raurica](#)). In funerary contexts it is often found together with modelling and grooming or medical tools. Many sets of writing implements are from graves, particularly from the 1st century CE onwards, including those of children and women, others are part of votive or professional depositions (Fünfschilling 2012, 169–176). In some cases, Roman writing equipment has been found in burials of the local population in the provinces or outside the Roman empire and

it has been suggested that it was used as a status symbol (Crummy et al. 2007).

It is useful to consider other kinds of evidence because of the multifunctionality of tools and the difficulties with their identification. Iconographic evidence in particular has proven invaluable for the identification of writing equipment and writing sets, as well as for our understanding of how they were used.

Funerary reliefs are of interest because they can tell us something about the symbolism of writing and writing equipment and its association with status and prestige. A large number of funerary

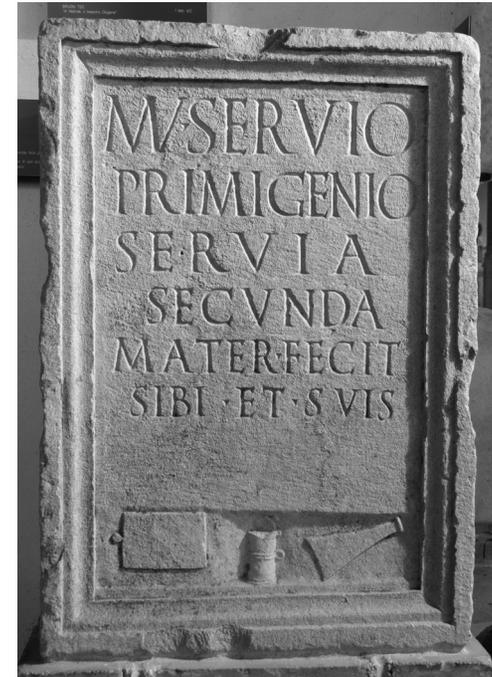


Fig. 13: Funerary relief of Manius Servius Primigenius, Aquileia (Italy), 1st century CE. [CIL V 1376](#), Museo Archeologico Nazionale di Aquileia, inv. 73. By permission of the Ministero per i Beni e le Attività Culturali e per il Turismo, Direzione regionale del Friuli Venezia Giulia – Museo Archeologico Nazionale di Aquileia. Further reproduction prohibited.

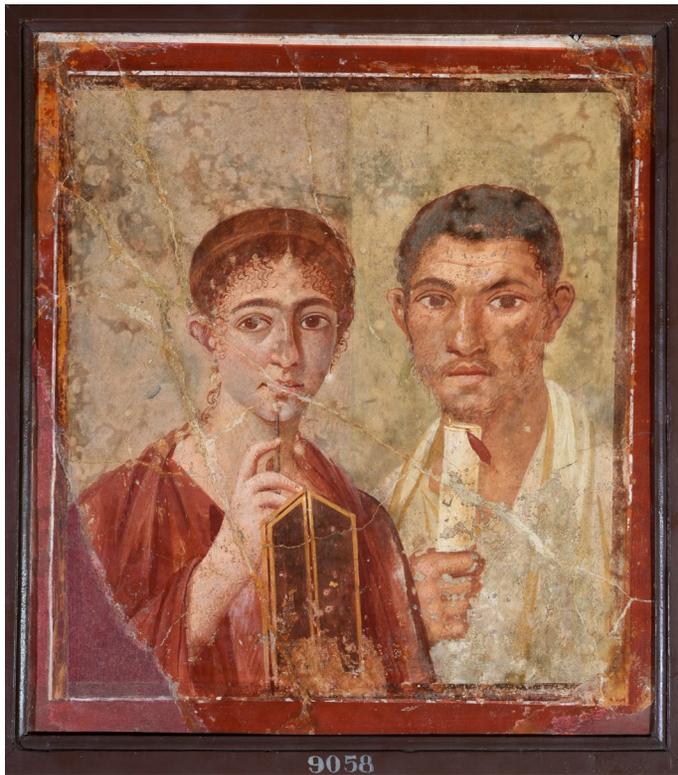


Fig. 14: Wall painting from the house of Terentius Neo in Pompeii (Italy), so-called baker and his wife, 1st century CE. Museo Archeologico Nazionale di Napoli, inv. 9058. By permission of the Ministero per i Beni e le Attività Culturali e per il Turismo – Museo Archeologico Nazionale di Napoli. Photo by Giorgio Albano.

monuments feature depictions of writing equipment, particularly from the areas of Phrygia, Noricum, the Germanies and Gaul. They refer to the profession of the deceased, allude to intellect and scholarliness, or, more frequently, to official, legal or financial roles of the local elites (Eckardt 2018, 139–153, also see Boeselager 1989).

One particularly important funerary monument is that of L. Cornelius Atimetus in the Vatican Museum (fig. 1), which he had made for himself, his freed slave L. Cornelius Epaphra and his other freed

slaves and their descendants. On the side of the altar a relief shows two men in front of a shop display with various tools including wax spatulas, cases with styli and pens and possible penknives. In the case of the penknives and spatulas their association with styli here has been crucial for the interpretation of respective finds as writing implements (Gaitzsch 1984; Božič 2001c).

Other important iconographic evidence includes wall paintings, for example from Pompeii. Such depictions often show more detail than stone reliefs. They feature women (and sometimes men) in contemplative poses with stylus and wax tablets or still lifes with various writing implements (Meyer 2009).

The evidence of late Roman or post-Roman codices is also of interest. They often contain miniatures showing a priest or a scholar who is writing, often surrounded by writing material, books and the associated furniture. Some of these depictions seem to be closely related to the Roman tradition. A famous example is the *Codex Amiatinus*, a 7th/8th century copy of Cassiodorus' *Codex Grandior* showing Esra with inkpen, stylus, wax spatula, compasses or dividers and an inkwell (Merten 1987).

Finally, the evidence of Roman authors sheds light on the (not unambiguous) terminology but also the use of certain materials. Pliny in his *Natural History*, for example, mentions writing equipment as products made of various materials and describes the production of ink and papyrus. The correspondence of Cicero provides comments on the writing materials he used and his personal library. Scenes of letter-writing can be found throughout Roman literature and Roman poets such as Martial, Ovid and Catullus, for example, comment on the process of writing and publishing. Texts about education are also relevant. Quintilian, a professor of rhetoric in late 1st century CE Rome, wrote a book on the education of a rhetor, the *Institutio oratoria*, that includes comments on the pros and cons of various writing materials (see relevant excerpts from all these texts in the [Literary Evidence](#)).

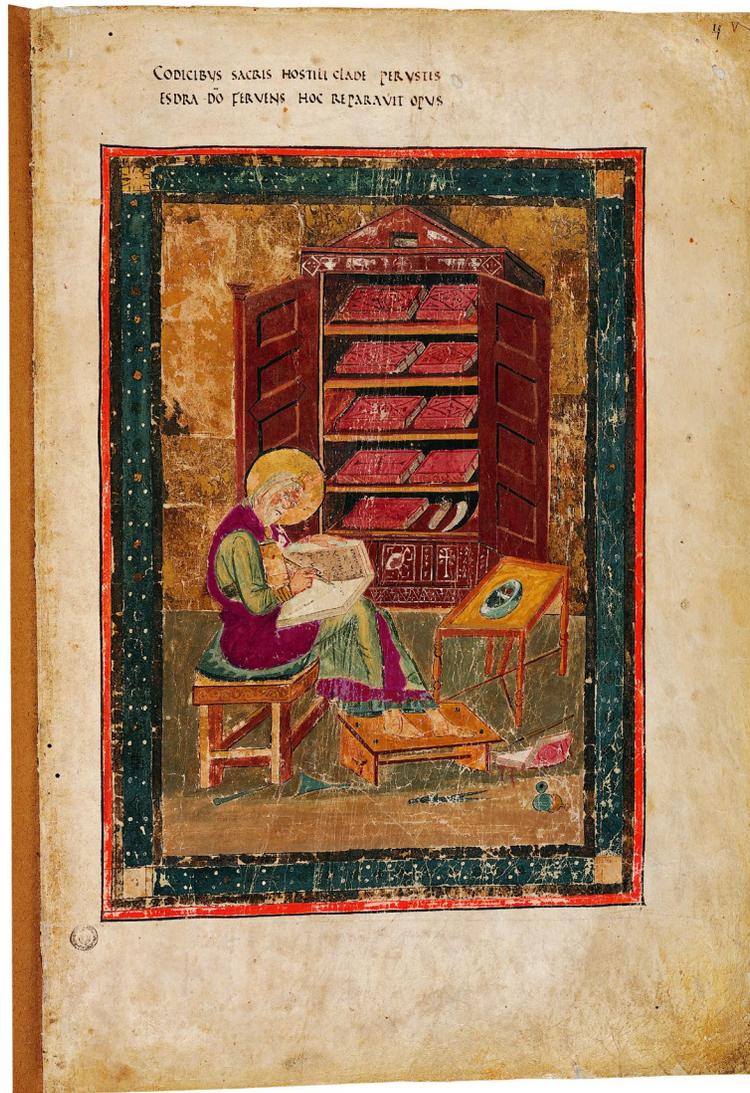


Fig. 15: Codex Amiatinus, Ezra with writing equipment, around 700 CE. © Biblioteca Medicea Laurenziana, Florence, Ms. Amiatino 1, f. Vr. By permission of the Ministero per i Beni e le Attività Culturali e per il Turismo, further reproduction prohibited.

Further reading:

General surveys of writing equipment and materials:

Božič and Feugère 2004; Bülow-Jacobsen 2009; Cribiore 2015; Garcia y Garcia 2005

Regional corpora:

Alonso et al. 2014 (Hispania); Bilkei 1980 (Pannonia); Castoldi 2021 (Cremona); Drescher 1989 (Ostia Antica); Fünfschilling 2012 (Augusta Raurica); Hrciarik 2006 (Slovakia); Maionica 1903 (Aquileia); Merten 1982 (Trier); Olesti Vila 2019 (Hispania, northeast); Öllerer 1998 (Magdalensberg); Starac 2008 (Istria)

Depictions:

Merten 1983, 1987; Meyer 2009; Öllerer 2001; Pugliese Caratelli 1950

Useful online databases for small finds, including writing equipment:

finds.org.uk (Portable Antiquities Scheme, UK)

artefacts.mom.fr (Online collaborative Encyclopedia of Archaeological Small Finds)

portable-antiquities.nl (Portable Antiquities of the Netherlands)

5. Catalogue of writing equipment

When thinking of writing implements, the first thing that comes to mind is what we write with and what we write on, e.g. pen and paper. But if we think further there are a number of accessories needed, or useful, for writing, for example to help keep equal distance between lines (ordination), to carry writing sets in or to prepare ink with.

In the following catalogue the Roman equivalents of pen and paper will be introduced in some detail. These include styli, pens and brushes and the main surfaces and materials used for handwriting such as papyrus and wood. Important accessories that are known from written and iconographic evidence or that can be found on Roman excavation sites are also described. The catalogue ends with tools for which the evidence is scarce or ambiguous. These include stones used to sharpen styli, pieces of lead used to draw lines to write on, stones and sponges used as erasers, small objects used to separate the ‘pages’ of bundles of writing tablets, etc. In addition to these, and not discussed in the catalogue, there are many other tools which can be associated with writing in some contexts but that are not specifically writing equipment. These include utensils that may have been used to mix ink and paint or to prepare wax, such as stirrers, spoons and spoon-probes, certain spatulas, stone palettes and small vessels.

For the relevant terminology in other languages commonly used in research publications, please refer to the [Glossary](#).

5.1 Utensils for writing: styli, pens and brushes

Stylus (*stilus/graphium*)

Roman styli were mainly used to write on [wax tablets](#) but also for other surfaces such as lead and wood. They were mostly made of metal, with iron and copper-alloys being the most commonly used materials. Early Roman styli are made of bone and they are not usually found after the 1st century CE (Schaltenbrand Obrecht 2012, 60–62, 65). Wooden styli are known from late Roman and Coptic Egypt and must have existed in other places as well (Schaltenbrand Obrecht 2012, 53). There are also objects with a wooden shank and a metal spiral nib frequently called ‘Vindolanda type’ pens, which

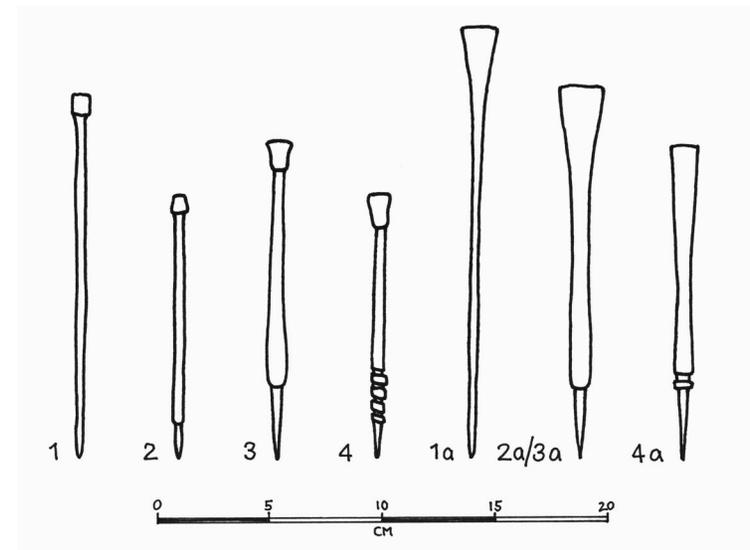


Fig. 16: Typology of Roman iron styli from Britain after Manning 1985, 85, redrawn by A. Willi.

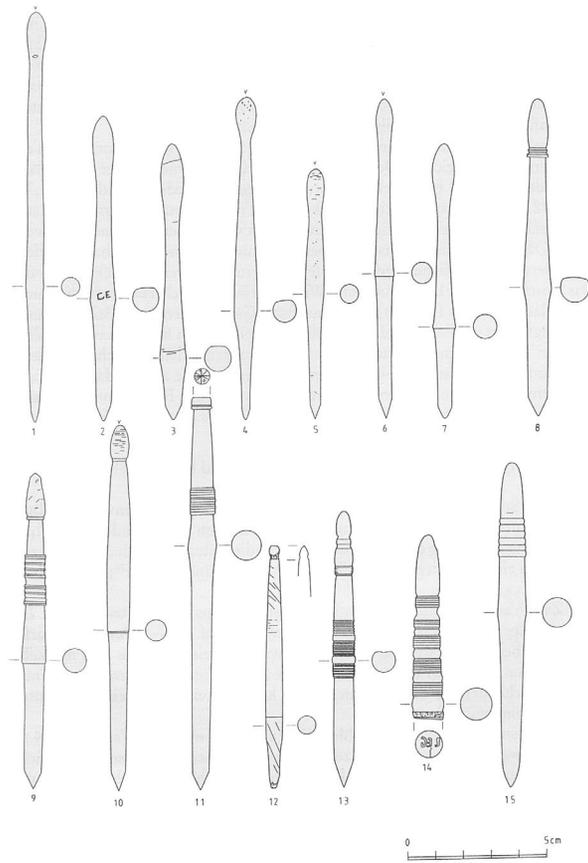


Fig. 17: Examples of bone styli from the Magdalensberg (Austria). After Gostenčnik 1996, 111 pl. 1. © Kordula Gostenčnik, reproduced with permission of Geschichtsverein für Kärnten.

were used with ink at Vindolanda (see e.g. Birley 1999, 29 and [below](#)) but that would also have been suitable for use as styli or stylus-like tools. Other materials are rare. Four styli entirely made of silver were found in a female burial in [Nersingen/Unterfahlheim](#) (Germany, Ambs and Faber 1998, 424, with drawing p. 401).

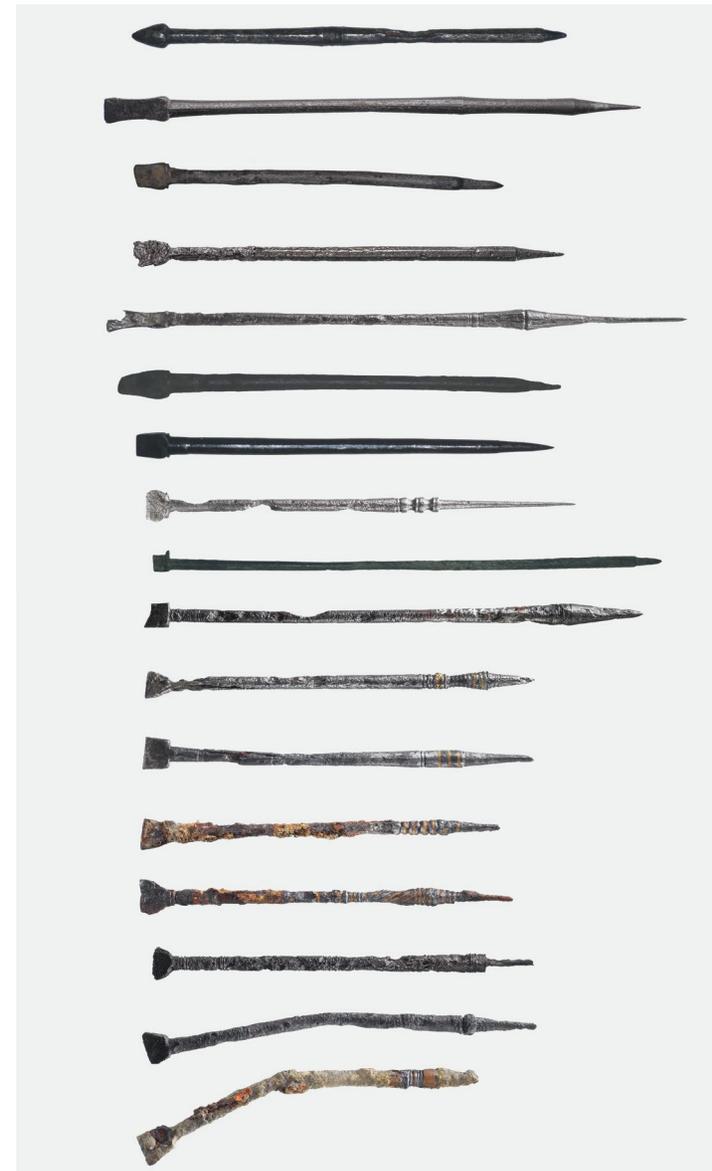


Fig. 18: Metal styli with various degrees of decoration. From Schaltenbrand Obrecht 2012, 263 fig. 257; 267 fig. 261. © Augusta Raurica.

Generally, styli consist of a point, a shaft (sometimes with collar) and an eraser. They are on average around 11–12 cm long and rarely longer than 15 cm.

There is great variety in design and typologies and their chronologies vary depending on the region (see the typologies in Schaltenbrand Obrecht 2012 and Manning 1985). Iron styli are usually forged in one piece and are round, square or polygonal in section. Shafts



Fig. 19: Copper-alloy stylus from Augusta Raurica (Switzerland) with inscription *Amica / dulcis / lasciva / Venus* ('My sweet girlfriend is a playful Venus'), late 2nd/early 3rd century CE. From Schaltenbrand Obrecht 2012, 69 fig. 62. © Augusta Raurica.

made of other metals were cast or made from a thin sheet rolled into a tube. An iron or steel point was sometimes stuck onto their tip but is usually lost. Metal styli can have intricate decoration, for example mouldings or inlays, and they can be inscribed with erotic or witty messages. Bone styli were carved and then turned and often appear chunky in comparison to the dainty metal ones. In metal styli, the eraser is often simply a wider, flattened or spatula-shaped continuation of the shaft, but again there are more elaborate shapes such as dolphins. Bone styli often have rounded or olive-shaped erasers. Both metal and bone implements were sharpened when the point had worn down (Schaltenbrand Obrecht 2012, 78).

The identification of styli is often difficult. Those made from bone are close in shape to other bone objects such as spindles, hairpins and needles and have therefore been misinterpreted or gone unnoticed (Schaltenbrand Obrecht 2012, 53–66, 88–89). Those in iron are often so heavily corroded that x-rays are needed to reveal the structure underneath the corrosion. This can help to tell them apart from other pointed objects such as nails or tools that were not primarily used for writing but perhaps for various purposes in craft and trade (Schaltenbrand Obrecht 2012, 79–81), such as tracing for woodwork decorations or for making marks to help with the assembly of furniture.

Styli are found across the empire, most frequently in urban and military settlements. The largest find groups are from modern Switzerland where the Roman colonies [Augusta Raurica](#) and [Aventicum](#) and the legionary camp at [Vindonissa](#) have yielded roughly 1200, 620 and 560 styli respectively. These are styli that were lost and ended up in the ground along streets and in commercial or domestic buildings, or, in the case of Vindonissa, in the rubbish dump outside the legionary camp. The largest number of bone styli (more than 200) was found in the settlement on the [Magdalensberg](#) (Austria, Gostenčnik 1996). Surveys of Roman Britain have highlighted finds on numerous rural sites (Hanson and Conolly 2002; Smith et al. 2018, 69–77). Individual styli are also found as grave goods throughout the empire.

It is rare to find Roman pens of any material. Reed pens are only rarely preserved, mainly in Egypt (see e.g. Swift 2017), and one was found in a cremation grave in [Intercisa](#)–Dunapentele (Hungary, Bilkei 1980, 81 no. 110 with pl. II.110). Metal pens seem to have been rare in general, and they are often preserved as small tubes, so they are easily overlooked. Moreover, tube-shaped [metal cases for pens and styli](#) are known and can be virtually indistinguishable from pens (Fünfschilling 2012, 185). Copper-alloy pens have been found in urban and military sites and in funerary contexts, mainly from Italy, Switzerland, Germany and Britain (Božič 2001b, 28).

Pens could be carried in leather cases together with inkwells and sometimes with styli (*theca calamaria*).

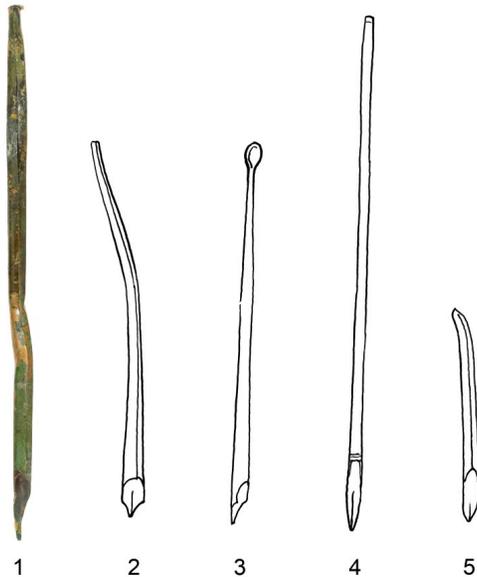


Fig. 21: A selection of metal inkpens from Germany and Italy (1: Butzbach, 2: Mainz, 3: Mainz–Weisenau, 4: Bingen, 5: Aosta). From Fünfschilling 2012, 178 fig. 16 (1: Römisch-Germanisches Zentralmuseum Mainz, inv. O.6846, photo by René Müller; 2–4: after Lindenschmit 1911, pl. 53,985–987; 5: after Božič 2001b, 28), courtesy of Augusta Raurica.



Fig. 22: A Vindolanda-type pen with spiral nib from Vindolanda, 97–105 CE. © Vindolanda Trust.

Further reading and images:

Božič 2001b; Božič and Feugère 2004, 34–35, 37; Eckardt 2018, 27–29; Jilek 2000; Swift 2017

Also see: [fig. 2](#) (Pompeii still lifes); [fig. 12](#) (S. Egidio); [fig. 15](#) (*Codex Amiatinus*).

Selected ancient literary evidence:

Cicero (*Q. fr. 2.14 [15b].1*) promises his brother that he will use a good pen, well-mixed ink and fine paper (*charta*) this time because Quintus complained that he could hardly read his last letter. Persius (*Sat. 3.10–20*) has a hungover student lament a bad-quality pen that creates a mess on the parchment. Quintilian (*Inst. or. 10.3.31*) says that having to dip the pen into the ink interrupts the flow of the thoughts. Martial (*14.38*) praises the quality of Egyptian reed for pens. Symposius wrote a riddle about the ink pen (*Aenigmata 2*).

Brush (*penicillus/penicillum*)

Little is known about Roman brushes which would have been used to write with ink or paint, for example onto pottery and walls. Possible finds include metal tubes that may have been stuck onto a wooden brush-shaft to hold the bristles in place (Fünfschilling 2012, 180; Raux and Widehen 2015, 685). They are difficult to tell apart from the remains of pens and pen cases. Rare metal tools with socket-shaped ends to receive bristles or other organic materials such as pieces of sponge have also been interpreted as brushes but

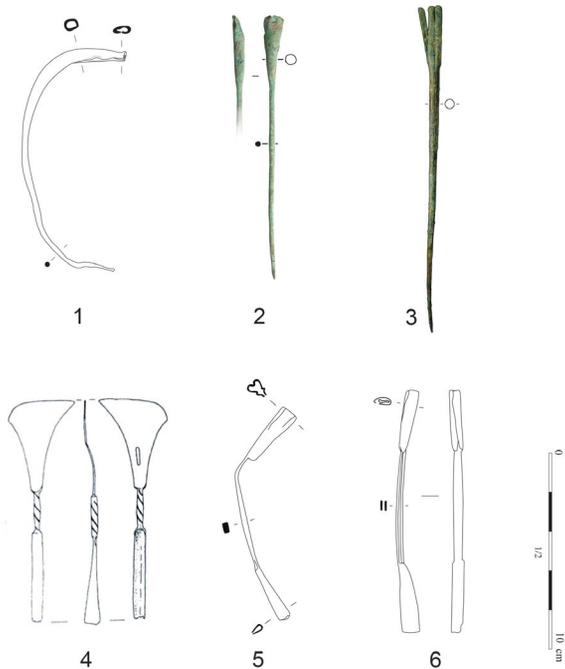


Fig. 23: Typology of metal brushholders after Raux and Widehen 2015, 680, courtesy of the authors. (1) type I.a, Murviel-lès-Montpellier, France, (2) type I.a, Famars, France, (3) type I.b, Pont-Noyelles, France, (4) type II, Trier, Germany, (5) type III.a, Carsac-Aillac, France, (6) type III.b, Besançon, France.

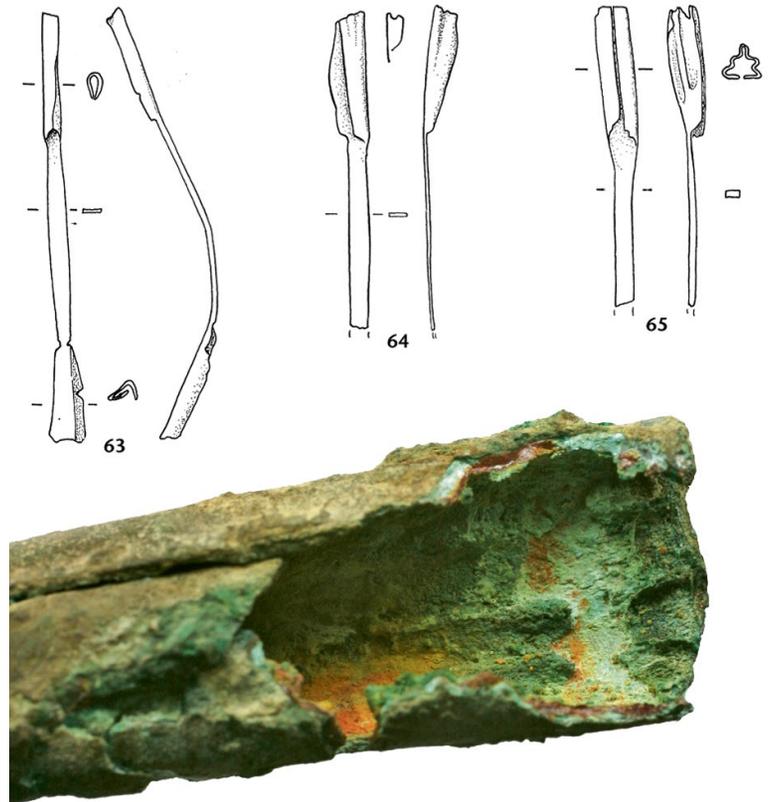


Fig. 24: Brushholders from Augusta Raurica (Switzerland), 1st/2nd century CE. From Fünfschilling 2012, 213 pl. 2 (detail). © Augusta Raurica.

as such may primarily have had other uses such as gilding (Raux and Widehen 2015). Some have one stylus- or spatula-shaped end, others have a flattened middle part and two socket-shaped ends. These latter objects measure between 9–15 cm, mainly date to the 1st century CE and are associated with urban sites (Raux and Widehen 2015, 684, further Fünfschilling 2012, 181). The largest numbers have been found in modern day Switzerland, France and the UK (Raux and Widehen 2015, 683).

Brushholders or brushes are mainly identified through the context in which they were found. For example two brushes were found in the so-called painter's grave in St-Médard-des-Prés (France) with various vessels containing what was interpreted as paint, tools and other objects thought to have belonged to a painter when excavated in the 19th century. In this case, the bristles seem to have been attached to the metal shaft with a copper wire (Fünfschilling 2012, 180).

Further reading:

Fünfschilling 2012, 180–181; Humphreys 2021, 208–10; Raux and Widehen 2015

Selected ancient literary evidence:

The use of the brush is not mentioned in the context of writing in Latin literature. Pliny the Elder (*NH* 9.148) mentions sponges used as brushes and (*NH* 28.235) a remedy for burns made from the bristles of plasterers' brushes; Cicero (*Q. fr.* 2.13.2) uses painting with a brush as a metaphor for literary description.

5.2 Main materials for writing on and document types

Ink tablet/leaf tablet (*tilia*)

Roman ink tablets were made of wood using various techniques. The best-known kind are wooden leaf tablets made of thin shavings of wood (Bowman and Thomas 1983). Most are less than 3 mm thick and roughly comparable in size to a modern postcard, but some are quite a bit larger and can, for example, measure 25 cm in length. Texts are sometimes written across, sometimes along, the grain. They were often folded down the centre to form a diptych.

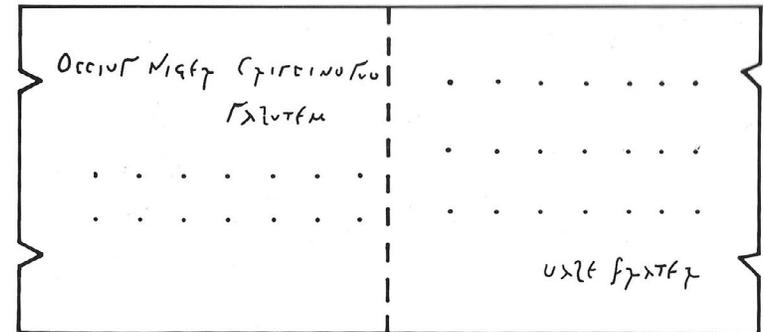


Fig. 25: Example of a leaf tablet used for a letter. From Bowman and Thomas 1983, 38 fig. 6. © Society for the Promotion of Roman Studies.

Leaf tablets were the papyrus of the northwestern provinces. They were used for ephemeral texts such as notes, drafts and private administration but also for personal letters. In the case of letters, the tablet was usually oriented horizontally and the text was written along the grain in two columns. The tablet was folded and the address of the recipient was written on the outside. Leaf tablets could also be tied together to be read in a concertina format; some preserve

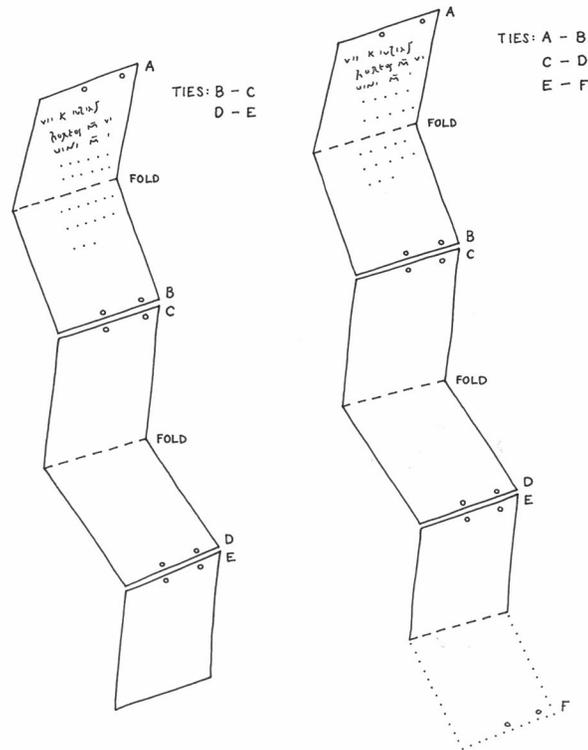


Fig. 26: Example of leaf tablets, concertina format (left) and independent diptychs (right). Redrawn by A. Willi after Bowman and Thomas 1983, 39 fig. 7.

tie-holes for the string. Notches in the edges of leaf tablets were probably used to secure a piece of string for tying and sealing the letter (Bowman and Thomas 1983).

Unlike [wax tablets](#), leaf tablets were usually produced from local wood (Bowman and Thomas 1983, 30–31; Häußler and Pearce 2007, 225). As is the case with other organic material, ink tablets are only preserved under specific conditions such as in the anaerobic environment of moist soil. They are best known from the auxiliary fort at [Vindolanda](#) (UK), which has so far yielded more than 1000

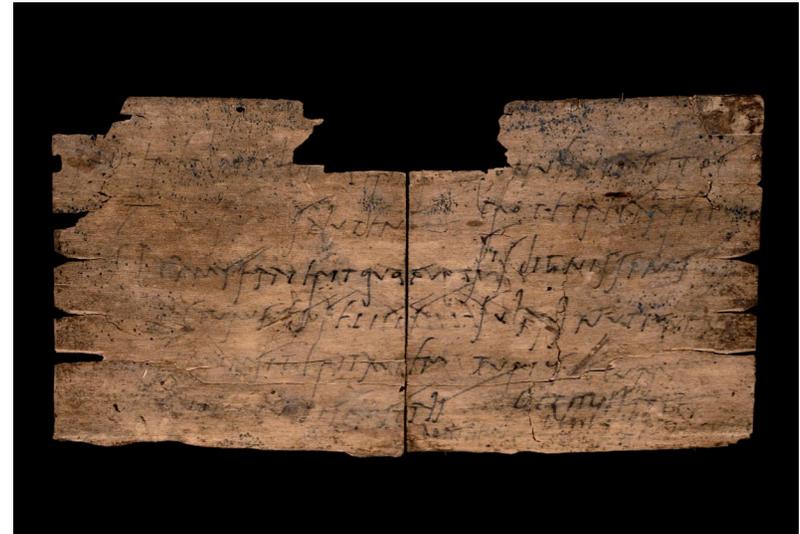


Fig. 27: Ink tablet from Vindolanda (UK): letter from Niger and Brocchus to Flavius Cerialis, late 1st/early 2nd century CE. [Tab. Vindol. 248](#), British Museum, museum no. 1980,0303.21. © Trustees of the British Museum.

examples, giving an intriguing insight to life in the camp, especially in the period 90–120 CE. A few Vindolanda tablets mention the word *tilia* referring to an ink tablet (esp. [Tab. Vindol. 589](#)).

Only a handful of leaf tablets were known before the Vindolanda tablets were first discovered in the 1970s. Ever since, scholars have become more aware of them and small numbers of finds are now known from many sites, particularly in the UK, albeit often less well preserved than the ones from Vindolanda (Hartmann 2015). The auxiliary fort at [Luguvalium](#) (Carlisle) with over 130 tablets represents another hotspot (Tomlin 1998).

From late antiquity and other parts of the empire slightly different ink tablets are preserved: the tablets from [Kellis](#) (Dakhleh Oasis, Egypt) dating to the 4th century CE and the *Tablettes Albertini*, 45 tablets found on the Tunisian–Algerian border west of Gafsa, dating to the 5th century CE. The latter contain legal contracts

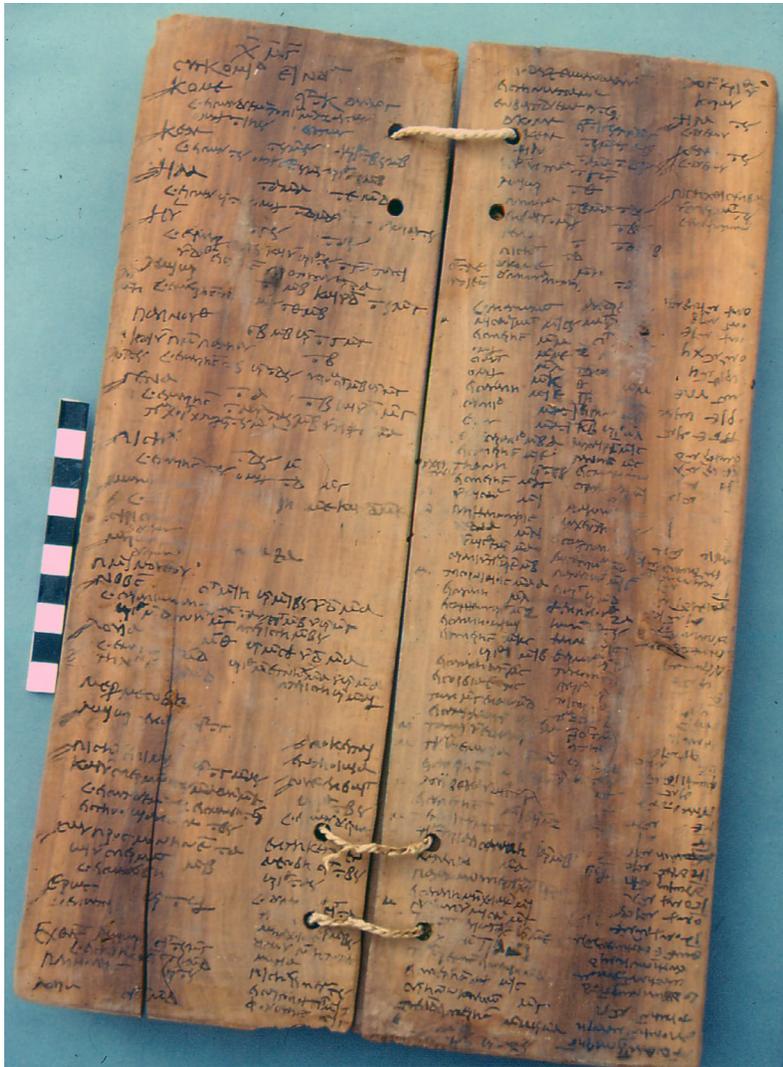


Fig. 28: Agricultural account book from Kellis (Egypt), tablet 1 verso and tablet 2 recto, 4th century CE. © Prof. Colin A. Hope.

concerning an agricultural estate and consist of thick slabs of wood measuring up to 26 cm in length and 10 cm in width (Courtois et al. 1952). The former include an agricultural account book made up of eight thin (c. 3 mm) leaves cut from one block of wood, measuring roughly 33 x 10 cm and tied together with string (Bagnall and Hope 1997, mainly Greek and Coptic with some Latin). They also include several tablets coated with a grounding of gesso (plaster) (Whitehorne 1996).

Further reading:

Bowman and Thomas 1983; Božič and Feugère 2004, 33–34; Hartmann 2015; Tomlin 1998; *Manual of Roman everyday handwriting* Volume 1

Selected ancient literary evidence:

Pliny the Elder ([NH.13.30](#)) mentions that the bifold shape of palm leaves first inspired the shape of folded leaf tablets. Isidorus ([Orig. 6.8.18](#)) discusses letter-writing on wooden tablets before the invention of papyrus and parchment. Herodian describes Commodus composing a list of people he wishes to be killed on what seems to be a leaf tablet ([1.17.1](#)) and Cassius Dio ([67.15.3](#)) describes a similar situation featuring Domitian. Martial ([14.5](#)) mentions ivory tablets written on with ink.

Stylus/wax tablet (*tabula cerata/cera*)

Wax tablets are rectangular wooden tablets. A rectangular recess was carved out to a depth of c. 2–3 mm and filled with a layer of beeswax. A [stylus](#) was used to write into the wax, its eraser end serving to flatten or scrape off wax to correct mistakes. Wax tablets were used long before the Roman period with their oldest attestation dating to the 3rd millennium BCE (Sumerian statue of Gudea) and the oldest known tablet found in the shipwreck of Uluburun dating to the 14th century BCE (Schaltenbrand Obrecht 2012, 23).

Roman wax tablets are usually up to 5 mm thick and the dimensions vary. Generally they are a good size to fit into a hand, around 10–15 x 15–20 cm. Many are smaller and some seem to have been considerably larger, up to around 30 cm in length (Božič and Feugère 2004, 22). Some were inscribed horizontally, others vertically. Usually, several tablets, often two or three, would be tied together to form diptychs/polyptychs or codices, also referred to as *pugillaria* in ancient sources. They could then be flipped like book pages. When the wax needed replacing, it was scraped out with a [spatula](#) which was also used to spread the new wax (Gaitzsch 1984). Rare examples made of ivory or bone have also been found (Božič and Feugère 2004, 25).

Remains of wax are sometimes preserved (see e.g. Speidel 1996, 90–91). It was usually blackened with carbon, sometimes red (Marichal 1992b, 171). In most cases however the wax filling is lost. What remains are traces of writing where the stylus had gone



Fig. 29: Stylus tablet from Vindonissa (Switzerland) with remains of black wax, 91 CE. Vindonissa Museum, inv. 7256. © Kantonsarchäologie Aargau, CH – 5200 Brugg, photo by Béla A. Polyvás.



Fig. 30: Roman statue of a person writing on a stylus tablet from Langres (France). © Musée d'art et d'histoire de Langres, France, photo by O. Harl.

completely through the wax and the letters were inadvertently scratched into the wood. Since the tablets could be reused, multiple texts are sometimes found on top of each other, making wax tablets hard to read. Most are found without any discernable writing on them at all. In some cases, ink was used on the wood directly (Speidel 1996, 17).

Wax tablets were sometimes used for letters, exercises and other ephemeral texts such as drafts, but predominantly they seem to have been used for carefully composed messages and above all documents, including contracts, receipts, wills and bookkeeping. In

some cases, writing on the rim of tablets (Speidel 1996, 17) suggests that they were stored together with others, for example on a pile, with the label making it easier to find the document needed.

When the tablets contained an important document, for example a contract, they could be sealed (Speidel 1996, 22–23). To this end, a strip was carved out down the middle of the back of one of the tablets to receive the seals. The names of the witnesses were written in ink on either side of the seals. The seals protected the original text (*scriptura interior*) but a copy was written on another part of the diptych/triptych which could be read at any time (*scriptura exterior*). It is unclear to what extent [seal boxes](#) were used to seal wax tablets, if at all.

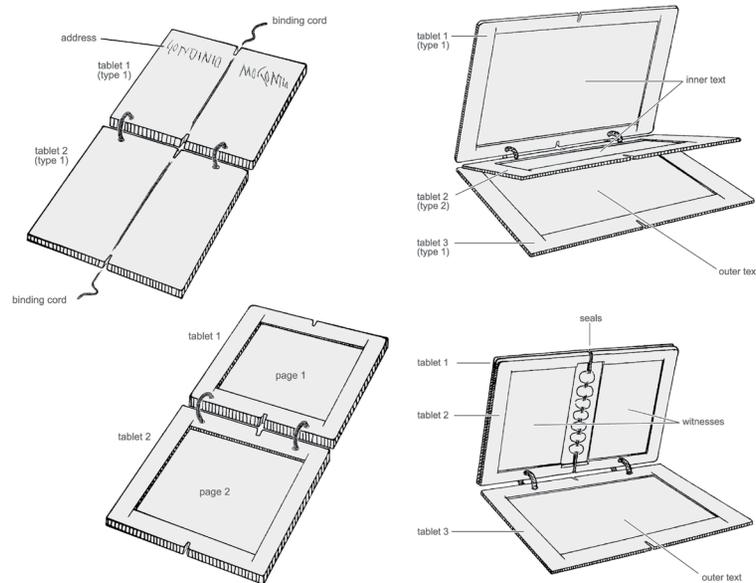


Fig. 31: Schematic reconstructions of a diptychon used as a letter (left) and of a sealed triptychon, e.g. a contract (right).

From Tomlin 2016, 22 fig. 14; 24 fig. 17 right. © MOLA.

Wax tablets were used all over the empire but, as is the case with leaf tablets, they are only preserved under specific circumstances (Hartmann 2015). They are sturdier than leaf tablets and preserved more widely but may in fact have been used less commonly. Important find spots represent the conditions required for preservation. In [Vindonissa](#) (Switzerland), more than 600 tablets dating to 30–101 CE were found in a rubbish dump outside the legionary camp, which also yielded numerous styli (Speidel 1996). To date this is the largest number of stylus tablets found at one site. In the moist soil of London, more than 400 tablets were preserved and now called the Bloomberg tablets after the excavation site. These letters, legal documents, accounts etc. date roughly to the period between 50–80 CE but include examples from the very beginning of Roman rule in Britain (Tomlin 2016). Other large finds include tablets from the Vesuvian sites, in particular the dossier of the banker L. Caecilius Iucundus (153 tablets) and the documents of the Sulpicii, around 350 tablets relating to the affairs of a bank in Puteoli that were found in a villa near Murécine in a wicker basket (Camodeca 1999). About 25 tablets containing mainly purchasing contracts from the mid-2nd century CE survive from a group of 50 found in the 18th and 19th century in the ancient goldmines of Alburnus Maior (Romania, *CIL* III p. 913–958; Pólay 1982). There are also hundreds of examples from [Vindolanda](#), dozens of which have traces of writing which are currently being investigated.

Unlike leaf tablets, wax tablets found in the northwestern provinces were usually imported from the circum-Alpine area as the analysis of the wood they were made of shows (often silver fir, see Häussler and Pearce 2007, 225). For the Bloomberg tablets it has however been suggested that they were also made by recycling barrels and casks (Tomlin 2016). One funerary inscription from Rome is thought to be that of the only known producer of wax tablets, M. Caecilius Hilarus, a *pugillariarius* (*CIL* VI 9841).

There seem to have been special [leather-cases](#) for tablets and depictions show them being carried with a sort of sling.

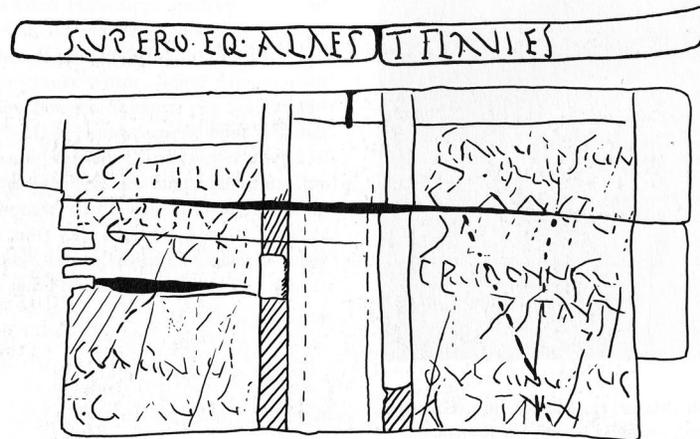


Fig. 32: Tablet from Vindonissa (Switzerland) with space for seals and writing on rim, 90 CE. Drawing from Speidel 1996, 98–9 no. 3. © Kantonsarchäologie Aargau, CH – 5200 Brugg, photo by Béla A. Polyvás.

Further reading and images:

Božič and Feugère 2004, 22–25; Camodeca 1999, 2017; Hartmann 2015; Marichal 1992b; Speidel 1996; Tomlin 2016; Weirauch and Cammarosano 2021; *Manual of Roman everyday writing* Volume 1.

Also see: [fig. 2](#) (Pompeii still lifes); [fig. 6](#) (butcher's wife); [fig. 13](#) (Manius Servius Primigenius); [fig. 14](#) (baker and wife).

Selected ancient literary evidence:

In Plautus' *Bacchides* (4.4.74–112), Chrysalus dictates a letter to be written by Mnesilochus to his father, with a stylus on wax tablets. Another letter is written with a stylus on wax by Byblis in Ovid's *Metamorphoses* (9.522–525). Quintilian (*Inst. or.* 10.3.31) says that writing on wax is better than parchment because it is easier to erase and has the advantage of not having to interrupt the writing process because of a lack of ink. He also says (*Quint. Inst. or.* 10.3.32) that if the tablet is too wide it may lead to unnecessarily long texts. Martial mentions thin tablets (14.3), five-leaved wax tablets (14.4) and three-leaved tablets (14.6) as gifts. Seneca (*De br. vit.* 13.4) explains the origin of the word *codex* used for 'public tablets' from several joined tablets. Herodas (*Mimes* 3.14–18) mentions repeated coating with wax for frequently used tablets. Ovid (*Ars* 1.437–438) recommends sending a love-letter on wax tablets and in his *Amores* (1.12.11–12) curses the *tabellae* he had sent to his love, but which had been unsuccessful and says that, while they were reddish as if coloured with *minium*, this must really have come from blood. Pliny the Younger (*Ep.* 3.5.15) says that Pliny the Elder left Rome only with a servant carrying a book and tablets for notes. Suetonius (*Iul.* 83) says that Caesar adopted Octavius on the last tablet of his will.

Papyrus (*papyrus/charta*)

Papyrus was written on with ink and widely used in the Mediterranean from at least around 3000 BCE and throughout the Roman and late antique periods. It was made from the stalk of the papyrus plant (*Cyperus papyrus*), a perennial wetland sedge that was cultivated in Egypt in shallow stagnant water.

The production of papyrus is described by Pliny ([NH 13.74–82](#)) but his account is unclear in detail (Bülow–Jacobsen 2009, 5–9). Generally, the stalk was peeled and cut into strips which were soaked and joined to form a sheet. Different parts of the stalk resulted in different qualities of papyrus. Another layer was put on top with the fibres running perpendicular to the first one. The sheets were dried and the surface smoothed before use.

Single sheets of papyrus were used for various texts including letters, writing exercises and legal documents. It was moreover one of two main materials used in antiquity for books, along with parchment. To this end, up to 20 sheets were pasted together and rolled into a scroll on average 20–30 cm wide and several metres long. At the centre of the resulting *volumen* was a wooden stick called *umbilicus* or *scapus*. *Volumina* were often labelled with small parchment or wooden [labels](#) for easier retrieval from storage and were transported in designated [buckets](#). Less commonly sheets of papyrus were folded and bound together to form a *codex*.

Usually, the layer of fibres running horizontally was on the inside of the scroll and formed the main side to be written on. It was inscribed in columns, with the scroll unrolling from left to right or right to left, or, less frequently, holding the roll vertically (*charta transversa*) and writing from top to bottom (Bülow–Jacobsen 2009, 19–23).

Papyrus only survives under specific conditions, such as the dry climate of the Egyptian desert and the Near East (Sarri 2018, 60–64).

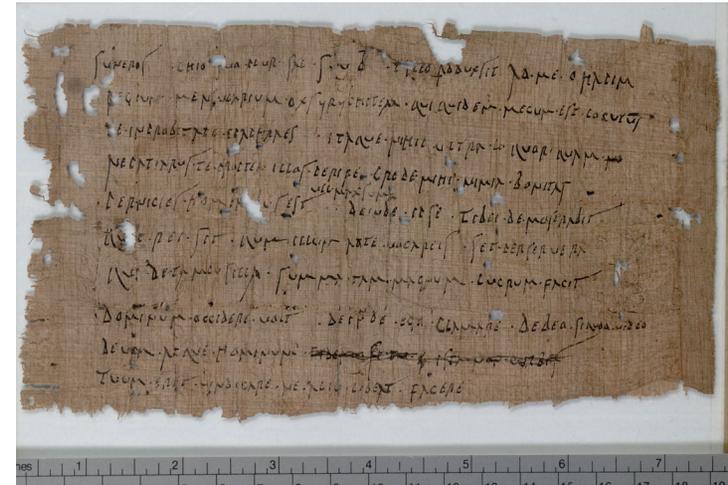


Fig. 33: Augustan era papyrus from Oxyrhynchos (Egypt), a letter from Syneros to the imperial slave Chius. [P.Oxy. XLIV 3208](#). Courtesy of The Egypt Exploration Society and the University of Oxford Imaging Papyri Project.



Fig. 34: Papyrus-scroll from Herculaneum, scorched during the Vesuvian eruption in 79 CE. Photo by S. Bailey, [The Digital Restoration Initiative/The University of Kentucky](#), licenced under CC BY-NC-SA 4.0.

Important find sites are Egypt's desert oases such as [Oxyrhynchos](#), and the towns and villages of the Fayum and the Nile valley. Under certain circumstances it has survived outside these areas. Important finds illustrate the variety of purposes papyri were used for. In the so-called Villa dei Papiri in [Herculaneum](#), the eruption of Vesuvius preserved more than 1800 papyri from a private library that are entirely scorched but can be unrolled and read with the appropriate technology. They contain literary and philosophical texts (Sider 2010). Another important find is the Babatha cache, a bundle of 35 legal documents found in a cave in the Judean Desert, all related to the life and finances of Babatha, a woman who lived in Roman Iudaea in the 2nd century CE and possibly died during Bar Kokhba's revolt (Lewis et al. 1989). The use of papyrus (amongst other things) in the Roman military is demonstrated by finds in [Dura Europos](#) on the Euphrates (Syria) from the Roman occupation dating to the mid-2nd to mid-3rd century CE with the documents of the *Cohors XX Palmyrenorum* (Welles et al. 1959).

Outside Egypt, papyrus was always imported and may not have been the most readily available writing material. That it was nevertheless used in places as far from Egypt as Hadrian's Wall is shown by fragments of papyrus found with the [Corbridge](#) hoard dating to the period between 122–138 CE (Häussler and Pearce 2007, 225).



Fig. 35: Relief on a sarcophagus from Neumagen (Germany) showing a school setting and pupils using papyrus scrolls, late 2nd century CE. Rheinisches Landesmuseum Trier, inv. 9921. © GDKE/Rheinisches Landesmuseum Trier, photo by Th. Zühmer.

Further reading and images:

Bülow-Jacobsen 2009, 4–9, 19–25; Sarri 2008, 60–64; Turner 1980; a useful resource is the [Duke Checklist](#) of editions

Also see: [fig. 2](#) (Pompeii still lifes); [fig. 14](#) (baker and wife).

Selected ancient literary evidence:

The earliest Roman reference to papyrus might be a fragment of Ennius cited by Servius (*Aen.* 8.361). Pliny the Elder (*NH* 13.74–82) describes the production of papyrus. Cicero (*Q. fr.* 2.14 [15b].1) mentions fine paper (*charta*). Martial has papyrus as gifts twice: *Mart.* 14.10 (large sheets); *Mart.* 14.11 (for letters). Horace (*Epist.* 2.1.111–113) notes how everyone in Rome who writes poetry, including himself, asks for *calamus*, *charta* and *scrinia* first thing in the morning.

Parchment/vellum (*membrana/pergamena*)

The word parchment derives from the name of the Greek city Pergamon. In antiquity it was believed that parchment was invented there in the first half of the 2nd century BCE, as related by Pliny (*NH* 13.70). However, Aramaic parchment documents have been dated to the 4th century BCE and animal skin was already used in Pharaonic Egypt (Bülow-Jacobsen 2009, 11).

Parchment is different from leather in that it is untanned. The skin of calves, goats or sheep was cleaned, freed from hair and treated with chalk, then stretched and dried, thinned and the surface smoothed. Parchment was first referred to as *membrana* which was also used for leather. The word *pergamena* is first attested in Diocletian's [Edict on Prices](#) (301 CE).

Parchment was written on with ink. Apart from papyrus, it was one of the main materials used for books in antiquity. A few examples of parchment *volumina* are known, with pages sewn together and then rolled (Bülow-Jacobsen 2009, 23–25). They contain parts of

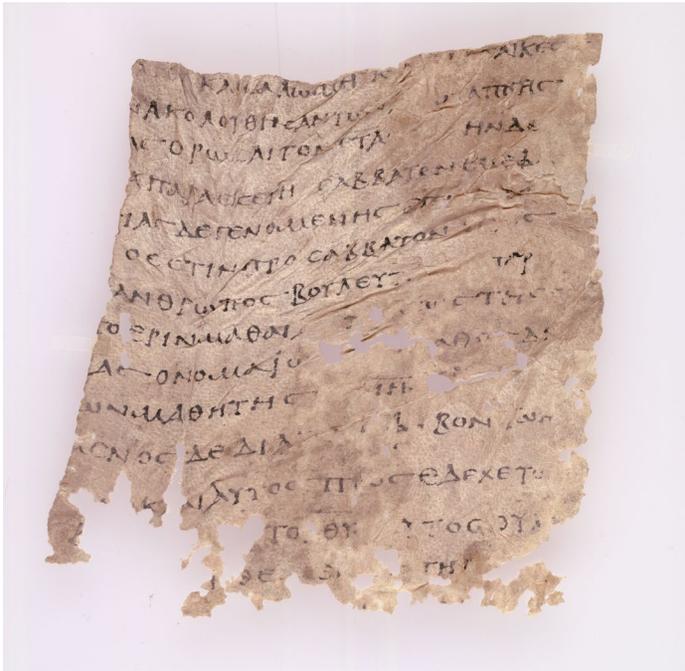


Fig. 36: Parchment fragment Pg.Dura 10 containing part of a gospel, from Dura Europos (Syria), 3rd century CE. © General Collection, Beinecke Rare Book and Manuscript Library, Yale University.

the Torah, the New Testament and the works of classical authors. Individual pieces of parchment were also used, but they were bound to form a *codex*. The *codex* existed simultaneously with the papyrus *volumen* from the late 1st or early 2nd century CE but only during the 3rd and 4th century did it slowly become the dominant form.

Roman parchment is preserved under similar circumstances as other organic materials. Important finds are the so-called Dead Sea scrolls found in the [Qumran](#) caves in the Judean desert. Most of the scrolls are parchment, some are papyrus and one is made of copper. They date roughly from the 3rd century BCE to the 2nd century CE and represent the archive of a religious community including biblical manuscripts but also legislative texts (ed. in the series *The Princeton Theological Seminary Dead Sea Scrolls*

Project, e.g. Charlesworth and Cross 1994). In [Dura Europos](#) on the Euphrates all pre-Roman documents are on parchment and this material was still used under Roman occupation from the mid-2nd century CE, for example for literary texts, military documents and civil administration (Welles et al. 1959).



Fig. 37: Dead Sea Scroll parchment containing 48 psalms, 1–68 CE. Dead Sea Scroll Digital Library B-314640, 11Q5, plate 978, frag. 1. Courtesy of The Leon Levy Dead Sea Scrolls Digital Library, Israel Antiquities Authority, photo by Shai Halevi.

Further reading:

Bülow-Jacobsen 2009, 11, 23–25; Charlesworth and Cross 1994; Sarri 2018, 84–86; Welles et al. 1959

Selected ancient literary evidence:

Persius ([Sat. 3.10–20](#)) concerns parchment. Quintilian ([Inst. or. 10.3.31](#)) says that writing on parchment is easier to read than on wax but that it has the disadvantage of interrupting the flow when the pen has to be dipped into the ink regularly. Isidorus ([Orig. 6.11](#)) mentions white, yellow and red parchment. Pliny the Elder ([NH 13.70](#)) writes about the alleged origin of parchment. Martial ([14.7](#)) mentions writing on parchment that could be erased.

Lead and other metal tablets

Thin sheets of soft metal were inscribed with styli and used for a variety of texts, mostly of a non-official nature, when a more durable support was needed. The sheets could easily be cut to any desired size and shape, folded or rolled for transport, storage or deposition and pierced for display or attaching.

Lead is the metal most commonly used for handwriting (Božič and Feugère 2004, 25–29). Most notably it was used for curse tablets (*defixiones*), not only in Roman times but already in classical Greece. Such tablets were used, for example, to demand justice following a theft or to curse professional opponents or rivals in love. Curse tablets are usually rectangular or square and of varying size, with lengths mostly around 10 cm but ranging anywhere from 3–4 cm up to nearly 30 cm. The texts often invoke deities of the underworld and can contain spells and magical phrases now incomprehensible.



Fig. 38: Roman curse tablet from Bath (UK). [RIB 154](#), *The Roman Baths, Bath*, accession no. batrm 1983.14.b.1. © Roman Baths, Bath & North East Somerset Council.



Fig. 39: Roman lead tag from Kempten (Germany) reading *Scitos Biraci / sag(um) (denarios) VII* ('Kept for(?) Scitos, son of Biracus, soldier's cloak, 7 Denarii'). *Archäologische Sammlung der Stadt Kempten*, inv. 1953, 98. © Archäologischer Park Cambodunum.

The tablets are usually found in places suitable for a message to the relevant deities such as sanctuaries, graves or bodies of water. Dozens of such tablets were found in the temple of Sulis Minerva in [Bath](#) and the sanctuary of Mercury in [Uley](#) in the UK (Tomlin 1988, 1993), another important find spot for Roman curse tablets is the Isis and Magna Mater temple in [Mainz](#) (Germany, see Blänsdorf 2012).

A more mundane use of metal as a support for handwriting are tags that were used to label a variety of objects as personal property or to record amounts and contents (Frei-Stolba 2011). Lead tags are usually small and of rectangular shape (c. 1–2 x 2–4 cm) and have a hole on one end for attachment. They are often inscribed on both sides and were sometimes reused, resulting in superimposed

inscriptions. Traditionally, scholars considered their use to be tied to military contexts. Military lead tags are for example known from the legionary camp in [Usk](#) (UK, see Hassall 1982, 51). But finds are in fact more frequent from the context of commerce and the production of goods, e.g. in Kalsdorf (Austria, see Römer–Martijnse 1990) or [Sisak](#) (Croatia, see Radman–Livaja 2014). Most of the finds date to the 1st–3rd centuries CE.

Hand inscribed bronze sheets and other more valuable metals such as gold or silver are rare and usually related to religion, bearing for example votive inscriptions or prayers for health (see e.g. Walser 1983).



Fig. 40: Copper–alloy plaque with punched dedication to Mars Medocius from Colchester (UK), about 222–235 CE. [RIB 191](#), British Museum, registration no. 1892,0421.1. © Trustees of the British Museum.

Further reading:

Blänsdorf 2012; Frei–Stolba 2011; Hassall 1982, 51; Radman–Livaja 2014; Römer–Martijnse 1990; Tomlin 1988, 1993

Other surfaces, objects and materials

People in Roman times scribbled on all kinds of surfaces and objects that were not primarily intended or purpose–made for writing. This includes instances of which no, or only indirect, evidence survives, such as tree bark (Kruschwitz 2010) or textiles. The latter were used by the Etruscans and, according to Livy, for keeping lists of magistrates in the temple of Moneta in Rome (e.g. [Liv. 4.20.8](#)). Scribbles were also made with chalk and charcoal (see e.g. [Mart. 12.61.7–10](#)) of which exceedingly few examples survive.

Hundreds of thousands of graffiti and *dipinti* have been preserved on more durable materials including those commonly associated with monumental inscriptions such as stone and metal, containing simple marks and names as well as administrative notes and even poetry. Many readers of this manual will be familiar with the numerous inscriptions discovered on the walls of public and private spaces in Pompeii (see e.g. Kruschwitz 1999, 235–44; Benefiel 2015) but such texts can be found across the empire.

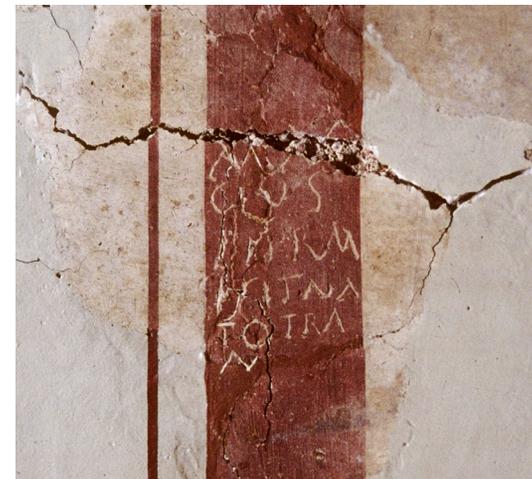


Fig. 41: Wall graffiti from the Roman villa in Wagen, Salet (Switzerland), reading *Mas/clus / perm/isit na/ to tra/n(scribere...?)* ('Masclus allowed his son to write(?)...'). © Kantonsarchäologie St. Gallen.

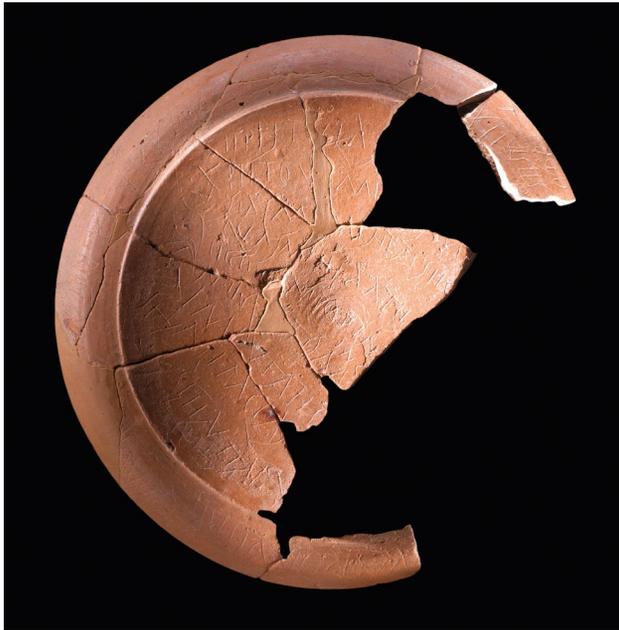


Fig. 42: Plate with a graffito letter from Pförring (Germany), 2nd century CE(?). Archäologische Staatssammlung München, inv. 1993,3507. © Archäologische Staatssammlung München, Manfred Eberlein, reproduced by permission from Kommission für Bayerische Landesgeschichte.

People also scribbled onto objects: metal vessels and objects with graffiti are sometimes found (see e.g. Lieb and Speidel 2003), but the most frequent objects to carry graffiti are ceramic vessels. Most graffiti on ceramic vessels were made after firing (*post cocturam*), presumably by the users or owners of the vessels. Innumerable examples are preserved from all over the Roman empire. In addition to names, marks, drawings/patterns and religious inscriptions, administrative texts are sometimes found, such as the lists from [La Graufesenque](#) (France) that helped the potters record the vessels in the kilns (Marichal 1988; Mullen, 2021a). Longer texts on pottery are otherwise rare in the Roman west, one example is a letter from Bavaria (Germany, see Thüry 1996).

While inscriptions generally called ‘graffiti’ on pottery were mostly made when the object or vessel was intact and functional, the term *ostrakon* designates a pottery sherd or broken vessel that was repurposed as writing material. The best-known use of *ostraca* is in classical Athens where pieces of pottery with scratched inscriptions were used as voting ballots. The term is now used more widely and applied to other geographical areas and periods, but *ostraca* are more commonly found in the Graeco-Roman east and in Egypt than in the northwestern provinces. Texts on Roman *ostraca* are normally a bit longer than the common graffiti and they were often written with ink. They include notes, lists, accounts and letters (Sarri 2018, 77–79). An important site with finds of Latin *ostraca* is the military camp in [Bu Njem](#) (Libya, Marichal 1992a).

Many handwritten inscriptions are related to trade and the production and distribution of goods. These include *tituli picti/dipinti* on amphorae (e.g. Ehmig 2003, 49–72) and graffiti on wooden barrels (e.g. Frei-Stolba 2017).

Other materials on which handwriting can be found occasionally are bone, e.g. graffiti on tokens, or owners’ and producers’ marks on leather (Baratta 2008).

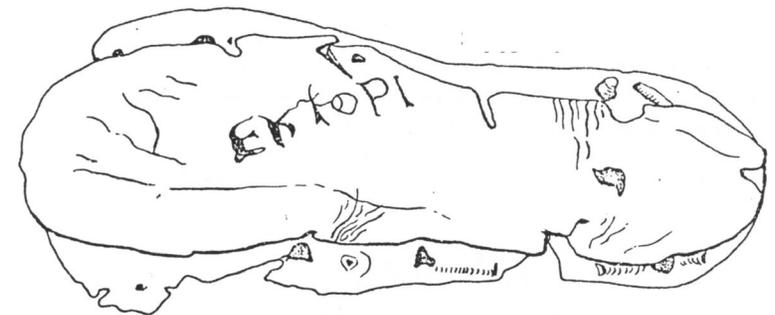


Fig. 43: Roman leather shoe sole with graffito from London (UK). [RIB 2445.27](#). Reproduced by permission from the CSAD and the Haverfield Trust.

5.3 Accessories

a) Writing with ink

Ink (*atramentum/cinnabaris*) and inkwell (*atramentarium*)

Roman black ink was made of soot and gum arabic or glue. Red ink (*cinnabaris*) was used for titles and headings and was made, for example, from plants or minerals (vermilion/cinnabar or minium). Iron gall has also been found in residues of Roman ink. Ink was stored in a dry state pressed into blocks or sticks and portions of liquid ink would have been prepared daily by adding water and used with inkwells (Eckardt 2018, 27–29). Remains of ink are sometimes found in inkwells (see e.g. Bilkei 1980, 67–68, 75–76; Päßgen 1986, 176; Wasgestian and Quarg 1986).



Fig. 44: Bottom of a wooden barrel from Vitudurum (Switzerland) with stamp and graffito, before 40/50 CE. From Frei-Stolba 2017, 107 fig. 110, © Kantonsarchäologie Zürich, Martin Bachmann.

Further reading and images:

Baratta 2008; Benefiel 2015; Ehmig 2003; Frei-Stolba 2017; Kruschwitz 1999, 2010; Lieb and Speidel 2003; Marichal 1988, 1992a; Sarri 2018; Thüry 1996; the [Duke Checklist](#) includes editions of *ostraca*

Also see: [fig. 9](#) (*tituli picti* on amphora); [fig. 10](#) (*ostrakon*)

Selected ancient literary evidence:

Livy (4.20.8) says that the books of the magistrates were written on linen and stored in the temple of Moneta; Martial (12.61.7–10) mentions verses written with charcoal or chalk in dark archways by drunk ‘poets’.



Fig. 45: Roman Samian and metal inkwells from Novo mesto and Drnovo (Slovenia). National Museum of Slovenia, inv. R 1487, R 634, R 635, R 1038. © National Museum of Slovenia, photo by Tomaž Lauko.

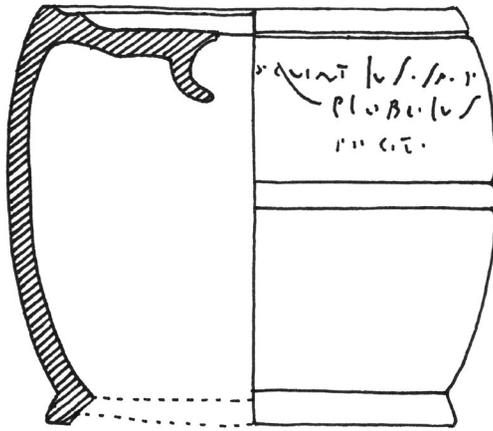


Fig. 46: Ceramic inkwell from Aquileia (Italy) with section showing the typical flat lid, and with an ante cocturam maker's inscription reading *A(ulus) Quintius Sp(urii) f(ilius) Plebeius fecit* ('Aulus Quintius Plebeius, son of Spurius, made this'), 1st century CE. Redrawn by A. Willi after Gomezel 1994.

Inkwells were used throughout the Roman period but are rarely found after the 4th century. They were predominantly made of ceramics and of metal, mainly copper-alloy. Inkwells made of glass are rare and their identification is controversial (Eckardt 2018, 57). Examples of different materials and design have also been found including lead, silver and alabaster examples (Božič and Feugère 2004, 35). The two most recognisable types of metal inkwells, Biebrich and Noll types, date to the 1st century CE and the use of Samian inkwells peaked in the same century.

Metal inkwells seem to have been mostly cast and then lathe-finished, but some were shaped over a mould. No production centres are known for certain, but it has been suggested that they were mainly made in Italy or in Gallia Belgica and the Rhine area. Samian inkwells were produced for example at [La Graufesenque](#) (France), where they are listed in the potters' accounts (Marichal 1988, e.g. no. 17 line 14). They are uncoated on the inside.

Ceramic inkwells come in a variety of shapes but mostly have rounded bodies. Metal inkwells are mainly cylindrical, rarely hexagonal. The lid is often what defines a Roman inkwell and without it they can be virtually indistinguishable from other vessels. An inkwell lid is usually flat with a small circular opening in the centre which could be closed with a stopper-lid in various ways. Ceramic inkwells may have had stopper-lids made of perishable materials such as cork.

Typically, metal inkwells from the 1st and 2nd century have loop handles attached to their side that were probably used to hold the objects or to attach other writing equipment to them. Until the end of the 1st century CE, metal double inkwells were used as well, providing red ink for titles and headings and black ink for the bulk of the text (Eckardt 2018, 70–76).

While ceramic inkwells are usually plain, metal inkwells can be intricately decorated with silver and gold inlays, sometimes with



Fig. 47: Metal inkwell, type Noll, with intricate gold and silver decoration from Vaison (France), 1st/2nd century CE. Louvre, inv. BJ1950. © Chatsam, Wikimedia, CC-BY-SA-3.0.

skilfully executed figural motifs. Most examples are, however, simpler and feature a varying number of circular ornaments on the body. They can be quite small compared to ceramic inkwells, with a diameter of under 4 cm, whereas Samian inkwells can come close to, or exceed, 10 cm (Eckardt 2018, 109–112).

Metal inkwells are found in funerary and high-status rural contexts more frequently than Samian inkwells, which seem to be associated with military/urban sites and commerce and industry in particular (Willis 2005; Monteil 2008).

Further reading and images:

Alonso et al. 2019; Bajusz 2004; Božič and Feugère 2004, 35–37; Damiani 2021; Eckardt 2018; Fünfschilling 2012, 186–194; Giumlia-Mair 2021; Monteil 2008; Paffgen 1986; Wasgestian and Quarg 1986; Willis 2005

Also see: [fig. 2](#) (Pompeii still lifes); [fig. 3](#) (Berlingen); [fig. 12](#) (S. Egidio); [fig. 13](#) (Manius Servius Primigenius); [fig. 15](#) (*Codex Amiatinus*).

Selected ancient literary evidence:

Pliny the Elder (*NH* 35.41–43) describes the production of ink and Vitruvius (7.10.2) how soot was used for ink. Persius (*Sat.* 3.10–20) describes ink that is clotty or too diluted. Cicero (*Q. fr.* 2.14 [15b].1) mentions well-mixed ink. Horace (*Epist.* 2.1.235–237) uses staining ink as a simile.

Penknife (*scalprum (librarium)*)

When the tip of [reed pens](#) wore down, they would need sharpening. For this purpose, small knives were used (whetstones may also have been used to sharpen pens, see [Anth. Pal.](#) 6.64–65). Small knives can serve numerous purposes, and when excavated they are often thought to be shaving or grooming knives. But for a number of finds their association with writing equipment suggests that they were

used as penknives (Božič 2002; Božič and Feugère 2004, 38–39). These small knives can be of various shapes, usually with metal or bone handles that can, for example, be figurative or hexagonal/octagonal in section (Božič 2001c).

For one specific type of knife this association has been argued particularly plausibly by Božič (2001c). It is depicted on the Atimetus/Epaphra relief ([fig. 1](#)) and is also found in female graves, calling the former interpretation as a shaving knife into question. This type is typical of the second half of the 1st / first half of the 2nd century CE (Božič and Feugère 2004, 39). It has an iron blade with a curved point. The handle is made of iron or copper-alloy or, less

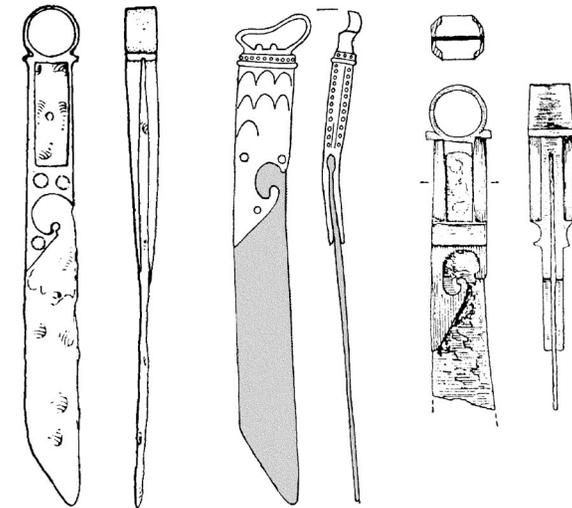


Fig. 48: Penknives of the type shown on the Atimetus/Epaphra altar, from London (UK), Winchester (UK) and Berlingen (Belgium), from Božič 2001c, 28 fig. 1 (after Kaufmann-Heinimann 1998, Biddle 1967 and Roosens and Lux 1973), courtesy of D. Božič.

often, bone, and has a very characteristic lunate cut-out. Most examples measure between 10–17 cm. They have been found in various places throughout the empire, mainly in the northwestern provinces, often in funerary or military contexts.



Fig. 49: Penknife from Augusta Raurica (Switzerland) with a spoon handle, 40–80 CE. Augusta Raurica, inv. 2009.058.F01382.1. From Fünfschilling 2012, 217 pl. 4 (detail). © Augusta Raurica..



Fig. 50: Roman penknife with iron blade and ivory handle from the Bloomberg site, London (UK). From Tomlin 2016, 277 fig. 139 no. 6471. © MOLA.

Further reading:

Božič 2001c; Božič and Feugère 2004, 37–39; Fünfschilling 2012, 182–184

Selected ancient literary evidence:

Tacitus ([Ann. 5.8](#)) recounts how Publius Vitellius harmed himself with a penknife and Suetonius ([Vitell. 2](#)) describes the same incident. The *Anthologia Palatina* mentions the penknife ([6.64](#)) as well as stones for sharpening pens ([6.64](#) and [65](#)).

Accessories for finishing and editing: sponge (*spongea*) and pumice (*pumex*)

Roman authors mention sponges for erasing texts written with ink. Martial jokingly sends his work to a patron along with a sponge so that it can be rendered inoffensive (Mart. [4.10.5–8](#)), and according to Suetonius, Augustus used to tell friends that the ‘Ajax’ that he had been trying to write had succumbed to the sponge (Suet. *Aug.* 85.2). Remains of sponge have been found inside inkwells from Cologne and Pompeii (Wasgestian and Quarg 1986, 179; Garcia y Garcia 2005, 135). A sponge may also be depicted on a funerary relief from Istanbul dating to the 1st century BCE (Pfuhl and Möbius 1979, no. 2271, image also in [Schaltenbrand Obrecht 2012](#), 30 fig. 15), but the rounded object next to other writing equipment could also be a pumice.

A hemispherical pumice stone with marks of use was found in the so-called *Tomba dello scriba* (scribe’s grave) in the *necropolis* of the *Via triumphalis* in Rome (Steinby 2003, 108 no. C7.h with pl. 22.2). Pumice is sometimes thought to have been used as an eraser (e.g. Eckardt 2018, 35, and see Prop. 3.1.8), and it may have served to sharpen pens as well (Dickey 2015, 50 and [Anth. Pal. 6.65](#)), but Roman authors mostly refer to its use for smoothing their book pages, i.e. papyrus.

Further reading and images:

Sponge: Garcia y Garcia 2005, 135; Wasgestian and Quarg 1986

Pumice: Dickey 2015, 50; Eckardt 2018, 35; Steinby 2003, 108

Also see: [fig. 1](#) (Atimetus/Epaphra); [fig. 3](#) (Berlingen); [fig. 12](#) (S. Egidio)

Selected ancient literary evidence:

Sponge: Martial ([4.10.5–8](#)) sends a sponge along with his book and Suetonius ([Aug. 85.2](#)) records that Augustus said that his Ajax succumbed to the

sponge. The *Anthologia Palatina* (6.65.7–8) lists the sponge-eraser as one of several writing implements dedicated by retiring writers.

Pumice: Propertius (3.1.8) wants his verses to be perfected with pumice. Catullus (1.1–2) says that his new book is freshly polished with pumice and in 22.4–8 he mentions paper smoothed with a pumice as part of sophisticated writing equipment; Ovid (*Tr.* 1.1.11–12) wants his book *Tristia* to be rough around the edges and not smoothed with pumice. Martial (8.72.1–2) says of an unfinished book that it was not polished with pumice yet.

b) Writing with a stylus

Spatula

Wax spatulas were used to scrape wax out of used writing tablets (*tabulae ceratae*) but also to spread and flatten wax, to which end they were probably heated. They are usually made of a roughly triangular iron blade and an iron or copper-alloy handle. Their dimensions can vary substantially within the range of 14–24 cm in length and 3–10 cm in width (Gaitzsch 1984).

For a long time, the function of these spatulas was unclear and they were, for example, referred to as medical instruments, razor blades or carpenters' or bricklayers' tools. However, both finds associated with other writing equipment, as well as ancient depictions confirm their function as wax spatulas.

A first description and catalogue was published in 1984 by W. Gaitzsch. Feugère (1995) identified three types: triangular spatulas, double spatulas and, more tentatively, spatulas with a narrow handle. Triangular spatulas are the most common type. Most had a simple square knob at the end of the handle which could be used to flatten the wax along the edges and in the corners. Of spatulas with an iron blade and copper-alloy handles the handles are often the only part that survives. Some have very elaborately sculpted handles often featuring a bust of Minerva.

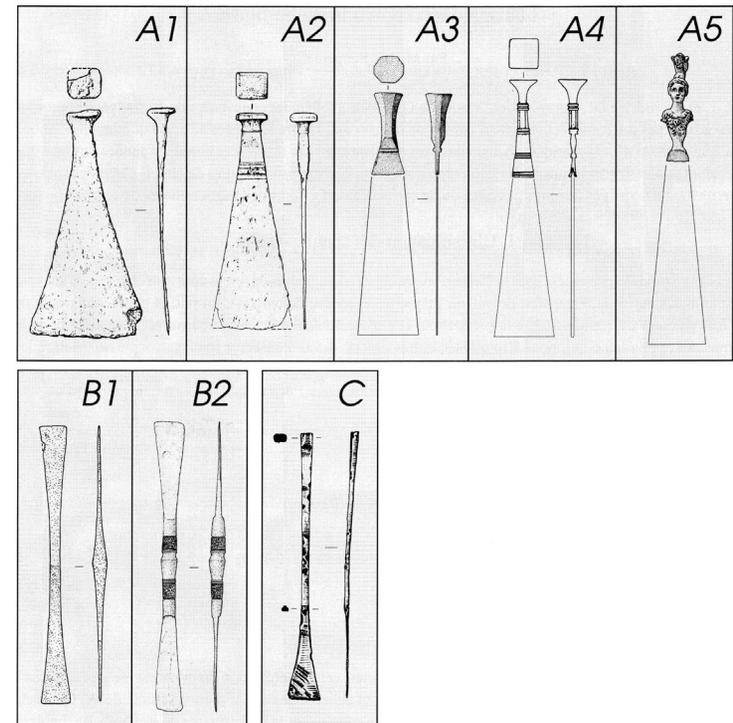


Fig. 51: Typology of spatulae by Feugère 1995, 322. © Michel Feugère.

Spatulas with simple handles are depicted on the Atimetus/Epaphra-relief (fig. 1). The relief does not show double spatulas, with two blades at opposite ends of the tool. Such tools have been interpreted as wax-spatulas because they were found together with writing equipment in some instances, but they may have been used for different purposes as well, for example as modelling tools for potters or plasterers (Fünfschilling 2012, 181–182). The association with wax tablets and writing is less clear for the spatulas with a narrow handle which usually have a socketed end. Both double-spatulas and those with narrow handles are part of the assemblage found on the *Titelberg* (Luxemburg) which also contains styli.

Minerva handles are often found without the blade which has contributed to the difficulties of their interpretation. They are frequently found in the area between southern Britain, the north of Gaul and the Rhine and mostly date to the 2nd century CE. When using Minerva handles as evidence for literacy the possibility of their having served as votive objects once detached from the blades needs to be taken into account (Crummy 2003).



Fig. 52: Roman copper-alloy spatula handles with missing iron blades at the Museo Archeologico Nazionale Aquileia (Italy). © Michel Feugère.



Fig. 53: Minerva-shaped spatula handle from Highworth, Swindon (UK), 100–250 CE. [PAS-ID WILT-9ECD01](#). © Salisbury and South Wiltshire Museum, CC-BY-4.0.

Further reading and images:

Božič and Feugère 2004, 31–33; Crummy 2003; Feugère 1995; Gaitzsch 1984; Humphreys 2021, 107, 290–202.

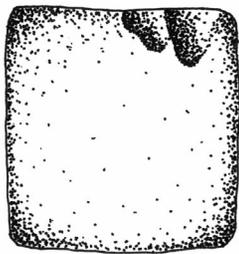
Also see: [fig. 1](#) (Atimetus/Epaphra); [fig. 2](#) (Pompeii still lifes); [fig. 3](#) (Berlingen); [fig. 12](#) (S. Egidio); [fig. 13](#) (Manius Servius Primigenius); [fig. 15](#) (*Codex Amiatinus*)

Selected ancient literary evidence:

While ancient authors mention the process of waxing tablets, see e.g. Herodas ([Mimes 3.14–18](#)) and Herodotus ([7.239](#)), there is no literary evidence for the spatula itself.

Sharpener for styli

Similar to the nib of a pen, the tip of a [stylus](#) would wear down quickly depending on the material, the surface and how frequently it was used. A small block of sandstone found together with three Augustan bone styli in [Basel](#) (Switzerland) has been interpreted as a sharpener (Fellmann 1955, 124). One of its edges features indentations which seem to be marks from whetting. Metal styli too could be sharpened with whetstones. Finds of very similar styli but of different length may be the result of previous continuous use and sharpening of the shorter examples (Schaltenbrand Obrecht 2012, 78–79). A small whetstone from Lincolnshire (United Kingdom) with a groove on one side was interpreted by R. S. O. Tomlin as a



(Left) Fig. 54: Sharpener from Basel (Switzerland), late 1st century BCE. Drawing by A. Willi after Fellmann 1955, 125 pl. 20.7.

(Right) Fig. 55: Iron styli of similar type but different length. From Schaltenbrand Obrecht 2012, 79 fig. 75. © Augusta Raurica.



Fig. 56: Possible stylus sharpener from Quadring, Lincolnshire (UK), with graffiti [M?]andacus Mattavi ('Mandacus(?), son of Mattavus'). [PAS-ID FASAM-F55282](#). © Lincolnshire County Council, CC-BY-2.0. possible stylus sharpener (Moorhead 2016, PAS-ID: [FASAM-F55282](#)). For bone styli, knives could have been used to this end.

Further reading:

Fellmann 1955, 124; Moorhead 2016; Schaltenbrand Obrecht 2012, 78–79

Selected ancient literary evidence:

Martianus Capella (1.65) describes how the Fates sharpen their styli when taking minutes at meetings on Olympus.

c) Containers and writing sets

Stylus/pen case (*graphiarium*) and writing case (*theca calamaria*)

Styli and pens were carried in simple cylindrical metal (bronze) or leather cases (*graphiaria*). Such cases are known from iconographic evidence and are sometimes found in excavations (Boeselager 1989; Božič and Feugère 2004, 31; Schaltenbrand Obrecht 2012, 27 note 64). Cases for single pens can be difficult to distinguish from the remains of pens themselves, and similar cases will have been used for other items, for example medical tools and instruments.

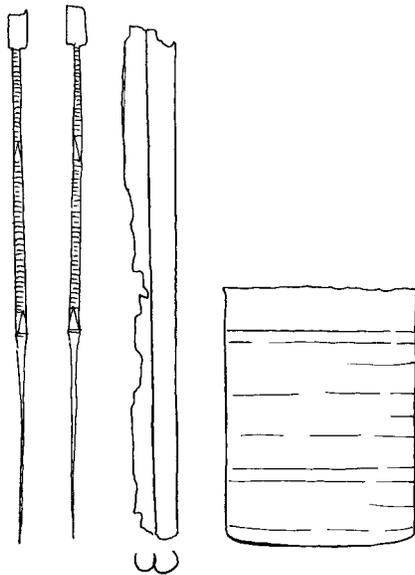


Fig. 57: Two styli, a double case and an inkwell from Brigetio-Szöny (Hungary), late 2nd/early 3rd century CE. From Fünfschilling 2012, 185 fig. 33. © Augusta Raurica.

Pens could also be carried in a case together with inkwells, in a *theca calamaria*, which was used from the 1st century CE onwards if not earlier (Boeselager 1989, esp. 227–231). Such cases containing double inkwells together with wax-spatulas, pens and styli are depicted on the Atimetus/Epaphra relief (fig. 1). They would have been made of leather and widened towards the opening. Leather cases are preserved from Egypt (Fünfschilling 2012, 185 fig. 31), and remains of a leather case that contained styli and a penknife amongst other things were also found in the grave of a young girl in Lully (Switzerland, Duvauchelle 2012, 77).

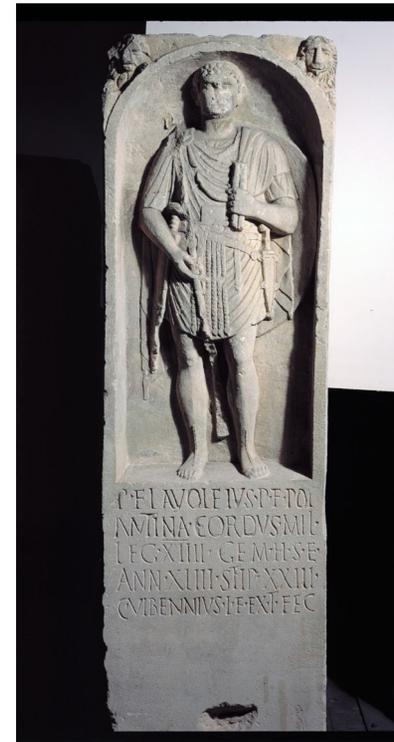


Fig. 58: Tombstone of P. Flavoleius Cordus showing him holding what appears to be a pen case in his left hand, 13 BCE–43 CE. [CIL XIII 7255](#), Landesmuseum Mainz, inv. S 116. © GDKE/Landesmuseum Mainz, Ursula Rudischer.

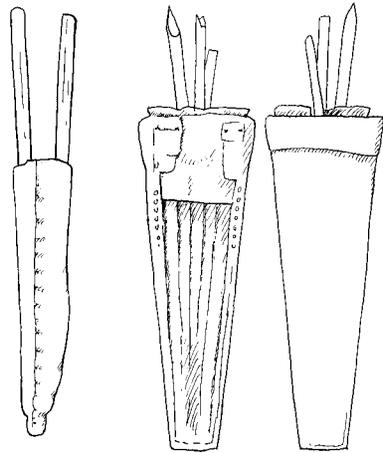


Fig. 59: Two late-Roman leather cases with preserved stili and reed pens from Antinoë (Egypt). From Fünfschilling 2012, 185 fig. 31. © Augusta Raurica.



Fig. 60: Roman funerary relief from Maria Saal (Austria), showing a man writing with one foot on a scrinium and holding a theca calamaria. © Ortoolf Harl.

It has also been suggested that the loop handles often attached to the side of metal [inkwells](#) were used to tie them to cases containing pens, and one type of metal inkwell seems to have had a penholder attached (Type Boeselager, Eckardt 2018, 87–88).

Further reading and images:

Boeselager 1989; Duvauchelle 2012; Eckardt 2018, 38–39; Fünfschilling 2012, 184–186; Schaltenbrand Obrecht 2012, 27

Also see: [fig. 1](#) (Atimetus/Epaphra); [fig. 15](#) (*Codex Amiatinus*); [fig. 61](#) (Salona)

Selected ancient literary evidence:

Suetonius ([Claud. 35](#)) says that Claudius was so suspicious that he had writing sets taken away from attendants and scribes. A *theca libraria* and a *graphiarium* are mentioned as gifts by Martial ([14.20–21](#)). Ammianus Marcellinus ([28.4.13](#)) mentions scribes with pen cases taking notes during a banquet as part of the decadence of Rome’s nobility. Mention of a *theca* that holds five pens in Diocletian’s *Edict on Prices* ([Ed. Diocl. 10.17](#)).

Leather case for stylus tablets

[Wax tablets](#) seem to have been carried in some sort of case with handles or a sling as is for example depicted on the Neumagen school relief ([fig. 35](#)) and on the side of the funerary altar of Q. Aemilius Rufus from Salona.

At least two finds have been identified as leather cases for tablets, one from [Vindolanda](#) and one from [Vindonissa](#) (Volken and Volken 2006), and there are further possible examples from the UK (e.g. London: Hill and Rowsome 2011, 553–554; Mould 2012, 42–43). They are almost identical, shaped like a small box, probably with a longer piece of leather on one side that served as the lid. There are no signs of handles. The example from Vindonissa can be

dated to the 1st century CE. It originally measured c. 15 x 8.5 x 5 cm and would have held several writing tablets. The example from Vindolanda is smaller and can be dated to 97–102/103 CE (described by van Driel–Murray 1993 and identified in Volken and Volken 2006).

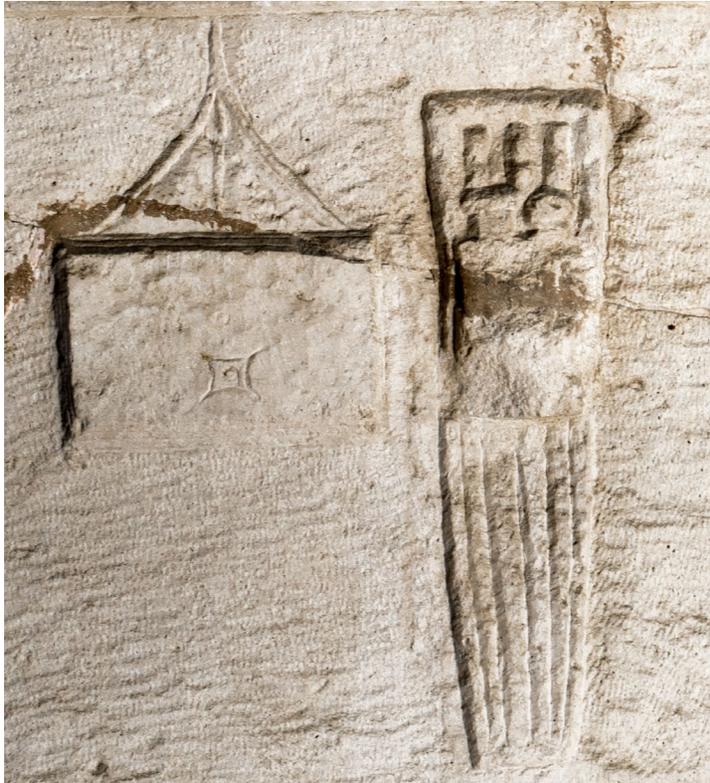
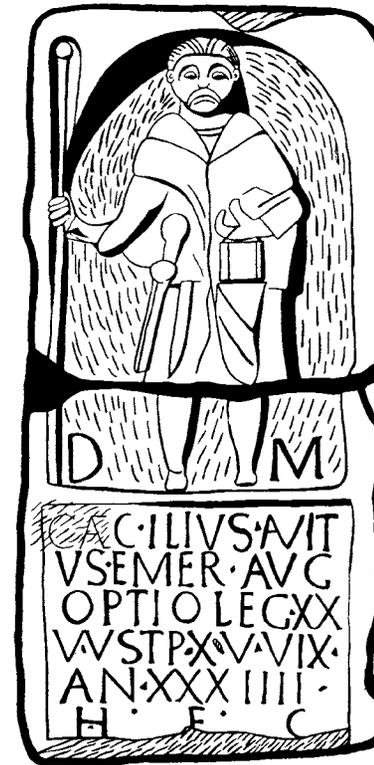
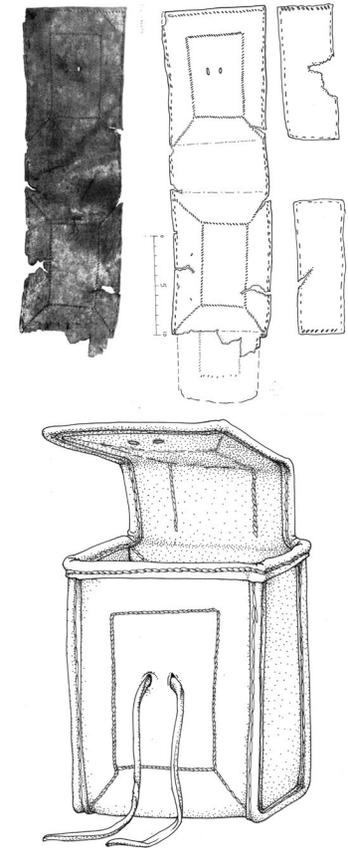


Fig. 61: Funerary relief of Q. Aemilius Rufus from Salona, (Croatia), detail, 131–230 CE. [CIL III 12895](#). © Arheološki muzej u Splitu, photo by Ortolf Harl.



(Left) Fig. 62: Roman funerary relief of Caecilius Avitus from Chester (UK), showing him carrying writing tablets. [RIB 492](#). Reproduced by permission from the CSAD and the Haverfield Trust.



(Right) Fig. 63: Remains and reconstruction of leather tablet case from Vindonissa (Switzerland), 1st century CE. Photo from Volken and Volken 2006, 38 fig. 6, drawings © M. and S. Volken.

Further reading:

van Driel–Murray 1993, 18 and 22 fig. 11.2, 3; Volken and Volken 2006

Book box/bucket (*capsa/scrinium/cista*)

Volumina of [papyrus](#) were transported in usually cylindrical and sometimes rectangular boxes. They are well known from iconographic evidence and are depicted for example on funerary reliefs, as part of statues and in mosaics (Feugère 2006, 233–237). Such buckets were made of wood and generally do not survive, but metal lock-plates with a characteristic design and shape have been preserved and identified (Pugsley 2003, 95–99; Feugère 2006; Eckardt 2021). Examples are known from across the northwestern provinces and from [Pompeii](#).

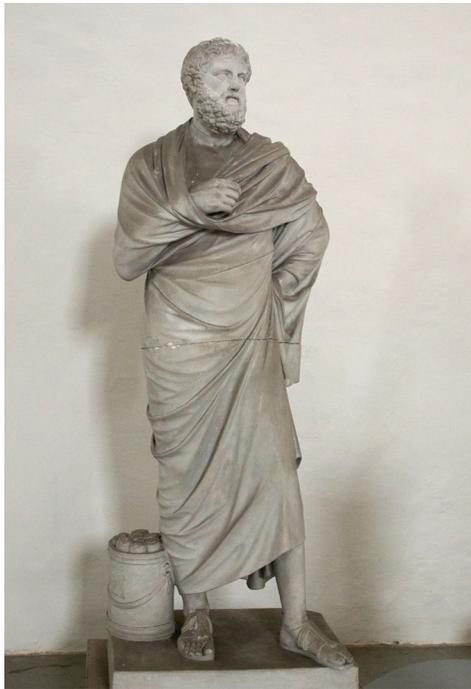


Fig. 64: So-called Lateran Sophocles with a *scrinium* by his feet, Roman marble copy of a 4th-century BCE Greek bronze statue. Plaster cast at the Gallery of Classical Art, Hostinné, Czech Republic. © Zde, Wikicommons, CC-BY-SA-4.0.

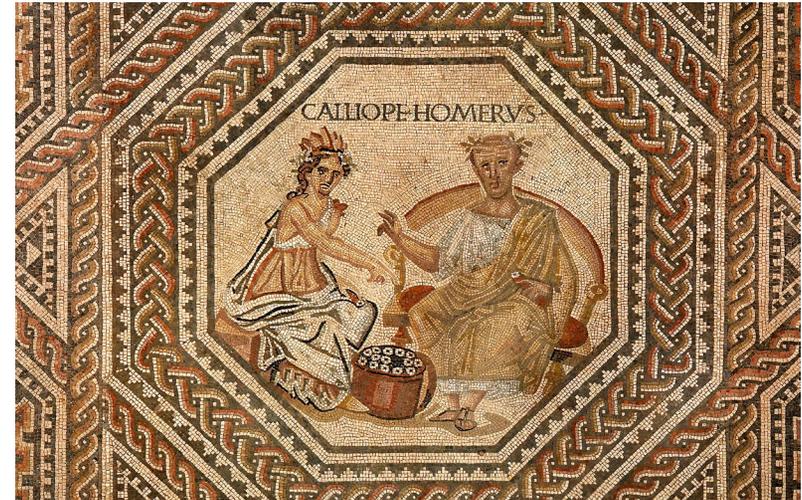


Fig. 65: Central panel of the Roman mosaic from Vichten (Luxembourg) showing the Muse Calliope with Homer and a book bucket with *volumina* at their feet, around 240 CE. Musée national d'histoire et d'art, inv. 1995-20/0. © Musée national d'histoire et d'art, Luxembourg.

Roman authors use three terms for book boxes (see literature cited below), and it appears that only *scrinium* specifically meant a cylindrical book bucket, while the terms *cista* and *capsa* were also used for other containers, with *cista* being the least specific. In depictions, such book boxes often have a lid, a lock and a strap or straps for carrying them (Feugère 2006, 233). Mosaics from Vichten (Luxembourg) and [Hadrumetum](#) (Tunisia) suggest that they had a capacity of around a dozen *volumina*, a slightly smaller one is shown next to a statue of Sophocles in the Lateran Museum (Rome).

In funerary monuments, book buckets are used to portray intellect, as seen on Phrygian monuments, or to denote office as on monuments to local officials in [Cremona](#) (Italy, Feugère 2006). In mosaics, they are often depicted next to a poet accompanied by a muse.



Fig. 66: Metal objects including the lock-plate of a *scrinium* from grave no. 700 in Emona (Slovenia), 1st century CE. Mestni muzej Ljubljana, inv. 510:LJU;0033272, 510:LJU;0033122 and 510:LJU;0032711.
© Museum and Galleries of Ljubljana, photo by Andrej Peunik.

Further reading and images:

Eckardt 2021; Feugère 2006; Pugsley 2003, 95–99

Also see: [fig. 2](#) (Pompeii still lifes); [fig. 60](#) (Maria Saal).

Selected ancient literary evidence:

Juvenal (3.203–207) mentions a *cista* that contains Greek books, but the shape is not described. In his tenth Satire schoolboys are accompanied by slaves carrying narrow book bags (10.114–117). Catullus (68.33–36) mentions a *capsula*, again no description, and (14.17–20) *scrinia*. Pliny the Elder (NH 16.229) tells us that *capsae* and *scrinia* were made of beechwood and Ovid (Tr. 1.1.105–110) says that *scrinia* are round (*curva*). In Horace's first Satire (Sat. 1.4.21–23) *capsae* is used for 'writings' or 'books'. In the letter [Epist. 1.20.1–3](#) he mentions the lock of the book bucket, from which the new book longs to escape (i.e. to be published); note the book in a similar situation in Martial 1.3.1–2. In Valerius Maximus [Mem. 6.5.6](#) a *scrinium* contains documents rather than books.

d) Accessories to help with ordination: compasses/divider (circinus), measures and lead discs

There are a number of objects that would have been used to ensure that the text ran along parallel and equally distributed lines.

From literary sources we know that discs of lead were used to trace lines on [papyrus](#). They are mentioned in a number of dedicatory poems listing writing equipment in the *Anthologia Palatina* (6.62–66), and Catullus (22.8) expresses his disdain over Suffenus, a very prolific poet who used only the most sophisticated writing materials, including papyrus and parchment that featured lines drawn with lead and smoothed with [pumice stone](#). Two lead objects from the port of [Ostia](#) may have been used for a similar purpose (or for marking wooden barrels as suggested by Drescher 1989).

Compasses or dividers and (folding) measures were used to transfer constant distances on surfaces that were to be written on. Both tools were also used in contexts other than writing but they are sometimes found together with other writing equipment, particularly in funerary contexts (Božič and Feugère 2004, 41).



Fig. 67: Compasses/dividers from Augusta Raurica (Switzerland), the one on the left dates to 45–70 CE. Augusta Raurica, inv. 2002.064.E06470.1 and 1963.9685. From Fünfschilling 2012, 196 fig. 50 (detail). © Augusta Raurica.

Roman compasses/dividers are usually made of copper-alloy or iron, sometimes a combination of both. They also served to sketch out circles or segments, for which an iron point would have served well. The two compasses are joined at the top with a metal peg to create a hinge. In some cases, a mechanism allows the hinge to be fixed in a certain position. Compasses/dividers come in various dimensions which may correspond to their use in different crafts and trades (Fünfschilling 2012, 196).

Roman measures can be made of bone, copper-alloy or wood. They are not unlike their modern counterparts: elongated rectangular strips, rectangular in section, with grooves and marks that indicate

the – sometimes surprisingly imprecise – scale (see e.g. Heinz 1991; Fellmann 2009, 37–38). Folding measures would have been particularly useful in a writing context as they measure one Roman foot (around 29.5 cm) and are easy to transport. They usually consist of two halves (but see Feugère 1983) that are equal in length and joined with a metal hinge. The two parts are square in section and the scale is indicated with grooves (Deschler-Erb 1998, 144).

The *Anthologia Palatina* (6.62–66) also mentions rulers but these are difficult to identify archaeologically. For possible rulers [see below](#) on bone spatulate strips.

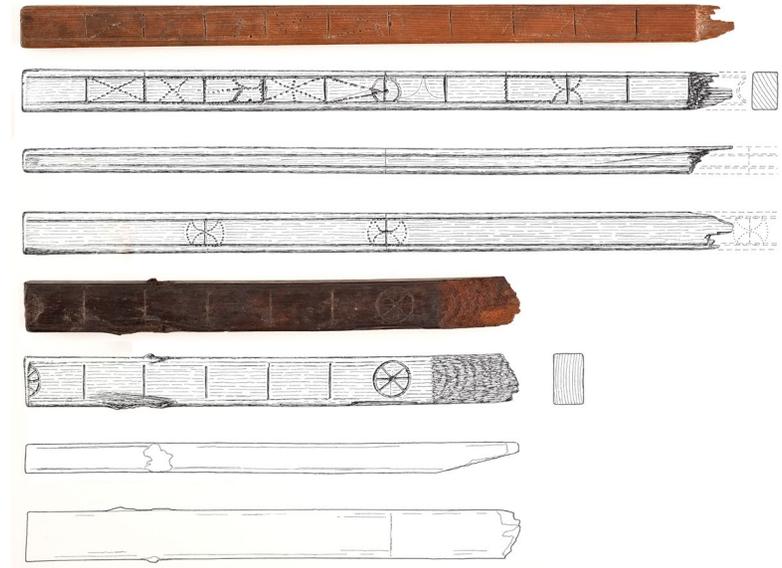


Fig. 68: Wooden measures from Vindonissa (Switzerland), 1st century CE. Vindonissa Museum, inv. 1941:2 and 13.709. Drawing from Fellmann 2009, pl. 6; photo © Kantonsarchäologie Aargau, CH – 5200 Brugg, Béla A. Polyvás.

Further reading and images:

Božič and Feugère 2004, 40–41

Lead discs: Drescher 1989

Compasses/dividers: Božič 2001a; Fünfschilling 2012, 196–197

Measures: Fellmann 2009, 37–39; Gostenčnik 1998; Heinz 1991

Folding measures: Deschler-Erb 1998, 144; Feugère 1983

Also see: [fig. 3](#) (Berlingen); [fig. 15](#) (*Codex Amiatinus*).

Selected ancient literary evidence:

Compasses: The use of the *circinus* (compasses) is not mentioned in the context of writing in Latin literature. Caesar (*Gall.* 1.38.4) says of the location of Vesontio that the river Doubs surrounds it as if drawn with a *circinus*. Vitruvius (1.1.4) says that the use of compasses is one of the things mathematics contributes to the skills of an architect.

Lead and rulers: See Catullus (22.8) for Suffenus' papyrus and parchment with lines drawn with lead. A number of poems in the *Anthologia Palatina* (6.62–66) mention lead and/or a ruler amongst the writing implements dedicated by retiring writers.

e) Accessories to help with storage and filing: labels (*sillyba*/indices/tituli) and separators

Papyri, parchment and writing tablets were stored in containers, on shelves and in cupboards. To make it easier to find a specific document, the edge of tablets could be written on directly. For papyrus, small labels (*sillyba*) were attached to one end of the roll.

Sillyba (sometimes *sillyboi*/*sittyba*, on the variants of the word see Caroli 2007, 31–38) or *indices/tituli* are rectangular pieces of papyrus or parchment of c. 2–3 cm wide and varying in length. They were usually glued to the roll so that they were visible when the papyrus

was rolled up. They normally presented a short title of the work and/or the name of the author.

Such title tags are known from archaeological, literary and iconographic evidence. Actual tags survive, mainly from *Oxyrhynchos* in Egypt dating to the 1st–3rd/4th centuries CE (Dorandi 1984, 195–199; Caroli 2007, 30–31). They were used for literary works (e.g. *P.Oxy.* 301, 1091 still attached, 3318) and possibly also for documents (e.g. *P.Oxy.* 381, 957, 958). Moreover we know that tags were used in Cicero's library (*Cic. Att.* 4.4a.1 and 4.5.4, and see Caroli 2007, 42–45) and they also seem to be visible in a number of depictions of rolls, for example in book buckets (see e.g. Turner and Parsons 1987, 34 with fig. 9).

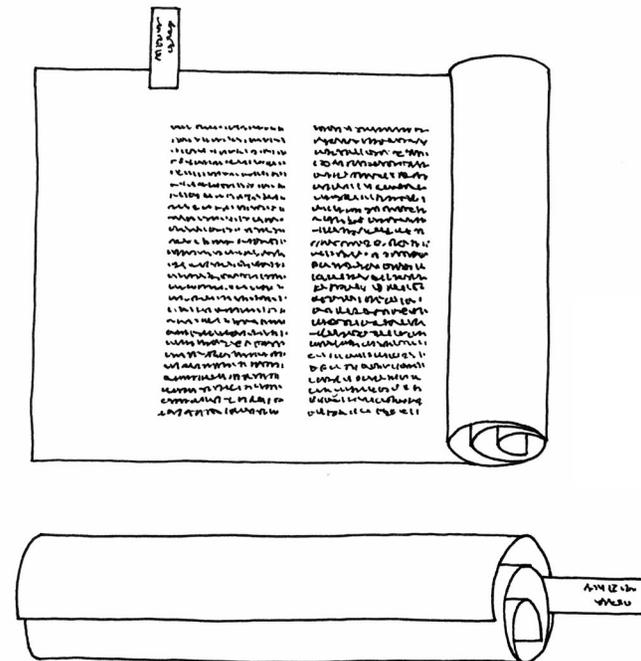


Fig. 69: Placement of *sillyba*. Redrawn by A. Willi after Caroli 2007, 30 fig. 5–6.

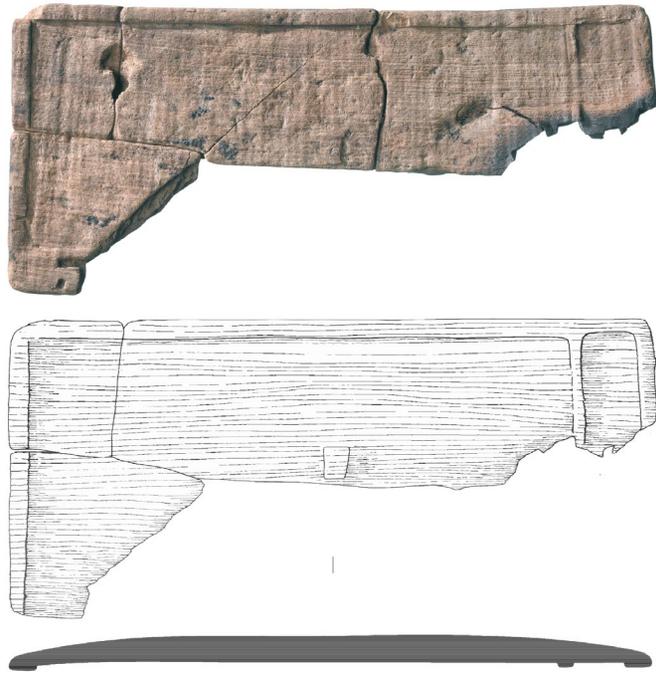


Fig. 70: Stylus tablet WT87 from the Bloomberg site, London (UK), with a separator retained from the original surface, 65/70–90/95 CE. From Tomlin 2016, 255 fig. 135. © MOLA.

Separators were used to keep the pages of writing tablets from damaging one another. These are small, roughly rectangular objects that were presumably mostly made of wood or leather, possibly also of bone (Božič and Feugère 2004, 24). They were added to the tablets of codices to protect the inscribed surfaces by keeping them apart. They were positioned in the centre of the tablet(s) or along the edge (Fünfschilling 2012, 167).

Such separators are depicted in frescos and mosaics (see e.g. Capasso 1992, fig. 3 and 4) and a 4th-century papyrus mentions tablets with a *ξύλον μικρόν* (small piece of wood) for this purpose in a list of objects the author of the letter asks his brother to purchase for him in Alexandria (*P.Fouad. 74*, see Marichal 1992b, 173).

Archaeological evidence for separators is rare and it is assumed that they were in most cases detachable and consequently lost but one of the wax tablets excavated at the Bloomberg site in London has a small rectangular separator in the centre which was fashioned from the original surface and not separately (Tomlin 2016, 252–255). Archaeological evidence for separators is known for both wax tablets and ink tablets. Other examples for wax tablets were found at *Vindonissa* (Switzerland), where the wooden separator measures 5.5 x 7 mm (Speidel 1996, 90–93 and 24); or in *Herculaneum* (Italy), in this case a codex with eight pages (Marichal 1992b, 173 and fig. 2). An example for the use of separators with ink tablets is a wooden book with three orations by Isocrates found in *Kellis* (Dakhleh–Oasis, Egypt) and dating to the 4th century CE. In this case, three separators made of leather were added after the tablets were inscribed and distributed along the longer edges of each tablet (Sharpe III 1992, e.g. fig. 14–21; Whitehorne 1996).



Fig. 71: Label still in place on a 2nd-century papyrus, showing the title of Bacchylides' Dithyramboi. *P.Oxy. VIII 1091*. © The British Library, *Papyrus 2056, f.001v*.

Further reading and images:

Labels: Caroli 2007, 28–52; Dorandi 1984

Separators: Božič and Feugère 2004, 23–24; Sharpe III 1992, e.g. fig. 14–21; Tomlin 2016, 252–255; Whitehorne 1996

Selected ancient literary evidence:

Separators: These are not mentioned in literary sources, but in the letter [P.Fouad 74](#), a scribe asks his brother to buy a number of items for him in Alexandria, including tablets with small pieces of wood in their centre.

Labels: Suetonius ([Calig. 49.3](#)) says that two books with titles on *indices* were found amongst Caligula's possessions. Cicero ([Att. 4.4a.1](#)) asks Atticus to send him two librarians (*librarioli*) to equip his library with *indices*, also see [Att. 4.5.4](#) where he states how happy he is with the result. Ovid ([Tr. 1.1.105–110](#)) addresses his book and describes how it will join his other works in the *scrinium*, all showing their *tituli* openly apart from the three that teach how to love. Ovid ([Ex Pont. 4.13.7–8](#)) addressing Carus, says that he will recognise his work even after Carus has ripped off the *titulus*.

Also see: [fig. 2](#) (Pompeii still lifes); [fig. 29](#) (stylus tablet from Vindonissa).

f) Other accessories sometimes associated with writing equipment**Seal box**

Seal boxes are small, hinged boxes consisting of a lid and a base that measure between 2–5 cm in length. They are mostly cast copper-alloy and come in various shapes, e.g. circular, rectangular and leaf-shaped. Usually, there are a number of small holes in the bottom of the base and two slots or notches, one in each side of the lid or the base. Many have decorations on the lid, for example separately cast relief ornaments or colourful enamel inlays. Older examples from the Mediterranean were carved from bone and there

are rare finds of other materials including lead, tin and ivory (Derks and Roymans 2002, 91 note 23).

Seal boxes have long been misidentified as perfume-containers and are easily mistaken as jewellery or other decorative elements, particularly when badly preserved. In some cases, remains of beeswax can be found inside them and even traces or imprints of string (e.g. Furger et al. 2009, 32).



Fig. 72: Decorated seal boxes from Augusta Raurica. From Furger et al. 2009, 226 pl. 16 (detail). © Augusta Raurica.

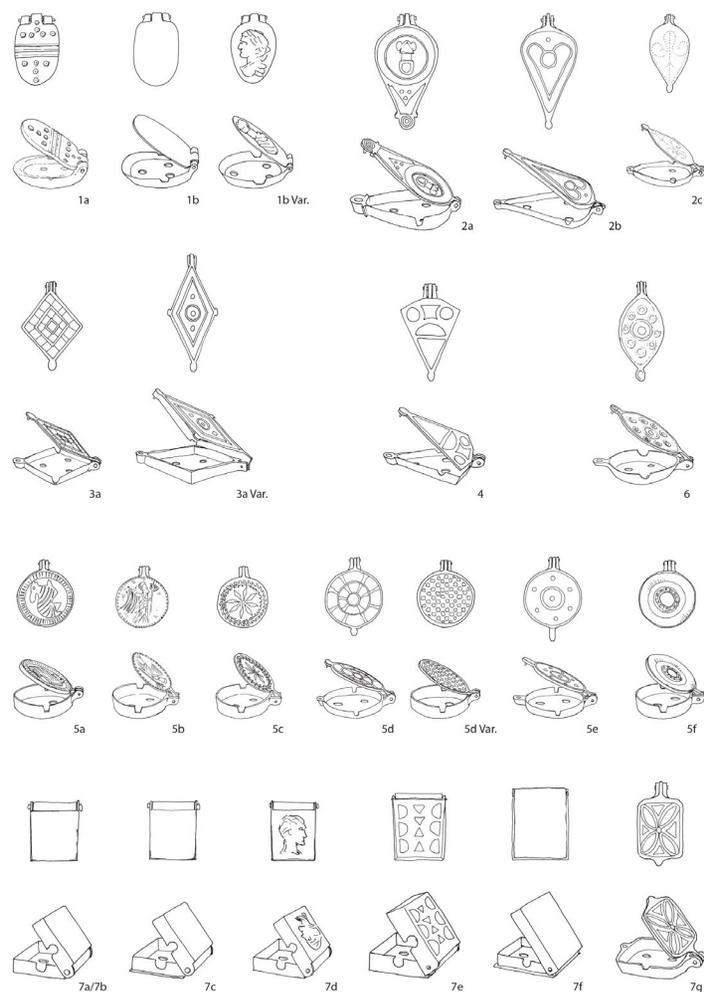


Fig. 73: Types of seal boxes according to Furger et al. 2009, 48 fig. 23. © Augusta Raurica.

Such boxes were used to protect seals from approximately 100 BCE and fell out of use in the late 3rd century CE (Furger et al. 2009, 47). Most finds of metal examples are from imperial times and from the northwestern provinces. They are frequently found in military and other larger settlements and generally in contexts of trade. In some cases, they seem to have been deposited in sanctuaries

(Furger et al. 2009, 39–41). They are rare in funerary contexts. In older publications they are sometimes identified as typical military objects, but this has been nuanced by surveys including the finds from non-military sites (Derks and Roymans 2002; Andrews 2012).

The distribution pattern is similar to that of [wax stylus tablets](#) and it is still often assumed that seal boxes were used with wax tablets, even though no direct archaeological record of this combination is known, and no literary evidence supports this assumption (e.g. Furger et al. 2009, 36). Research by Andrews suggests instead that



Seal box from Augusta Raurica (Switzerland) with wax filling, mid/second half of 2nd century CE. Augusta Raurica, inv. 1980.051.

From Furger et al. 2009, 21 fig. 8. © Augusta Raurica.

they were mainly used to seal money bags as is in fact confirmed by an *in situ* find from [Trier](#) (Germany) and supported by finds from [Kalkriese](#) (Germany) and Honley (UK) (Andrews 2013). According to Andrews and as supported by archaeological evidence, the string was wound around a leather or textile pouch and its ends were inserted through the small holes of the seal box, then led out through the side-slots and tied. A seal could then be imprinted in the wax placed over the string within the box, and the box was

probably stitched onto the pouch. That wax tablets were sealed is well known and despite the lack of evidence it cannot be ruled out that seal boxes were used to seal writing tablets. It is thought that in this case the three holes in the bottom would have allowed a little bit of wax to leak out and attach the box to the tablet when it hardened (Furger et al. 2009, 19).

With the assumed close connection to writing tablets, finds of seal boxes have been considered by some scholars to indicate the presence of literacy in rural areas, particularly those providing manpower for auxiliary units (Derks and Roymans 2002). Their findings need to be reconsidered in the light of the alternative explanation concerning money bags. However, the accounting and the numeracy involved can be seen as part of the wider context of literacy.



Fig. 75: Seal box from Yorkshire (UK) with preserved string. © Colin Andrews.

Further reading:

Andrews 2012, 2013; Bertrand et al. 2021; Derks and Roymans 2002; Furger et al. 2009; Koscevic 1991; López de la Orden 1993

Bone spatulate strips

We know that rulers were used as writing implements in Antiquity (*Anth. Pal.* 6.62–66) and a group of bone ‘spatulate strips’ have been identified as possible examples. The exact function of these strips is controversial, but they are found in association with other writing equipment in depictions as well as in graves, military and civilian and rural sites across the empire and therefore seem to have been used in this context (Božič and Feugère 2004, 40).

They are made of bone and of rectangular or trapezoidal shape with an often-rounded head on one end which is sometimes pierced with one or two holes. The section of the ‘blade’ can be plano-convex,

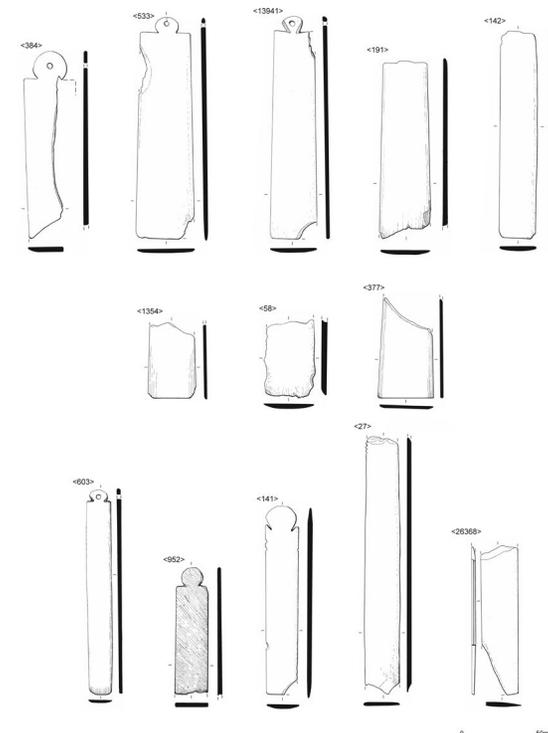


Fig. 76: Roman bone spatulate strips (possible rulers) from London (UK). © Glynn Davis, reproduced by permission of MOLA.

i.e. with one flat and one curved side, lentoid or trapezoidal. The edges of the blade are straight but not always parallel to each other, so the blade can taper or expand.

There seem to be broadly two groups distinguished by their date, dimensions and shape of head (Božič 2002, 34–35, but for an alternative typology, see Davis 2016, 6). The earlier one dates to the 1st century and the first half of the 2nd century CE and is shorter and wider, between 13–14.5 cm long and 2.5–3.5 cm wide. The later examples from the 3rd century and maybe the second half of the 2nd century CE are generally longer (16–19 cm) and narrower (1.5–2.5 cm).



Fig. 77: Bone spatulate strip from the grave in tumulus 26 in Berlingen (Belgium), around 80 C^vE. Gallo-Roman Museum Tongeren, inv. 69.B.26.38d. © Gallo-Roman Museum Tongeren.

These objects have been described as labels, folding tools, rulers or tools to flatten surfaces, for example, of [papyri](#). Other uses can be imagined such as to facilitate reading by moving the tool along with the text. More recent research on the wear seen on examples from [London](#) seems to point towards a flattening or smoothing function and suggests that spatulate bone strips were not primarily intended for use as rulers (Davis 2016).

Further reading:

Božič 2002; Božič and Feugère 2004, 39–40; Davis 2016; Fünfschilling 2012, 195–196

Glossary

English	Latin	Dutch	French	German	Italian	Spanish
book box/bucket	<i>capsa/scrinium/cista</i>	boekrolhouder	boîte à livres	Buchrollenkästchen	cassetta per i libri	capsa
brush	<i>penicillus/penicillum</i>	borstel	pinceau	Pinsel	pennello	pincel
compasses/divider	<i>circinus</i>	cirkel	compas	Zirkel	compasso	compás
ink	<i>atramentum/cinnabaris</i>	inkt	encre	Tinte	inchiostro	tinta
ink pen	<i>calamus/harundo</i>	calamus	calame/plume à écrire	(Rohr)feder	calamo	cálamo
ink tablet/leaf tablet	<i>tilia</i>	houten schrijftafeltje	tablette de bois	Holztafelchen	tavoletta di legno	tablilla de madera
inkwell	<i>atramentarium</i>	inktpot	encrier	Tintenfass	calamaio	tintero
labels (papyri)	<i>sillyba/indices/tituli</i>	labels	étiquettes	Etiketten/Titel	titoli	etiquetas
lead	<i>plumbum</i>	lood	plomb	Blei	piombo	plomo
measure	<i>regula</i>	passer	règle graduée	Maßstab	metro	regla
papyrus	<i>papyrus/charta</i>	papyrus	papyrus	Papyrus	papiro	papiro
parchment/vellum	<i>membrana/pergamena</i>	perkament	parchemin	Pergament	pergamena	pergamino
penknife	<i>scalprum (librarium)</i>	pennenmes	couteau à affûter les calames	Federmesser	tagliapenna	cortaplumas
pumice stone	<i>pumex</i>	puijsteen	Pierre ponce	Bimsstein	pietra pomice	piedra pómez
ruler	<i>regula</i>	liniaal	règle	Lineal	regolo	regla
seal box	?	zegeldoos	boîte à sceau	Siegelkapsel	porta ceralacca	cápsula de sellos
sharpener (for styli)	?	wetsteen	Pierre à aiguiser	Spitzer/Wetzstein	pietra per affilare	piedra de afilar
spatula	?	wasschraper	spatule à cire	Wachsspachtel	spatola di cera	raspador de cera
sponge	<i>spongea</i>	spons	éponge	Schwamm	spugna	esponja
stylus	<i>stilus/graphium</i>	stilus	stylet	Stilus/Griffel	stilo	estilo/estilete
stylus/wax tablet	<i>tabula cerata/cera</i>	wastafeltje	tablette de cire	Wachstäfelchen	tavoletta di cera	tablilla de cera
stylus/pen/writing case	<i>graphiarium/theca calamaria</i>	etui (e.g. voor pen-nen/voor stili)	étui (e.g. à stylets/à calames)	Etui/Futteral (e.g. Griffetui/Schreibzeugfutteral)	astuccio/teca	estuche

Literary evidence

Ammianus Marcellinus 28.4.13:

Poscuntur etiam in conviviis aliquotiens trutinae, ut appositi pisces et volucres ponderentur, et glires, quorum magnitudo saepius replicata, non sine taedio praesentium, ut antehac inusitata, laudatur assidue, maxime cum haec eadem numerantes, notarii triginta prope assistant, cum thecis et pugillaribus tabulis, ut deesse solus magister ludi litterarii videretur.

Sometimes at their banquets the scales are even called for, in order to weigh the fish, birds, and dormice that are served, whose great size they commend again and again, as hitherto unexampled, often repeating it to the weariness of those present, especially when thirty secretaries stand near by, with pen-cases and small tablets, recording these same items, so that the only thing lacking seems to be a schoolmaster.

(Transl. J. C. Rolfe, Loeb)

Anonymus Valesianus II 79:

Igitur rex Theodericus illiteratus erat et sic obtuso sensu, ut in decem annos regni sui quattuor litteras subscriptionis edicti sui discere nullatenus potuisset. De qua re laminam auream iussit interrasilem fieri, quattuor litteras “legi” habentem; unde si subscribere voluisset, posita lamina super chartam, per eam pennam ducebat, ut subscriptio eius tantum videretur.

Now King Theodoric was without training in letters, and of such dull comprehension that for ten years of his reign he had been wholly unable to learn the four letters necessary for endorsing his edicts. For that reason he had a golden plate with slits made, containing the four letters “legi”; then, if he wished to endorse anything, he placed the plate over the paper and drew his pen through the slits, so that only this subscription of his was seen.

(Transl. J. C. Rolfe, Loeb)

Anthologia Palatina 6.62:

κυκλοτερῆ μολιβον, σελίδων σημάντορα πλευρῆς, / καὶ σμίλαν, δονάκων ἀκροβελῶν γλυφίδα, / καὶ κανονῖδ' ὑπάτην, καὶ τὴν παρὰ θῖνα κίσσηριν, / ἀύχμηρὸν πόντου τρηματόεντα λίθον, / Καλλιμένης Μούσαις, ἀποπασάμενος καμάτοιο, / θῆκεν ἐπεὶ γήρα κανθὸς ἐπεσκέπετο.

Callimenes, on giving up his work, now old age has veiled his eyes, dedicates to the Muses his circular lead which marks off the margin of the pages, and the knife that sharpens his pointed pens, his longest ruler, and the pumice from the beach, the dry porous stone of the sea.

(Transl. W. R. Paton, Loeb)

Anthologia Palatina 6.63:

γραμματόκαρ πλήθοντα μελάσματι κυκλομόλιβδον / καὶ κανόνα γραφίδων Ἰθντάτων φύλακα, / καὶ γραφικοῖο δοχεῖα κελαινοτάτοιο ῥεέθρου, / ἄκρα τε μεσσοτόμους εὐγλυφέας καλάμους, / τρηγαλέην τε λίθον, δονάκων εὐθηγέα κόσμον, / ἔνθα περιτριβέων ὄξυ χάραγμα πέλει, / καὶ γλύφανον καλάμου, πλατέος γλωχῖνα σιδήρου, / ὄπλα σοὶ ἐμπορίας ἄνθετο τῆς ἰδῆς / κεκμηῶς Μενέδημος ὑπ' ἀγλύος ὄμμα παλαιόν, / Ἑρμεία: σὺ δ' αἰεὶ φέρβε σὸν ἐργατίνην.

Weary Menedemus, his old eyes misty, dedicates to thee, Hermes (and feed ever thy labourer), these implements of his calling, the round lead full of black matter giving birth to lines, the ruler that keeps the pens very straight, the receptacle of the black writing fluid, his well-cut reed-pens split at the top, the rough stone that sharpens and improves the pens when they are worn and the writing is too scratchy, and the flat steel penknife with sharp point.

(Transl. W. R. Paton, Loeb)

Anthologia Palatina 6.64:

γυρὸν κυανέης μολιβον σημάντορα γραμμῆς, / καὶ σκληρῶν ἀκόνην τρηγαλέην καλάμων, / καὶ πλατὺν ὄξυντῆρα μεσσοσχιδέων δονακίων, / καὶ κανόνα γραμμῆς ἰθυπόρου ταμίην, / καὶ χρόνιον γλυπτοῖσι μέλαν πεφυλαγμένον ἄντροις, / καὶ γλυφίδας καλάμων ἄκρα μελαινομένων / Ἑρμείη Φιλόδημος, ἐπεὶ χρόνω ἐκκρεμὲς ἤδη / ἦλθε κατ' ὀφθαλμῶν ῥυσὸν ἐπισκύνιον.

Philodemus, now that his wrinkled brows owing to old age come to hang over his eyes, dedicates to Hermes the round lead that draws dark lines, the pumice, rough whet-stone of hard pens, the knife, flat sharpener of the split reed-pens, the ruler that takes charge of the straightness of lines, the ink long kept in hollowed caverns and the notched pens blackened at the point. (Transl. W. R. Paton, Loeb)

Anthologia Palatina 6.65:

τὸν τροχόντα μόλιβδον, ὃς ἀτραπὸν οἶδε χαράσσειν / ὀρθὰ παραζύων
ἰθυτενῆ κανόνα, / καὶ χάλυβα σκληρὸν καλαμηφάγον, ἀλλὰ καὶ αὐτὸν
/ ἠγεμόνα γραμμῆς ἀπλανέος κανόνα, / καὶ λίθον ὀκριόντα, δόναξ ὅθι
δισσὸν ὀδόντα / θήγεται ἀμβλυνθεὶς ἐκ δολιχογραφίης, / καὶ βυθίην
Τρίτωνος ἀλιπλάγκτοιο χαμεύνην, / σπόγγον, ἀκεστορίην πλαζομένης
γραφίδος, / καὶ κίστην πολύωπα μελανδόκον, εἰν ἐνὶ πάντα / εὐγραφέος
τέχνης ὄργανα ῥυομένην, / Ἑρμῆ Καλλιμένης, τρομερὴν ὑπὸ γήραος
ὄκνη / χεῖρα καθαρμοζών ἐκ δολιχῶν καμάτων.

Callimenes, resting from its long labour his sluggish hand that trembles with age, dedicates to Hermes his disc of lead that running correctly close to the straight ruler can deftly mark its track, the hard steel that eats the pens, the ruler itself, too, guide of the undeviating line, the rough stone on which the double-tooth of the pen is sharpened when blunted by long use, the sponge, wandering Triton's couch in the deep, healer of the pen's errors, and the ink-box with many cavities that holds in one all the implements of calligraphy.

(Transl. W. R. Paton, Loeb)

Anthologia Palatina 6.66:

ἄβροχον ἀπλανέος μόλιβον γραπτῆρα κελεύθου, / ἧς ἐπι ρίζουται
γράμματος ἀρμονίη, / καὶ κανόνα τροχαλοῖο κυβερνητῆρα μολίβδου, /
καὶ λίθακα τρητὴν σπόγγω εἰδομένην, / καὶ μέλανος σταθεροῖο δοχίον,
ἀλλὰ καὶ αὐτῶν / εὐγραφέων καλάμων ἀκροβαφεῖς ἀκίδας, / σπόγγον,
ἄλως βλάστημα, χυτῆς λειμῶνα θαλάσσης, / καὶ χαλκὸν δονάκων τέκτονα
λεπταλέων, / ἐνθάδε Καλλιμένης φιλομειδέσιν ἄνθετο Μούσαις, / γήραι
κεκμηῶς ὄμματα καὶ παλάμην.

Here Callimenes, his eye and hand enfeebled by age, dedicates

to the laughter-loving Muses the never-moistened lead which draws that undeviating line on which is based the regularity of the script, the ruler which guides the course of this revolving lead, the porous stone like a sponge, the receptacle of the permanent ink, the pens themselves, too, their tips dyed black, the sponge, flower of the sea, forming the meadows of the liquid deep, and the knife, brazen artificer of slender pens.

(Transl. W. R. Paton, Loeb)

Caesar, Gallic War 1.38.4:

Namque omnium rerum quae ad bellum usui erant summa erat in eo oppido facultas, idque natura loci sic muniebatur, ut magnam ad ducendum bellum daret facultatem, propterea quod flumen Dubis ut circino circumductum paene totum oppidum cingit (...).

For there was in that town an abundant supply of all things needful for war, and the place was so well fortified by Nature as to afford great facilities for the conduct of a campaign. The river Dubis (Doubs), with a circuit that might have been traced by compasses, surrounds well-nigh the whole town.

(Transl. H. J. Edwards, Loeb)

Cassius Dio 67.15.3:

ἤκουσα δὲ ἔγωγε καὶ ἐκεῖνο, ὅτι πάντας ἅμα αὐτοῦς ὁ Δομιτιανὸς
ὑποπτέυσας ἀποκτεῖναι ἠθέλησε, καὶ σφῶν τὰ ὀνόματα ἐς σανίδιον
φιλύρινον δίθυρον ἐσγράψας ὑπὸ τὸ προσκεφάλαιον ἐν τῇ κλίνῃ ἐν ἧ
ἀνεπαύετο ὑπέθηκε (...).

For my part, I have heard also the following account—that Domitian, having become suspicious of these persons, conceived the desire to kill them all at the same time, and wrote their names on a two-leaved tablet of linden-wood, which he placed under his pillow on the couch on which he was wont to take his rest (...).

(Transl. E. Cary, H. B. Foster, Loeb)

Catullus 1.1–2:

Cui dono lepidum novum libellum / arido modo pumice expoliturum?

To whom am I to present my pretty new book, freshly smoothed off with dry pumice–stone?

(Transl. F. W. Cornish, J. P. Postgate, J. W. Mackail. Loeb)

Catullus 14.17–20:

Nam, si luxerit, ad librariorum / curram scrinia, Caesios, Aquinos, / Suffenum, omnia colligam venena, / ac te his suppliciis remunerabor.

For let the morning only come—I will be off to the shelves of the booksellers, sweep together Caesii, Aquini, Suffenus, and all such poisonous stuff, and with these penalties will I pay you back for your gift.

(Transl. F. W. Cornish, J. P. Postgate, J. W. Mackail. Loeb)

Catullus 22.4–8:

Puto esse ego illi milia aut decem aut plura / perscripta, nec sic ut fit in palimpsesto / relata: chartae regiae, novi libri, / novi umbilici, lora rubra, membranae, / directa plumbo, et pumice omnia aequata.

I suppose he has got some ten thousand or even more written out in full, and not, as is often done, put down on used sheets; imperial paper, new rolls, new bosses, red ties, parchment wrappers; all ruled with lead and smoothed with pumice.

(Transl. F. W. Cornish, J. P. Postgate, J. W. Mackail. Loeb)

Catullus 68.33–36:

Nam, quod scriptorum non magna est copia apud me, / hoc fit, quod Romae vivimus: illa domus, / illa mihi sedes, illic mea carpitur aetas; / huc una ex multis capsula me sequitur.

For as for my not having plenty of authors at hand, that is because I live at Rome: that is my home, that is my abode, there my life is spent; when I come here only one small box out of many attends me.

(Transl. F. W. Cornish, J. P. Postgate, J. W. Mackail. Loeb)

Cicero, Letters to Atticus 4.4a.1:

Perbelle feceris si ad nos veneris. offendes dissignationem Tyrannionis mirificam librorum meorum, quorum reliquiae multo meliores sunt quam putaram. et velim mihi mittas de tuis librariolis duos aliquos quibus Tyrannio utatur glutinatoribus, ad cetera administris, iisque imperes ut sumant membranulam ex qua indices fiant, quos vos Graeci, ut opinor, σιττόβαζ appellatis.

It will be delightful of you to pay us a visit. You will find that Tyrannio has made a wonderful job of arranging my books. What is left of them is much better than I had expected. And I should be grateful if you would send me a couple of your library clerks to help Tyrannio with the gluing and other operations, and tell them to bring a bit of parchment for the labels, *sittybae* as I believe you Greeks call them.

(Transl. D. R. Shackleton Bailey, Loeb)

Cicero, Letters to Atticus 4.5.4:

Bibliothecam mihi tui pinxerunt cum structione et sittybis. eos velim laudes.

Your people have painted my library together with the bookcases and labels. Please commend them.

(Transl. D. R. Shackleton Bailey, Loeb)

Cicero, Letters to Quintus 2.13.2:

Modo mihi date Britanniam, quam pingam coloribus tuis, penicillo meo.

All you have to do is to give me Britain to paint. I'll use your colours with my brush.

(Transl. D. R. Shackleton Bailey, Loeb)

Cicero, Letters to Quintus 2.14 [15b].1:

Calamo bono et atramento temperato, charta etiam dentata, res agetur; scribis enim te meas litteras superiores vix legere potuisse, in quo nihil eorum, mi frater, fuit, quae putas; neque enim occupatus eram neque perturbatus nec iratus alicui, sed hoc facio semper, ut, quicumque calamus in manus meas venerit, eo sic utar, tamquam bono.

This time it will be quality pen and well–mixed ink and ivory–

finished paper, since you say you could hardly read my last letter. No, my dear fellow, it was for none of the reasons you suppose. I was neither busy nor upset nor annoyed with anybody. It's just that I always take the first pen that comes to hand as though it was a good one.

(Transl. D. R. Shackleton Bailey, Loeb)

Edict of Diocletian 7.38:

Membranario in [qua]t<erni>one pedali pergamen[i vel] croca[ti] D XL.

For a parchment maker for making a one-foot quaternion of white or yellow parchment: 40 Denarii.

(Transl. A. Willi)

Edict of Diocletian 10.17:

Thecam cannarum n. quinque D XL.

For a case for five reed pens: 40 Denarii.

(Transl. A. Willi)

Herodas, Mimes 3.14–18:

κῆ μὲν τάλαινα δέλτος, ἦν ἐγὼ κάμνω / κηροῦσ' ἐκάστου μηνός, ὄρφανή
κεῖται / πρὸ τῆς χαμεύνης τοῦ ἐπὶ τοῖχον ἐρμῖνος, / ἦν μήκοτ' αὐτὴν οἶον
Αἶδην βλέψας / γράψῃ μὲν οὐδὲν καλόν, ἐκ δ' ὄληνξύσῃ·

The wretched tablet, which I tire myself out waxing each month, lies orphaned before the bed-post next the wall, except when he looks at it as if it were Hades and writes nothing good but scrapes it all smooth.

(Transl. J. Rusten, I. C. Cunningham, Loeb)

Herodian 1.17.1:

ὁ δὲ Κόμοδος ἀσγάλλων τοὺς μὲν ἀπεπέμψατο, αὐτὸς δὲ ἐπανελθὼν ἐς τὸ
δωμάτιον ὡς δὴ καθευδήσων (καὶ γὰρ μεσημβρίας εἰώθει τοῦτο ποιεῖν),
λαβὼν γραμματεῖον τούτων δὴ τῶν ἐκ φιλύρας ἐς λεπτότητα ἠσκημένων
ἐπαλλήλω τε ἀνακλάσει ἀμφοτέρωθεν ἐπτυγμένων γράφει, ὅσους χρὴ τῆς
νυκτὸς φονευθῆναι.

Commodus in a fury dismissed the two men and retired to his room as though he were going to take his usual mid-day siesta. But instead he took up a writing tablet (one of the kind made out

of lime wood cut into thin sheets with two hinged pieces that close together) and wrote down the names of those who would be executed that night

(Transl. C. R. Whittaker, Loeb)

Herodotus 7.239:

ἐπεῖτε γὰρ Ξέρξης ἔδοξε στρατηλατέειν ἐπὶ τὴν Ἑλλάδα, ἐὼν ἐν Σούσοισι ὁ Δημάρητος καὶ πυθόμενος ταῦτα ἠθέλησε Λακεδαιμονίους ἐξαγγεῖλαι. ἄλλως μὲν δὴ οὐκ εἶχε σημῆναι· ἐπικίνδυνον γὰρ ἦν μὴ λαμφοθεῖη· ὁ δὲ μηχανᾶται τοιάδε· δελτίον δίπτυχον λαβὼν τὸν κηρὸν αὐτοῦ ἐξέκνησε, καὶ ἔπειτα ἐν τῷ ξύλῳ τοῦ δελτίου ἔγραψε τὴν βασιλέος γνώμην, ποιήσας δὲ ταῦτα ὀπίσω ἐπέτηξε τὸν κηρὸν ἐπὶ τὰ γράμματα, ἵνα φερόμενον κεινὸν τὸ δελτίον μηδὲν πρήγμα παρέχοι πρὸς τῶν ὁδοφυλάκων. Xerxes being resolved to march against Hellas, Demaratus, who was then at Susa and had knowledge of this, desired to send word of it to the Lacedaemonians. But he feared to be detected, and had no other way of acquainting them than this trick:—taking a double tablet, he scraped away the wax from it, and then wrote the king's intent on the wood; which done, he melted the wax back again over the writing, so that the bearer of the tablet thus left blank might not be troubled by the way-wardens.

(Trans. A. D. Godley, Loeb)

Horace, Epistles 1.20.1–3:

*Vertumnum Ianumque, liber, spectare videris, / scilicet ut prostes
Sosiorum pumice mundus. / odisti clavis et grata sigilla pudico (...).*

You seem, my book, to be looking wistfully toward Vertumnus and Janus in order, forsooth, that you may go on sale, neatly polished with the pumice of the Sosii. You hate the keys and seals so dear to the modest (...).

(Transl. H. Rushton Fairclough, Loeb)

Horace, Epistles 2.1.111–113:

*Ipse ego, qui nullos me adfirmo scribere versus, / invenior Parthis
mendacior, et prius orto / sole vigil calamum et chartas et scrinia posco.*

I myself, who declare that I write no verses, prove to be more of

a liar than the Parthians: before sunrise I wake, and call for pen, paper, and book-buckets.

(Transl. after H. Rushton Fairclough, Loeb)

Horace, Epistles 2.1.235–237:

Sed veluti tractata notam labemque remittunt / atramenta, fere scriptores carmine foedo / splendida facta linunt.

But as ink when handled leaves mark and stain, so ofttimes with unseemly verse poets put a blot on bright exploits.

(Transl. H. Rushton Fairclough, Loeb)

Horace, Satires 1.4.21–23:

Beatus Fannius ultro / delatis capsis et imagine, cum mea nemo / scripta legat volgo recitare timentis (...).

Happy fellow, Fannius, who has delivered his books and bust unasked! My writings no one reads, and I fear to recite them in public (...).

(Transl. H. Rushton Fairclough, Loeb)

Horace, Satires 10.72–74:

Saepe stilum vertas, iterum quae digna legi sint / scripturus, neque te ut miretur turba labores, / contentus paucis lectoribus.

Often must you turn your pencil to erase, if you hope to write something worth a second reading, and you must not strive to catch the wonder of the crowd, but be content with the few as your readers.

(Transl. H. Rushton Fairclough, Loeb)

Isidorus, Origins 6.8.18:

Ante cartae et membranarum usum in (de)dolatis ex ligno codicillis epistolarum eloquia scribebantur (...).

Before the use of papyrus sheets or parchment, the contents of letters were written on shingles hewn from wood (...).

(Transl. S. A. Barney, W. J. Lewis, J. A. Beach, Oliver Berghof, *The Etymologies of Isidore of Seville*, Cambridge 2006)

Isidorus, Origins 6.11.4:

Membrana autem aut candida aut lutea aut purpurea sunt. Candida

naturaliter existunt. Luteum membranum bicolor est, quod a confectore una tingitur parte, id est crocatur.

Parchment comes in white or yellowish or purple. The white exists naturally. Yellowish parchment is of two colors, because one side of it is dyed, that is yellowed, by the manufacturer.

(Transl. S. A. Barney, W. J. Lewis, J. A. Beach, Oliver Berghof, *The Etymologies of Isidore of Seville*, Cambridge 2006)

Juvenal 3.203–207:

Lectus erat Cordo Procula minor, urceoli sex / ornamentum abaci, nec non et parvulus infra / cantharus et recubans sub eodem marmore Chiron, / iamque vetus Graecos servabat cista libellos / et divina opici rodebant carmina mures.

Cordus' possessions were: a bed too small for Procula, six small jugs to decorate his sideboard, and, underneath, a little centaur, Chiron, made from the same 'marble,' and a box, by now ancient, which kept his little Greek books safe—and the philistine mice were gnawing the immortal poems.

(Transl. S. Morton Braund, Loeb)

Juvenal 10.114–117:

Eloquium ac famam Demosthenis aut Ciceronis / incipit optare et totis quinquatribus optat / quisquis adhuc uno parcam colit asse Minervam, quem sequitur custos angustae vernula capsae.

The eloquence and reputation of Demosthenes or Cicero is what boys keep on praying for throughout the spring holidays, every boy who goes to school accompanied by a house slave to guard his narrow satchel and who still worships thrifty Minerva with a single tiny coin.

(Transl. S. Morton Braund, Loeb)

Livy 4.20.8:

Quis ea in re sit error, quod tam veteres annales quodque magistratum libri, quos linteos in aede repositos Monetae Macer Licinius citat identidem auctores, septimo post demum anno cum T. Quinctio Poeno A. Cornelium Cossum consulem habeant, existimatio communis omnibus est.

Where the error in regard to this matter lies, in consequence of which such ancient annals and also the books of the magistrates, written on linen and deposited in the temple of Moneta, which Licinius Macer cites from time to time as his authority, only give Aulus Cornelius Cossus as consul (with Titus Quinctius Poenus) seven years later, is a matter on which everybody is entitled to his opinion.

(Transl. B. O. Foster, Loeb)

Martial 1.3.1–2:

Argiletanas mavis habitare tabernas, / cum tibi, parve liber, scrinia nostra vacent?

Would you rather live in the shops of Argiletum, when my boxes have room for you, small book?

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 4.10.5–8:

Curre, sed instructus: comitetur Punica librum / spongea: muneribus convenit illa meis. / non possunt nostros multae, Faustine, liturae / emendare iocos: una litura potest.

Run, but go equipped. Let a Punic sponge accompany the book, it suits my gift. Many erasures cannot mend my jests, Faustine, but one erasure can.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 8.72.1–2:

Nondum murice cultus asperoque / morsu pumicis aridi politus / Arcanum properas sequi, libelle.

Not yet decked in purple and polished by the bite of dry pumice, you hasten, my little book, to follow Arcanus.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 12.61.7–10:

Quaeras, censeo, si legi laboras / nigri fornicis ebrium poetam, / qui carbone rudi putrique creta / scribit carmina quae legunt cacantes.

I advise you, if you are anxious to be read of, to look for some boozy poet of the dark archway who writes verses with rough

charcoal or crumbling chalk which folk read while they shit.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.3:

Pugillares citrei. Secta nisi in tenues essemus ligna tabellas, / essemus Libyci nobile dentis onus.

Tablets of citrus wood. If we had not been cut into thin tablets, we should be the noble burden of a Libyan tusk.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.4:

Quinciplices. Caede iuvenorum domini calet area felix, / quinciplici cera cum datur altus honos.

Five-leaved tablets. The happy forecourt of the master is warm with the slaughter of steers when exalted honor is granted by a five-leaved wax tablet.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.5:

Pugillares eborei. Languida ne tristes obscurent lumina cerae, / nigra tibi niveum littera pingat ebur.

Ivory tablets. Lest somber wax dim your failing eyes, let black letters paint snow-white ivory for your use.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.6:

Tunc triplices nostros non vilia dona putabis, / cum se venturam scribet amica tibi.

Three-leaved tablets. You will think our three-leaved tablets no paltry gift when your mistress writes to you that she is coming.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.7:

Pugillares membranei. Esse putas ceras, licet haec membrana vocetur: / delebis, quotiens scripta novare velas.

Parchment tablets. Suppose it wax, though it be called parchment. You will erase whenever you want to write afresh.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.10:

Chartae maiores. Non est munera quod putes pusilla, / cum donat vacuas poeta chartas.

Bigger sheets. There's no reason for you to think it a petty present when a poet gives you blank sheets.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.11:

Chartae epistolares. Seu leviter noto seu caro missa sodali / onnes ista solet charta vocare suos.

Letter paper. Whether sent to a slight acquaintance or a dear friend, this paper calls everybody "dear."

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.20:

Theca libraria. Sortitus thecam calamis armare memento / cetera nos dedimus, tu leviora para.

Case for writing materials. Having drawn the case in the lottery, remember to equip it with pens. We have furnished the rest, you must provide the lesser items.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.21:

Graphiarium. Haec tibi erunt armata suo graphiaria ferro: / si puero dones, non leve munus erit.

Stilus case. These stilus cases you will arm with their steel. If you give them to a boy, it will be no slight gift.

(Transl. D. R. Shackleton Bailey, Loeb)

Martial 14.38:

Fasces calamorum. Dat chartis habiles calamos Memphitica tellus; / texantur reliqua tecta palude tibi.

Bundles of pens. The land of Memphis gives reeds handy for writing. With reeds from other swamps let your roof be thatched.

(Transl. D. R. Shackleton Bailey, Loeb)

Martianus Capella 1.65:

Clotho vero, Lachesis Atroposque, quoniam sententias Iovis orthographae studio veritatis excipiunt (...) stilos acuunt cerasque componunt.

But Clotho, Lachesis and Atropos, since they record Jupiter's words striving for truthfulness and correctness (...) sharpen the styli and prepare wax tablets.

(Transl. A. Willi)

Ovid, Amores 1.12.11–12:

At tamquam minio penitus medicata rubebas— / ille color vere sanguinolentus erat.

Yet you had a blushing hue, as if tintured deep with minium— but that colour was really a colour from blood.

(Transl. Grant Showerman. Revised by G. P. Goold, Loeb)

Ovid, Ars amatoria 1.437–438:

Cera vadum temptet, rasis infusa tabellis: / Cera tuae primum conscia mentis eat.

Let wax, spread on smooth tablets, attempt the crossing; let wax go first to show your mind.

(Transl. J. H. Mozley, Loeb)

Ovid, Ex Ponto 4.13.7–8:

Ipse quoque, ut titulum chartae de fronte revellas / quod sit opus videor dicere possum tuum.

I, too, though you should tear the title from the head of your pages, could tell, I think, what work is yours.

(Transl. A. L. Wheeler, Loeb)

Ovid, Metamorphoses 9.522–525

Dextra tenet ferrum, vacuam tenet altera ceram. / incipit et dubitat, scribit damnatque tabellas, / et notat et delet, mutat culpatque probatque / inque vicem sumptas ponit positasque resumit.

In her right hand she holds her pen, in her left an empty waxen tablet. She begins, then hesitates and stops; writes on and hates what she has written; writes and erases; changes, condemns, approves; by turns she lays her tablets down and takes them up again.

(Transl. F. J. Miller, Loeb)

Ovid, *Tristia* 1.1.105–110:

Cum tamen in nostrum fueris penetrare receptus, / contigerisque tuam, / scrinia curva, domum, / aspicias illic positos ex ordine fratres, / quos studium cunctos evigilavit idem. / cetera turba palam titulos ostendit apertos, / et sua detecta nomina fronte geret; tres procul obscura latitantes parte videbis, — / sic quoque, quod nemo nescit, amare docent.

But when you find refuge in my sanctuary, reaching your own home, the round book-cases, you will behold there brothers arranged in order—brothers whom the same craftsmanship produced with toil and waking. The rest of the band will display their titles openly, bearing their names on their exposed edges, but three at some distance will strive to hide themselves in a dark place, as you will notice—even so, as everybody knows, they teach how to love.

(Transl. A. L. Wheeler, Loeb)

Ovid, *Tristia* 1.1.11–12:

Nec fragili geminae poliantur pumice frontes, / hirsutus passis ut videre comis.

Let no brittle pumice polish your two edges; I would have you appear with locks all rough and disordered.

(Transl. A. L. Wheeler, Loeb)

PFouad 74:

ὑπομνηστικὸν τῷ τιμωτάτῳ ἀ[δε]λφῷ Δανιηλίῳ, μυροπόλῃ, / παρ' ἐμοῦ Φοιβάμμωνος, νομικοῦ, ὅπως σὺν Θεῷ / παραγινομένη ἢ αὐτοῦ διάθεσις ἐπὶ τῆς μεγαλόπολεως / Ἀλεξανδρείας συνωνήση μοι τὰ ἐξῆς δηλούμενα, / οὔτως· / στιχάριον ἀντιοχήσιον, ἔμπλουμον, ἀπὸ ὀλίγης χρήσεως, / ἕως τιμῆς κερ(ατίου) ι, πλέον ἔλαττον, / θρόνιον μικρὸν ἔν, πεποιημένον

εἰς τὸ ἐργαστήριον, / μέλαν, κάλαμον ἀντιοχήσιον, διπλοῦν ἔν ἕως κερ(ατίου) α, / δελτάριον τετράγωνον μέγα δεκάπτηχον, τῶν / πτηγίων γιγνομένων λεπτῶν ὡσεὶ φυλλαρίων / καὶ ἐν μέσῳ αὐτῶν ξύλον μικρὸν ἴνα μὴ τὸ κηριῶ / -- -- -- -- --

A reminder for the highly esteemed brother Danielios, the ointment dealer, from me, the lawyer/scribe Phoibammon, so that when, God willing, his (i.e. your) sale takes place at the large city of Alexandria, you will buy for me the following, namely: an antiochian sticharion (garment), embroidered, little used, for up to 10 keratia, preferably less; a small stool, made for the workshop; black (sc. ink); an antiochian reed pen, a double one, for up to one keration; a rectangular, large writing tablet, with ten tablets, the tablets thin as leaves (phyllaria) and in their centre a small piece of wood, so the wax does not...

(Transl. A. Willi)

Persius 3.10–20:

iam liber et positus bicolor membrana capillis / inque manus chartae nodosaque venit harundo. / tum querimur crassus calamo quod pendeat umor / nigra sed infusa vanescit sepia lympha, / dilutas querimur geminet quod fistula guttas. (...) an tali studeam calamo?

Now my book comes to hand, and the two-tone parchment smoothed of hair, some paper and a jointed reed pen. Then we start whining: the liquid hangs from the nib too thickly, but when water's added, the black cuttle ink thins and we whine that the reed keeps globbing together the diluted drops. (...) But how can I work with a pen like this?

(Transl. S. Morton Braund, Loeb)

Plautus, *Baccides* 4.4.74–112:

CHRY.S.: Nunc tu abi intro, Pistoclere, ad Bacchidem, atque ecfer cito / PIST.: Quid?

CHRY.S.: Stilum, ceram et tabellas, linum.

Chrys.: Now go inside to Bacchis, Pistoclerus, and quickly bring out— / PIST.: (interrupting) What? CHRY.S.: A pen, wax and tablets, and thread.

(Transl. W. de Melo, Loeb)

Pliny the Younger, Letters 3.5.15:

In itinere quasi solutus ceteris curis, huic uni vacabat: ad latus notarius cum libro et pugillaribus, cuius manus hieme manicis muniebantur, ut ne caeli quidem asperitas ullum studii tempus eriperet.

When travelling he felt free from other responsibilities to give every minute to work; he kept a secretary at his side with book and notebook, and in winter saw that his hands were protected by long sleeves, so that even bitter weather should not rob him of a working hour.

(Transl. B. Radice, Loeb)

Pliny, Natural History 9.148:

Spongearum tria genera accepimus: spissum ac praedurum et asperum tragos [id] vocatur, spissum et mollius manus, tenue densumque, ex quo penicilli, Achillium.

We are informed that there are three kinds of sponge: a thick and very hard and rough one is called goat-thorn sponge, a less thick and softer one loose-sponge, and a thin one of close texture, used for making paint-brushes, Achilles sponge.

(Transl. H. Rackham, Loeb)

Pliny, Natural History 13.30:

Folia, cultrato mucrone lateribus in sese bifida, tabellas primum demonstravere geminas, nunc ad funes vitiliumque nexus et capitum levia umbracula finduntur.

The leaves have a knife-like edge at the sides and are divided into two flanges that fold together; they first suggested folding tablets for writing, but at the present day they are split up to make ropes and plaited wicker-work and parasols.

(Transl. H. Rackham, Loeb)

Pliny, Natural History 13.70:

Mox aemulatione circa bibliothecas regum Ptolemaei et Eumenis, supprimente chartas Ptolemaeo, idem Varro membranas Pergami tradit repertas.

Subsequently, also according to Varro, when owing to the rivalry between King Ptolemy and King Eumenes about their

libraries Ptolemy suppressed the export of paper, parchment was invented at Pergamum.

(Transl. H. Rackham, Loeb)

Pliny, Natural History 13.74–82:

Praeparatur ex eo charta diviso acu in praetenues sed quam latissimas philyras; principatus medio, atque inde scissurae ordine. prima hieratica appellabatur antiquitus religiosis tantum voluminibus dicata, quae adulatione Augusti nomen accepit, sicut (75) secunda Liviae a coniuge eius: ita descendit hieratica in tertium nomen. proximum amphitheatricae datum fuerat a confecturae loco. excepit hanc Romae Fanni sagax officina, tenuatamque curiosa interpolatione principalem fecit e plebeia et nomen ei (76) dedit; quae non esset ita recurata in suo mansit amphitheatrica. post hanc Saitica ab oppido ubi maxima fertilitas, ex vilioribus ramentis, propiorque etiamnum cortici Taeneotica a vicino loco, pondere iam haec, non bonitate, venalis. nam emporitica inutilis scribendo involucris chartarum segestribusque mercium usum praebet, ideo a mercatoribus cognominata. post hanc papyrum est extremumque eius scirpo simile ac ne funibus quidem nisi in umore utile. (77) Textitur omnis madente tabula Nili aqua: turbidus liquor vim glutinis praebet. in rectum primo supina tabulae schida adlinitur longitudine papyri quae potuit esse resegminibus utrimque amputatis, traversa postea crates peragit. premitur ergo prelis, et siccantur sole plagulae atque inter se iunguntur, proximarum semper bonitatis deminutione ad deterrimas. numquam plures scapo quam vicinae. (78) Magna in latitudine earum differentia: xiii digitorum optimis, duo detrahuntur hieraticae, Fanniana denos habet, et uno minus amphitheatrica, pauciores Saitica nec malleo sufficit, nam emporiticae brevitatis sex digitos non excedit. praeterea spectantur in (79) chartis tenuitas, densitas, candor, levor. primatum mutavit Claudius Caesar. nimia quippe Augustae tenuitas tolerandis non sufficiebat calamis; ad hoc tramittens litteras liturae metum adferebat ex aversis, et alias indecoro visu pertrahenda. igitur e secundo corio statumina facta (80) sunt, e primo subtemina. auxit et latitudinem pedali mensura. erat et cubitalis macrocolis, sed ratio deprehendit vitium unius schidae revolsione plures infestante paginas. ob haec

praelata omnibus Claudia, Augustae in epistulis auctoritas relicta; Liviana suam tenuit, cui nihil e prima erat sed omnia e secunda. (81) Scabritia levigatur dente conchave, sed caducae litterae fiunt: minus sorbet politura charta, magis splendet. rebellat saepe umor incuriose datus primo, malleoque deprehenditur, aut etiam odore cum cura fuit indiligentior. deprehenditur et lentigo oculis, sed inserta mediis glutinamentis taenea fungo papyri bibula vix nisi littera fundente se: tantum inest fraudis. alius igitur iterum texendis labor. (82) Glutinum vulgare e pollinis flore temperatur fervente aqua, minimo aceti aspersu, nam fabrile cummisque fragilia sunt. diligentior cura mollia panis fermentati colat aqua fervente; minimum hoc modo intergerivi, atque etiam lini lenitas superatur. omne autem glutinum nec vetustius esse debet uno die nec recentius. postea malleo tenuatur et glutino percurritur, iterumque constricta erugatur atque extenditur malleo..

The process of making paper from papyrus is to split it with a needle into very thin strips made as broad as possible, the best quality being in the centre of the plant, and so on in the order of its splitting up. The first quality used to be called 'hieratic paper' and was in early times devoted solely to books connected with religion, but in a spirit of flattery it was given the name of Augustus, just as the second best was called 'Livia paper after his consort, and thus the name 'hieratic' came down to the third class. The next quality had been given the name of 'amphitheatre paper,' from the place of its manufacture. This paper was taken over by the clever workshop of Fannius at Rome, and its texture was made finer by a careful process of insertion, so that it was changed from common paper into one of first-class quality, and received the name of the maker; but the paper of this kind that did not have this additional treatment remained in its own class as amphitheatre paper. Next to this is the Saitic paper named from the town where it is produced in the greatest abundance, being made from shavings of inferior quality, and the Taeneotic, from a neighbouring place, made from material still nearer the outside skin, in the case of which we reach a variety that is sold by mere weight and not for its quality. As for what is called 'emporitic' paper, it is no good for

writing but serves to provide covers for documents and wrappers for merchandise, and consequently takes its name from the Greek word for a merchant. After this comes the actual papyrus, and its outermost layer, which resembles a rush and is of no use even for making ropes except those used in water. Paper of all kinds is 'woven' on a board moistened with water from the Nile, muddy liquid supplying the effect of glue. First an upright layer is smeared on to the table, using the full length of papyrus available after the trimmings have been cut off at both ends, and afterwards cross strips complete the lattice-work. The next step is to press it in presses, and the sheets are dried in the sun and then joined together, the next strip used always diminishing in quality down to the worst of all. There are never more than twenty sheets to a roll.

There is a great difference in the breadth of the various kinds of paper: the best is thirteen inches wide, the hieratic two inches less, the Fannian measures ten inches and the amphitheatre paper one less, while the Saitic is still fewer inches across and is not as wide as the mallet used in making it, as the emporitic kind is so narrow that it does not exceed six inches. Other points looked at in paper are fineness, stoutness, whiteness and smoothness. The status of best quality was altered by the emperor Claudius. The reason was that the thin paper of the period of Augustus was not strong enough to stand the friction of the pen, and moreover as it let the writing show through there was a fear of a smudge being caused by what was written on the back, and the great transparency of the paper had an unattractive look in other respects. Consequently the foundation was made of leaves of second quality and the woof or cross layer of leaves of the first quality. Claudius also increased the width of the sheet, making it a foot across. There were also eighteen-inch sheets called 'macrocola,' but examination detected a defect in them, as tearing off a single strip damaged several pages. On this account Claudius paper has come to be preferred to all other kinds, although the Augustus kind still holds the field for correspondence; but Livia paper, having no quality of a first-

class kind, but being entirely second class, has retained its position.

Roughness is smoothed out with a piece of ivory or a shell, but this makes the lettering apt to fade, as owing to the polish so given the paper does not take the ink so well, but has a shinier surface. The damping process if carelessly applied often causes difficulty in writing at first, and it can be detected by a blow with the mallet, or even by the musty smell if the process has been rather carelessly carried out. Spottiness also may be detected by the eye, but a bad porous strip found inserted in the middle of the pasted joins, owing to the sponginess of the papyrus, sucks up the ink and so can scarcely be detected except when the ink of a letter runs: so much opportunity is there for cheating. The consequence is that another task is added to the process of paper-weaving.

The common kind of paste for paper is made of fine flour of the best quality mixed with boiling water, with a very small sprinkle of vinegar; for carpenter's paste and gum make too brittle a compound. But a more careful process is to strain the crumb of leavened bread in boiling water; this method requires the smallest amount of paste at the seams, and produces a paper softer than even linen. But all the paste used ought to be exactly a day old—not more nor yet less. Afterwards the paper is beaten thin with a mallet and run over with a layer of paste, and then again has its creases removed by pressure and is flattened out with the mallet.

(Transl. H. Rackham, Loeb)

Pliny, *Natural History* 16.229:

Facilis et fagus, quamquam fragilis et tenera. eadem sectilibus lamnis in tenui flexilis capsisque ac scrineis sola utilis.

Beech also is easily worked, although brittle and soft; also cut in thin layers of veneer it is flexible, and is the only wood suitable for boxes and book-buckets.

(Transl. after H. Rackham, Loeb)

Pliny, *Natural History* 28.235:

In ambustis ursinus adips cum lili radicibus, aprunum aut suillum fimum inveteratum, saetarum ex his e penicillis tectoris cinis cum adipe tritus (...).

For burns bear's grease with lily roots, dried dung of wild boar or of pig, the ash of pig's bristles from plasterers' brushes beaten up with pig fat (...).

(Transl. W. H. S. Jones, Loeb)

Pliny, *Natural History* 34.139:

In foedere, quod expulsis regibus populo Romano dedit Porsina nominatim comprehensum invenimus, ne ferro nisi in agri cultu uteretur. et tum stilo osseo scribere institutum vetustissimi auctores prodiderunt.

We find it an express provision included in the treaty granted by Porsena to the Roman nation after the expulsion of the kings that they should only use iron for purposes of agriculture; and our oldest authors have recorded that in those days it was customary to write with a bone pen.

(Transl. H. Rackham, Loeb)

Pliny, *Natural History* 35.41–43:

Atramentum quoque inter facticios erit, quamquam est et terrae, geminae originis. aut enim salsuginis modo emanat, aut terra ipsa sulphurei coloris ad hoc probatur. inventi sunt pictores, qui carbones infestatis sepulchris effoderent. inportuna haec omnia ac novicia. fit enim e fuligine pluribus modis, resina vel pice exustis, propter quod etiam officinas aedificavere fumum eum non emittentes. laudatissimum eodem modo fit e taedis. adulteratur fornacium balinearumque fuligine quo ad volumina scribenda utuntur. (42) sunt qui et vini faecem siccata excoquant adfirmentque, si ex bono vino faex ea fuerit, Indici speciem id atramentum praebere. Polygnotus et Micon, celeberrimi pictores, Athenis e vinaceis fecere, tryginon appellantes. Apelles commentus est ex ebore combusto facere, quod elephantinum vocatur. (43) adportatur et Indicum ex India inexploratae adhuc inventionis mihi. fit etiam aput infectores ex flore nigro, qui adhaerescit aereis cortinis. fit et ligno e taedis combusto tritisque in

mortario carbonibus. mira in hoc saepiarum natura, sed ex iis non fit. omne autem atramentum sole perficitur, librarium cumme, tectorium glutino admixto. quod aceto liquefactum est, aegre eluitur.

Black pigment will also be classed among the artificial colours, although it is also derived from earth in two ways; it either exudes from the earth like the brine in salt pits, or actual earth of a sulphur colour is approved for the purpose. Painters have been known to dig up charred remains from graves thus violated to supply it. All these plans are troublesome and new-fangled; for black paint can be made in a variety of ways from the soot produced by burning resin or pitch, owing to which factories have actually been built with no exit for the smoke produced by this process. The most esteemed black paint is obtained in the same way from the wood of the pitch-pine. It is adulterated by mixing it with the soot of furnaces and baths, which is used as a material for writing. Some people calcine dried wine-lees, and declare that if the lees from a good wine are used this ink has the appearance of Indian ink. The very celebrated painters Polygnotus and Micon at Athens made black paint from the skins of grapes, and called it grape-lees ink. Apelles invented the method of making black from burnt ivory; the Greek name for this is elephantinon. There is also an Indian black, imported from India, the composition of which I have not yet discovered. A black is also produced with dyes from the black florescence which adheres to bronze pans. One is also made by burning logs of pitch-pine and pounding the charcoal in a mortar. The cuttle-fish has a remarkable property in forming a black secretion, but no colour is made from this. The preparation of all black is completed by exposure to the sun, black for writing ink receiving an admixture of gum and black for painting walls an admixture of glue. Black pigment that has been dissolved in vinegar is difficult to wash out.

(Transl. H. Rackham, Loeb)

Propertius 3.1.8:

Exactus tenui pumice versus eat.

Let my verse run smoothly, perfected with fine pumice.

(Transl. G. P. Goold, Loeb)

Quintilian, Orator's Education 10.3.31:

Scribi optime ceris, in quibus facillima est ratio delendi, nisi forte visus infirmior membranarum potius usum exiget, quae ut iuvant aciem, ita crebra relatione, quoad intinguntur calami, morantur manum et cogitationis impetum frangunt.

It is best to write on wax, where it is easiest to erase, unless weak sight demands the use of parchment instead; but though this is better for the eyes, it delays the hand and breaks off the flow of the thought, because of the frequent movement to and fro, whenever the pen is dipped in the ink.

(Transl. D. A. Russell, Loeb)

Quintilian, Orator's Education 10.3.32:

Ne latas quidem ultra modum esse ceras velim, expertus iuvenem studiosum alioqui praelongos habuisse sermones quia illos numero versuum metiebatur, idque vitium, quod frequenti admonitione corrigi non potuerat, mutatis codicibus esse sublatum.

I do not advise unduly wide wax tablets, because I knew a young man, otherwise a good student, who wrote excessively long pieces, because he measured them by the number of lines; this fault, which could not be corrected by repeated warnings, disappeared when his notebook was changed.

(Transl. D. A. Russell, Loeb)

Quintilian, Orator's Education 10.4.1:

Sequitur emendatio, pars studiorum longe utilissima: neque enim sine causa creditum est stilum non minus agere cum delet.

Next comes Correction, much the most useful part of study. It has been held, and not without reason, that the pen is as active as it ever is when it scratches something out.

(Transl. D. A. Russell, Loeb)

Seneca, De Clementia 1.14:

Numquid aliquis sanus filium a prima offensa exheredit? nisi magnae et multae iniuriae patientiam evicerunt, nisi plus est, quod timet, quam quod damnat, non accedit ad decretorium stilum.

Does any father in his senses disinherit a son for his first

offence? Only when great and repeated wrong-doing has overcome his patience, only when what he fears outweighs what he reprimands, does he resort to the decisive pen.

(Transl. J. W. Basore, Loeb)

Seneca, *De brevitae vitae* 13.4:

Hoc quoque quaerentibus remittamus, quis Romanis primus persuaserit navem conscendere. Claudius is fuit, Caudex ob hoc ipsum appellatus, quia plurimum tabularum contextus caudex apud antiquos vocatur, unde publicae tabulae codices dicuntur et naves nunc quoque ex antiqua consuetudine, quae commeatus per Tiberim subvehunt, codicariae vocantur.

We may excuse also those who inquire into this—who first induced the Romans to go on board ship. It was Claudius, and this was the very reason he was surnamed Caudex, because among the ancients a structure formed by joining together several boards was called a caudex, whence also the Tables of the Law are called codices, and, in the ancient fashion, boats that carry provisions up the Tiber are even to-day called codicariae.

(Transl. J. W. Basore, Loeb)

Servius, *Aeneid* 8.361 (quoting Ennius):

‘Nec me decet hanc carinantibus edere chartis’.

‘Nor does it befit me to publish this on foul-mouthed pages’.

(Transl. E. H. Warmington, Loeb)

Suetonius, *Augustus* 85.2

Nam tragoediam magno impetu exorsus, non succedenti stilo, abolevit quaerentibusque amicis, quidnam Ajax ageret, respondit Aiace suum in spongiam incubuisse.

Though he began a tragedy with much enthusiasm, he destroyed it because his style did not satisfy him, and when some of his friends asked him what in the world had become of Ajax, he answered that “his Ajax had fallen on his sponge.”

(Transl. J. C. Rolfe, Loeb)

Suetonius, *Caligula* 49.3:

Quod ne cui dubium videatur, in secretis eius reperti sunt duo libelli

diverso titulo, alteri “Gladius,” alteri “Pugio” index erat; ambo nomina et notas continebant morti destinatorum.

That no one may doubt this, let me say that among his private papers two notebooks were found with different titles, one called “The Sword” and the other “The Dagger,” and both containing the names and marks of identification of those whom he had doomed to death.

(Transl. J. C. Rolfe, Loeb)

Suetonius, *Claudius* 35:

Sero enim ac vix remisit, ne feminae praetextatique pueri et puellae contrectarentur et ne cuius comiti aut librario calamariae et graphiariae thecae adimerentur.

Indeed, it was not until late, and then reluctantly, that he gave up having women and young boys and girls grossly mishandled, and the cases for pens and styles taken from every man’s attendant or scribe.

(Transl. J. C. Rolfe, Loeb)

Suetonius, *Julius Caesar* 83:

In ima cera Gaium Octavium etiam in familiam nomenque adoptavit.

At the end of the will, too, he adopted Gaius Octavius into his family and gave him his name.

(Transl. J. C. Rolfe, Loeb)

Suetonius, *Vitellius* 2:

Publius, Germanici comes, Cn. Pisonem inimicum et interfectorem eius accusavit condemnavitque, ac post praeturae honorem inter Seiani conscios arreptus et in custodiam fratri datus scalpro librario venas sibi incidit, nec tam mortis paenitentia quam suorum obtestatione obligari curarique se passus in eadem custodia morbo periit.

Publius, a member of Germanicus’ staff, arraigned Gnaeus Piso, the enemy and murderer of his commander, and secured his condemnation. Arrested among the accomplices of Sejanus, after holding the praetorship, and handed over to his own brother to be kept in confinement, he opened his veins with a penknife, but allowed himself to be bandaged and restored, not so much from

unwillingness to die, as because of the entreaties of his friends; and he met a natural death while still in confinement.

(Transl. J. C. Rolfe, Loeb)

Symphosius, *Aenigmata* 1:

Graphium.

De summo planus sed non ego planus in imo / versor utrimque manu. diverso munere fungor: / altera pars revocat quicquid pars altera fecit.

I am flat at the top but not flat at the bottom, I turn either way in the hand. I have a conflicting task: one part of me undoes whatever the other part did.

(Transl. A. Willi)

Symphosius, *Aenigmata* 2:

Harundo.

Dulcis amica dei, ripae vicina profundae, / suave canens Musis, nigro perfusa colore, / nuntia sum linguae digitis signata magistris.

A sweet friend to the god, a neighbour to the fathomless bank, singing sweetly for the Muses, steeped in black, I am the messenger of the tongue when distinguished by the master's fingers.

(Transl. A. Willi)

Tacitus, *Annals* 5.8:

Mox crebris prolationibus spem ac metum iuxta gravatus Vitellius petito per speciem studiorum scalpro levem ictum venis intulit vitamque aegritudine animi finivit.

Later, as adjournment followed adjournment, Vitellius, anxious to be rid alike of hope and fear, asked for a penknife on the ground that he wished to write, slightly incised an artery, and in the sickness of his heart made an end of life.

(Transl. J. Jackson, Loeb)

Valerius Maximus, *Memorable Doings and Sayings* 6.5.6:

Nec aliter <se> L. Crassus in eodem iustitiae experimento gessit. Cn. Carbonis nomen infesto animo utpote inimicissimi sibi detulerat, sed tamen scrinium eius a servo allatum ad se, complura continens quibus facile opprimi posset, ut erat signatum cum servo catenato ad eum

remisit.

In the same test of justice L. Crassus behaved no differently. He had launched a prosecution against Cn. Carbo in a spirit of hostility, for Carbo was his bitter enemy. All the same, when a slave brought him a briefcase of Carbo's containing a quantity of material with which he could easily have been brought down, Crassus returned it to him sealed as it was along with the slave in chains.

(Transl. D. R. Shackleton Bailey, Loeb)

Vitruvius 1.1.4:

Geometria autem plura praesidia praestat architecturae; et primum ex euthygrammis circini tradit usum, e quo maxime facilius aedificiorum in areis expediuntur descriptiones normarumque et librationum et linearum directiones.

Mathematics again furnishes many resources to architecture.

It teaches the use of rule and compass and thus facilitates the laying out of buildings on their sites by the use of set-squares, levels and alignments.

(Transl. F. Granger, Loeb)

Vitruvius 7.10.2:

In fornace resina conlocatur. Hanc autem ignis potestas urendo cogit emittere per nares intra laconicum fuliginem, quae circa parietem et camerae curvaturam adhaerescit. Inde collecta partim componitur ex gummi subacta ad usum atramenti librarii, reliquum tectores glutinum admiscentes in parietibus utuntur.

Resin is placed in the furnace. Now the fiery potency burns it and compels it to emit soot through the outlets into the chamber. The soot clings round the walls and vaulting of the chamber. It is then collected and in part compounded with gum and worked up for the use of writing ink; the rest is mixed with size and used by fresco-painters for colouring walls.

(Transl. F. Granger, Loeb)

Abbreviations

AE = *Année épigraphique*, 1888–
 CIL = *Corpus Inscriptionum Latinarum*, ed. T. Mommsen et al., 1863–
 PAS = *Portable Antiquities Scheme* (<https://finds.org.uk>)
 P.Fouad = *Les Papyrus Fouad I: nos 1–89*, ed. A. Bataille, 1939
 P.Oxy. = *The Oxyrhynchus Papyri*
 Pg.Dura = see Welles et al. 1955
 RIB = *Roman Inscriptions in Britain*, various editors, 1965– and
romaninscriptionsofbritain.org
 Tab. Vindol. = *Tabulae Vindolandenses*, ed. A. K. Bowman, J. D. Thomas and
 R. S. O. Tomlin, 1983–2011

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