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new perspectives on Latin brick terminology
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Later, laterculus, and testa

New perspectives on Latin brick terminology

Abstract*
For centuries antiquarians and archaeologists have tried to reconcile the terminology of ancient writers on architecture, such as Vitruvius, with the perceived realities of the material record. One particular issue of debate concerns the interpretation of different words for “brick” in Latin. In this paper it is argued that earlier attempts to settle this question are unsatisfactory and leave several problems unresolved. A thorough examination of literary and epigraphic sources, combined with new insights in Hellenistic brick usage, suggests that primary distinctions in Latin brick terminology were based on shape and size, rather than on a mere division between fired and unfired bricks. Thus, it is argued that later basically signified a large moulded block, but normally was used to indicate mud bricks; that laterculus changed over time from being a diminutive (a small later) to becoming the standard term for the relatively thin fired bricks of the Roman Imperial period; and that testa originally and primarily signified a fragment of a roof tile (or a potsherd), but from the 1st century AD also may designate typical Roman Imperial bricks, after they have been divided into smaller, often triangular, pieces.

Keywords: later, laterculus, testa, bricks, fired bricks, mud bricks, Roman architecture, Vitruvius

Introduction
Basically, Latin has three different words for brick: later, laterculus, and testa. The different meanings and English translations of these and other closely related words according to the Oxford Latin Dictionary can be listed as following:2

<table>
<thead>
<tr>
<th>Later-eris, m.</th>
<th>A brick; -eres ducere, to make bricks. b (sg.) brickwork, bricks. c (prov. after Gk. πλίνθον πλύνειν) -erem lauare, to waste one’s labour.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laterāria -ae, f. A brickworks, brick-kiln.</td>
<td></td>
</tr>
<tr>
<td>Laterārius -a -um, a. (of earth) Used for brickmaking.</td>
<td></td>
</tr>
<tr>
<td>Latericus -iī, n. Brickwork; (pl.) brick walls.</td>
<td></td>
</tr>
<tr>
<td>Latericus -a -um, a. Made or constructed of brickwork, brick.</td>
<td></td>
</tr>
<tr>
<td>Testa -ae, f.</td>
<td></td>
</tr>
<tr>
<td>Testāceus (-iīs) -a -um, a. Made of bricks or tiles of burnt clay; (also, of pavements, etc.) made of such tiles, etc., pulverized. b resembling brick or pottery of burnt clay, esp. in colour.</td>
<td></td>
</tr>
</tbody>
</table>

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* I would like to express my gratitude towards Prof. Örjan Wikander and Prof. Arne Jönsson, who both read and commented on early drafts, and to the anonymous referees, who supplied many valuable remarks. Remaining errors are entirely my own.

1 As will be shown, there are also a few other words, which in some circumstances attain a meaning equivalent to “brick”, such as tegula.

2 At present the Thesaurus Linguae Latinae only treats the words deriving from later. On these, OLD and the Thesaurus are essentially in agreement. In this paper only those connotations that are related to bricks will be discussed.
As can be gathered from this tabulation, the words *later* (1), *laterculus* (1) and *testa* (1b) all carry the meaning of "a brick". The entry for *testa* implies that this word should be understood to indicate a brick made of fired clay, whereas *laterculus* is presented as a diminutive form of *later*, "a small brick". However, the emphasis on these particular distinctions together with the habitual use of an identical translation ("brick"), although basically correct, effectively conceals some important nuances and differences in the way these words were used and understood by ancient writers. An in-depth analysis of these differences, including a revision of prevailing interpretations, may shed new light on some hitherto unresolved issues, contribute to a better understanding of certain passages, for example in Vitruvius, and also advance our insights into Roman brick industry. Furthermore, this study may be helpful in future investigations on the formation of Latin technical vocabulary and its relation to everyday language.

**Methodology**

The questions raised in this paper are affected by several complicating factors. Apart from the fact that each of the three main words had several different meanings, these words could also be used on different linguistic levels: in the everyday language of ordinary Romans, in the academic language of the educated élite, and in the technical jargon of a specialized corps of professionals, all at the same time. Some distinctions that were made in technical terminology may not have been relevant in the vulgar vocabulary. Thus, we may have both technical and non-technical varieties of each word. Furthermore, languages are not static. New words are adopted and new meanings are affixed to extant words as a response to the appearance of new customs, technologies, practices, and ideas. Therefore, the main approach of this paper will be to investigate if changes and nuances in the use of the different words can be correlated with known variations in the appearance and usage of bricks in antiquity. For this reason, it is essential that we give as full as possible an account of the literary source material, and also that we first try to exhaust the internal evidence that is provided by it, before we start comparing it to the archaeological one. This is not to say that the interpretation of texts takes precedence over discussions on archaeological finds, or *vice versa*, only that we should try to get the full picture of each category before making inferences between them. A common pitfall is to build a hypothesis on a narrow selection of examples from both categories, which appear to corroborate each other, and then extrapolate this interpretation on a general level.

In order to provide a general background to the topic, I will first outline the development of the use of bricks in antiquity. This overview is based mainly on an in-depth study of the archaeological evidence for fired bricks from the Hellenistic period, undertaken by the present author. Secondly, I will give a short summary of previous and prevailing interpretations of the words in question. Then will follow an overview of relevant testimonia from ancient literature, where the use of the different words in each passage will be discussed with regard to its internal context, in order to narrow down the possible meanings. Most of the authors were living and writing in the city of Rome but they are dispersed widely in time: from the early 2nd century BC to the 4th century AD. Thus, the usage of words will be analysed also from a chronological point of view, before it is compared with the archaeological record in search of possible convergences. The excerpts are presented in full in a catalogue together with what is deemed to be their most likely interpretation.

A more direct way of confronting this problem would be to make a systematic inventory of brick stamps and compare the occurrence of the words *later*, *laterculus*, and *testa* with the actual objects that they designate. However, for several reasons this approach turns out to be less rewarding than might be expected. Roman brick stamps include a wealth of information, including the owner of the estate, the manager of the workshop, and even the brick maker, but do not normally give the name of the object itself. For some curious reason roof tiles seem to differ from bricks in this regard, as we occasionally find the word *tegulae* in stamps, abbreviated or written in full. Sometimes the more general term *opus doliare* is used to signify the stamped item. The second obstacle lies in the limitations of the published record. Even though Roman bricks stamps have for a long time been meticulously studied and published, especially those found in and about the city of Rome, the epigraphic content of the stamps are rarely accompanied by a description of the object they were imprinted on. Even worse, many epigraphists tend to use a perfunctory terminology that does not distinguish between bricks and roof tiles, calling everything "tegulae", "Ziegeln", or "laterizi". Photos and illustrations, if there are any, are generally restricted to the stamp itself. Thus, we cannot say for certain, just by con-

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3 Langslow 1989, 34.

4 Gerding 2006; 2008; Östborn & Gerding 2015; Gerding & Östborn forthcoming.

5 For this study a chronological limit was set at the end of the 4th century AD, mainly because of the transformation of the Roman brick industry during the course of that century (see e.g. Wilson 2006, 231).

6 For an overview of Roman brick stamps, see Steinby 1978.
sulting the standard publications, whether stamps containing the word tegula were used also on bricks. Even if they were, the same stamp could have been used indiscriminately for different types of products in the same figlina.\footnote{The fact that dimensions are specified (tegula secipedalis, tegula bi-pedalis) in some stamps from the Hadrianic period (CIL 15.650–651) indicates that we are actually dealing with a particular product, probably bricks or floor tiles.}

We have a few examples of the words later and laterculus being mentioned in graffiti inscribed on bricks by brick makers before firing, often to keep track of production.\footnote{Scholz 2012. According to Marjašić (1986) it was a supervisor, in charge of several brick makers, who made the graffiti in order to keep a record of the daily production.} In some cases it is also possible to compare the use of words with the bricks themselves, although it is not always certain that the text refers to the object it was written on. It should be kept in mind that these graffiti, unlike the literary testimonia, derive from many different parts of the Roman world. They are also much more difficult to date than proper stamps. Still, this material has been incorporated in the catalogue and will be discussed below.

### The development of bricks

Mud bricks have been used widely and continuously all around the Mediterranean from the Neolithic period to the present day, whereas the use of fired bricks in masonry for a long time was limited to the Near East.\footnote{For mud bricks and the Near Eastern brick tradition, see Sauvage 1998; Wright 2005, 75–108.} It did not appear in the Graeco-Roman world until the second half of the 4th century BC.\footnote{Gerding 2006; Östborn & Gerding 2015. For a full account of the development, see Gerding & Östborn forthcoming.} The earliest finds have been made in the north Aegean, but fired bricks soon spread to Epirus, Sicily, and southern Italy. They also started to turn up in Etruria and Cisalpine Gaul during the course of the 3rd century BC. However, the use of fired bricks was limited and sporadic throughout the Hellenistic period. Generally, Hellenistic fired bricks have the same approximate dimensions as contemporary mud bricks, although these dimensions may vary from one by one foot (tetradoron) to one-and-a-half by one-and-a-half feet (sesquipedalis), which in reality means anything from about 30 to more than 50 cm on each side, depending on the size of the local foot standard. The thickness varies between 6 and 14 cm, but is usually found in the range of 8–10 cm. There are also some cases of smaller bricks, representing “half-bricks”, and larger ones, exceeding two feet in length. In northern and north-central Italy the majority of Hellenistic bricks have the same typical dimensions: c. 30 × 45 cm, representing one by one-and-a-half Attic-Roman feet. This corresponds to the type of brick that Vitruvius labelled lydion.\footnote{Vitr. De arch. 2.3.3.}

In Campania, from the early 1st century BC, a completely different kind of brick came to dominate the market: bricks made of roof tiles. The practice of reusing roof tiles and other terracotta elements in various forms of masonry goes back almost as far the use of proper bricks, and was particularly rife in southern Italy.\footnote{A well-documented early example can also be found in Fregellae in central Italy (Coarelli 2000).} This usage might seem as a waste of money since roof tiles are more complex and consequently more costly than plain bricks, but a good supply of broken or discarded roof tiles may have made it economical even so. In Campania the usage became more systematic and pervasive. The tiles had their flanges cut off and were then divided into smaller pieces. These ersetz bricks were considerably thinner than ordinary Hellenistic bricks (c. 3–4 cm) and smaller overall. They were also used in a different way than before: instead of solid brickwork we now find the combination of brick masonry and Roman concrete,\footnote{Roman concrete may be more correctly described as “strongly mortared rubble construction” (DeLaine 2001, 230).} where an exterior brick casing provided both lost shuttering and protective surface for the concrete core.\footnote{Pieces of bricks/tiles were also often used as aggregate in the concrete core. Since the aggregate was laid in the mortar (sometimes in orderly rows) and not pre-mixed, as in modern concrete, the distinction between “masonry” and “Roman concrete” is not as clear-cut as it might first appear.} This innovation may not have originated from Campania, but certainly was further developed in this region. Brick-faced concrete appears also in northern Italy, possibly as early as the mid-2nd century BC,\footnote{Aquileia: Righini 1999, 138f., 147.} but here the large Hellenistic bricks continued to be used both as aggregate and as facing.

As far as we know, fired bricks were not introduced in the city of Rome until the late Republican or early Augustan era.\footnote{Gerding 2008.} This might seem strange but should be viewed against the background that the diffusion of fired bricks was slow and hesitant during the entire Hellenistic period.\footnote{Gerding 2008. Contra Coarelli 2000.} When they finally appeared in the Roman capital, they arrived together with the Campanian tradition of using broken tiles. Bricks made of roof tiles continued to be utilized in and around Rome at least until the middle of the 1st century AD, but at some point in time, probably in the late Augustan or early Tiberian reign, proper bricks started to be manufactured in the lower Tiber valley. These square bricks were made in different sizes, the most common of which was the besalis (½ of a Roman foot on either side), but they all retained the relative thinness of roof...
Roman brick industry developed rapidly, and the mass production of standardized bricks eventually made the use of broken roof tiles redundant. These "Imperial" bricks were exported and widely copied in the provinces. However, large "Hellenistic" bricks continued to be used both in northern and southern Italy parallel to the smaller variant, and they also spread to other regions (e.g. Illyria and Spain). There appears to have been a convergence in size over time between the two categories. The later *lydion*, for example, tends to be thinner (5–6 cm) than its earlier Hellenistic counterpart, whereas the small *besalis* was increasingly supplanted by larger standard sizes (*sesqui pedalis* and *bipedalis*).

**Previous research**

In previous discussions on the exact meanings of the Latin words for brick, and their relationship to the archaeological and architectural remains, *laterculus* is generally seen simply as a diminutive form of *later* and is therefore usually omitted. The use of the remaining two words is often perceived as a reflection of the existence in the Roman period of two kinds of bricks: unfired bricks (i.e. mud bricks) and fired bricks. The matter is further complicated, however, by the epithets *crudus* and *coctus/coctilis*, which sometimes accompany the word *later*. According to most scholars *later* is the original word for brick, signifying, in the early periods, mud bricks only. When fired bricks were introduced the need arose to distinguish between the different kinds of bricks (*crudus/coctus*), and also to bring in new expressions (*testa, testaceus*).

The varying terminology has been explained in two different ways: some scholars maintain that *later*, without any epithet, always should be interpreted as mud brick, whereas others argue that *later*, like its modern equivalent "brick", is inherently ambiguous and as a generic term could be used to signify any kind of brick, fired or unfired. Moreover, it is argued that although the exact meaning of the word ultimately depends on the context, it can usually be deduced from the date of the text: in early texts, written in a period when mud bricks dominated, that would also be the normal implication of the word; in sources from the Roman Imperial period, when fired bricks had come to play an important role in Roman urban architecture, *later* usually signifies a fired brick. One of the lynch pins of this argument is the city wall of Arretium (present day Arezzo), which is described by Vitruvius (2.8.9) as being made of *lateres*. In the early 20th century archaeologists uncovered what appeared to be a section of the ancient city wall of Arretium, and it turned out that it was made of fired bricks, although most of them were rather poorly fired.

The proponents of both views seem to agree that *testa* originally denoted fragments of roof tiles (which were sometimes reused as bricks), but that later on, in the Imperial period, it could also signify a proper (fired) brick. Thus, during this period *later* and *testa* would have been interchangeable.

The "second view" described above is most notably represented by A.R.A. Van Aken, who wrote the seminal article on Roman brick terminology. This article is also referred to in the *Thesaurus Linguae Latinae* (s.v. "later"). Although Van Aken's paper was ground-breaking in several ways, it also contains some inconsistencies. For example, after having stated that *later* could carry the different meanings of "mud brick" and "fired brick", the author continues to suggest that *later coctus/coctilis* is "a sun-dried brick, slightly hardened in the kiln", a statement which he himself later contradicts. Moreover, Van Aken expresses his astonishment over the fact "that the latter classical authors usually continue to speak of the *coctus*, when they mean brick." This observation, if anything, should have made him question his own theory that *later* in the Imperial period regularly meant "fired brick". Finally, he also got some facts wrong: his assertion that "walls built of brick only [i.e. solid brick walls] did not exist", is probably influenced by the completely dominating use of bricks as facing on concrete walls in Roman Imperial architecture, especially in the capital, but not entirely correct.

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18 Lagli 1957, 583–621; Blake 1959, 161–164.  
19 Bukowiecki 2010.  
21 Rivoira 1921, 2; Van Aken 1952, 141, 144; Coarelli 2000, 88–89.  
22 According to Van Aken (1952, 144) the shift towards a new primary meaning of the word *later* occurred in the Claudian-Neronian time; according to Coarelli (2000, 89) it had taken place already in the late Republican period.  
23 Pernier 1920.  
24 Van Aken 1952, 140: *testa* can be a broken tile or a proper brick. Cf. also Helen 1975, 16.  
25 Coarelli (2000, 89), for example, equates *testaceus* and *latericus*.  
26 Van Aken 1952, 141. E.B. Van Deman seems to have held the view that the term *later* would have applied also to semi-baked bricks, as a solution to the "Arezzo paradox" (Blake 1947, 278).  
27 Cf. Van Aken 1952, 142. The interpretation was also criticized by Coarelli (2000, 88) as unfounded.  
28 Van Aken 1952, 144.  
29 Van Aken 1952, 146. Solid brick walls can be found in several places, e.g. in northern Italy (Manzelli 2001).
However, neither of the two theories presented above fit with the evidence (archaeological and literary) and essentially they are based on three false assumptions:

1. The distinction between later and testa primarily represents that between unfired and fired bricks (the first theory).
2. Later merely means “a brick” and may signify any type of brick (the second theory).
3. Testa becomes equivalent with “fired brick” and may signify any type of fired brick (both theories).

In this paper it is argued that:

1. Later originally and primarily signified a moulded block of a certain approximate shape and size, i.e. a large slab that could only be lifted with two hands.
2. When no epithet is used, later usually signifies a large block of unfired clay (i.e. a mud brick).
3. Later coctus/coctilis signifies a fired brick of the same shape and size as a typical mud brick.
4. Testa originally and primarily signified a fragment of a roof tile (or a potsherd).
5. From the middle of the 1st century AD testa may also signify typical Roman Imperial bricks, i.e. relatively thin bricks which have been divided into triangular pieces.
6. Laterculus, although at first it may have been a diminutive form of later, came to be used for denoting (Imperial) Roman fired bricks (especially besales), which have not yet been broken into triangular pieces (testae).

The main point of the argument is that later was never used to describe the typical triangular bricks of the Roman Imperial period. Rather, the use of this word together with the attribute coctus/coctilis provides literary evidence for the continued use of large “Hellenistic” fired bricks into the Imperial period.

Presentation of literary testimonia

132 passages were collected from 31 different authors (see Table 1). In the following section only a brief summary of the testimonia is provided; for the full material, see the appended catalogue. The passages are presented in chronological order, starting with Plautus.

There is no internal evidence for the exact meaning of later in Plautus (Truculentus 305); nor was it relevant to the play. The word laterculus (Poen. 325), however, has for a long time been understood to signify some kind of cake, probably because it was shaped as a small brick. The proverb laterem lavare (“to wash a brick”), used by Terentius (Phorm. 186) as a metaphor for wasted labour, indicates a mud brick rather than a fired brick, as the context implies not only wasted labour, but an action that is counterproductive. The passages from Cató’s De agricultura demonstrate three important things: 1) that later, in this context, most probably was used to signify mud brick; 2) that the word laterculus could be used to indicate objects of a certain shape, rather than a certain material; and 3) that testa could signify both a fragment of a roof tile and (collectively) broken pieces of terracotta (either roof tiles or pottery). This is also supported by later texts: in the writings of Lucilius (frag. 324) later clearly indicates mud brick, and in that of Sisenna (frag. 11) testa is a fragment of a roof tile.

Cicero’s use of later implies that it constituted a common building material in Rome and that it was still employed in his time, but the passages are inconclusive as to its exact meaning, as are those by Sallustius and Livius. In a roughly contemporary source (Caes. BCiv. 2.10.6), however, later must be mud brick, since it could be damaged by water, and this meaning can also be assumed in other passages from that text, including the related words latericus and latericium, since they all refer to the same building. The exact meaning of laterculus in this context is less clear but, in view of the technical character of the text, the word seems to indicate something different from a later. Varro is the first to distinguish between later coctilis and later crudus (Rust. 1.14.4), but in his earlier writing he used later without epithet (Sat. Men. 248). He also refers to mud brick walls (Sat. Men. 530: latericia) as an old, perhaps outdated, building method. In two cases later is used to describe blocks of gold. Nothing in Varro contradicts the translation of testa as a “fragment of a roof tile”, although it is clear that the word could have other meanings as well (e.g. “snail shell”). Opus testaceum (Rust. 3.11) may, therefore, be understood as some kind of brickwork made of broken roof tiles.

Vitrivius also makes the distinction between later coctus and later crudus in his treatise (1.5.8). However, he only makes use of the term later coctus one more time, as he describes the

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31. H.T. Riley (1887, 313 n. 1) mentioned both possibilities. However, the idea that the metaphor is about the futility of washing away the red colour of a fired brick (cf. Otto 1890, 187) seems rather far-fetched. Instead, the use of the proverb by Ambrosius (De virginibus 3.4.19) clearly paints the picture of a dissolving mud brick.
32. Coarelli (2000, 89) mentions Cic. Div. 2.29 as a case where later is used for fired brick, but it is not stated what evidence this conclusion is based on, internal or external. The passage can be compared with Cassius Dio (39.6.1.1–2), who describes the destructive effect of the flood in 54 BC on the houses in Rome, as they were made of παλίθα (i.e. mud bricks).
ancient walls of Babylon in the following sentence, and the expression later crudus is never repeated again. Instead the words later, latericius and latericium are used consistently without any further specification. In at least eight cases (2.3.1; 2.3.2; 2.3.4; 2.8.16; 2.8.17: 2.8.18 ter) these words definitely imply mud brick and in another seven cases (2.3.3; 2.3.4; 2.8.9 ter; 2.8.10; 2.8.16) they almost certainly do. Some of these occurrences are inconclusive, strictly speaking, but in view of their close proximity to and shared context with unambiguous cases, later must be regarded as synonymous with later

33 On the topos of the walls of Babylon, see below.
The use of *tegula sesquipedalis* (5.10.2) and *tegula bipedalis* (5.10.2 bis; 7.4.2) in Vitruvius has not been discussed before, to my knowledge, and deserves mention. This could possibly refer to roof tiles, reworked and reused as floor tiles, but the specific dimensions and obvious need for uniform size leads me to believe that *tegulae*, in this case, signify ready-made floor tiles. The use of this term may be due to their similarity to roof tiles in size and, especially, in thickness. This applies also to *tegula hamata* (7.4.2), which perhaps should be amended as *tegula mamata* (cf. Plinius, *HN* 35.46.159: *mammatis*). These were definitely custom-made tiles, having small rounded protrusions on one side. When placed vertically on interior walls, the small knobs would distance them from the wall surface and create continuous air slots. These slots allowed hot air to circulate through the walls of *calidaria* in baths, and provided protection for wall paintings in damp environments. The use of the expression *tegulae sine marginibus* (5.10.3) is inconclusive and could be explained either as reworked roof tiles or as plain tiles. *Laterculi besales* (5.10.2) were used for *pileae* in a hypocaust and must be understood as fired bricks of a certain shape and size (two thirds of a foot square).

In sum, it can be concluded that, although Vitruvius was aware of fired bricks (1.5.8), in his second book he only discusses mud bricks and mud brick construction. The long digression that starts at 2.8.9 and continues until 2.8.16 clearly aims at proving that mud bricks should not be despised as a lowly building material. Consequently, the walls of Arretium that are mentioned in 2.8.9 were made of mud bricks, at least in Vitruvius’ mind, regardless of the fired bricks that were found by Pernier. He does, however, describe the practice of using broken roof tiles as a “substitute” for fired bricks in certain situations. This seems to reflect the usage of building materials in the city of Rome in the early 20s BC.

The older Seneca (rhetor) repeats the proverb of Plautus (*laterem lavare*) whereas the younger one (philosophus) repeats the anecdote about the floating brick (*later*) that we already know from other sources, but they do not contribute to our understanding of the word. Hyginus (*Fabulae* 223) describes the walls of Babylon, one of the Seven Wonders of the World, as being made of *later coctus* (collect.).

Curtius (7.3.8) speaks about *later and laterculus* in a Near Eastern context where mud brick generally is to be expected. However, he specifies the use of *laterculi coctiles* for the walls of Babylon (5.1.25), whereas Ovidius (*Met. 4.57–58*) and Lucanus (*Bellum civile* 6.49) use the words *coctiles* and *testa* for the same purpose.

The chronological difference between the authors, although slight, may be of importance and possibly indicates a new meaning imbued in the word *testa* (fired brick). The difference may also be attributed to ignorance concerning the exact construction technique that was used in this distant monument. Martialis (9.75) returns to the wording of Vitruvius and Hyginus (*later coctus*) when describing the same edifice.

Columella uses all three words, *later, laterculus,* and *testa,* usually without epithets. Once he specifies *later crudus* (9.1.2), but in at least one other case (11.3.2) it is clear that *later* alone also signifies mud brick. He opposes the use of *lateres* for fences around farms, as they rapidly deteriorate without protection against the rain. Since he in another context (9.7.2) recommends the use of *laterculi* for a similar purpose,

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34 The entire chapter 2.3, for example, is obviously dedicated to mud bricks.

35 Adam (1994, 65) has suggested that *structura testacea,* which was applied as a protective layer on top of mud brick walls (*Vitr. De arch. 2.8.18*), could designate either fragmented or powdered tiles (cf. the use of *testae* in Vitr. *De arch. 7.4.3*). However, it is obvious that quite large fragments are intended here, since the crowning structure only could be made to project from the wall by placing the pieces in superimposed layers, each corbeling the lower one.

36 The Odeion in Tauromenion exhibits large “Hellenistic” fired brick which have been broken into triangular pieces and used as facing on concrete walls. Possibly, the hybrid expression *later testaceus* refers to this usage.

37 Gerdning 2008.

38 We may only speculate whether Vitruvius influenced Hyginus, or if it was the other way around.

39 In the case of Ovidius, it is difficult to establish whether a missing *lateribus* or *laterculi* is implied, or if the epithet *coctiles* refers directly to *muri.* The meaning, however, would be the same: “walls of fired bricks.”
we might assume that this word now indicates some kind of fired brick. In this text testa signifies both shell and fragment. Pavimenta testacea (1.6.13) could be interpreted as a tiled floor, made of broken roof tiles (cf. Vitruv. De arch. 7.1.4), but the most likely reading may be a plastered floor, including small pieces of potsherds (cocti pesto). Frontinus, on the other hand, never mentions later or laterculus and testa only once (Aq. 2.125), when citing a senatorial decree from 11 BC. The exact meaning cannot be deduced, but it is probable that testa signifies broken or powdered terracotta (used as an ingredient in water-resistant plaster), since it was intended for repairing the aqueducts.

Plinius maior has a lot to say about bricks. Some of it seems to derive from Vitruvius, and in these passages later is used consistently for mud bricks. Otherwise Plinius frequently shifts between later/laterculus and later/laterculus crudus. The latter phrase probably reflects instances when the author wished to express himself with greater precision, although to a modern reader it causes some confusion. The epithet coctus/ coctilis is also used occasionally. Of particular interest is the use of laterculus for blocks of salt and stone (31.41.84; 36.14.68), which is reminiscent of Varro’s (Sat. Men. frags. 96, 474) and Tacitus’ (Ann. 16.1) mention of blocks of gold (lateres aurii). Plinius minor obviously exhibits some concern for technical matters in his letters to trajan, although the format does not allow him to go into details. Thus, he uses the expression opus testaceum to signify brickwork of some kind. From the contexts (an aqueduct and a theatre) it can be inferred that we are dealing with some kind of fired bricks, probably combined with Roman concrete (i.e. heavily mortared rubble).

The famous saying about Augustus’ transformation of Rome, which is quoted by Suetonius (Aug. 28.3), has often been taken to mean that the first emperor found a city built of fired bricks (latericus) but left one of marble. However, the internal evidence of the text is inconclusive as to the nature of the bricks. The same goes for the passage from Digesta. Celsus is discussing a legal question, where the expression aenus lateribus circumstructus probably is merely intended to establish that the water container was located within the walls of the building in question. Tertullianus’ use of lateres is also inconclusive. Arnobius (Ado. nat. 4.6) uses laterculi crudii to signify mud bricks and contrasts them with testa, which then should indicate some kind of fired bricks. However, it cannot be ruled out that these testae were made of roof tiles.

In one of Ausonius’ poems (Parentalia 11) testa obviously signifies a roof tile. Since it is thrown away by the tiler, it was most likely broken. Ammianus Marcellinus uses laterculus coctilis in his descriptions of contemporary military buildings in a Near Eastern setting. Ambrosius’ use of the proverb latem lavare has already been mentioned (see n. 31 above). In at least one other passage (De Cain et Abel 2.3.10) he uses later to denote mud bricks. Justinus (Epit. 1.2.7) returns to the theme of the walls of Babylon, and describes them as being made of later coctus (collect.).

Some additional texts are also worth mentioning. Liber aris architectonae by Cetius Faventinus contains many references to bricks, but they were not included in the catalogue. This text clearly represents an abbreviated version/copy of Vitruvius, which closely follows the terminology of the original. Therefore it cannot be regarded as independent evidence, apart from providing an indication that the vocabulary of Vitruvius still made sense in the late 3rd/early 4th century AD. Even this conclusion is uncertain, though. Neither is Palladius included, as he falls outside the chronological time frame of this study. Still, some observations will be made, as he makes for an interesting comparison with Vitruvius. Palladius clearly intends mud bricks when he stipulates the correct time of the year for making lateres (6.12). However, when discussing the proper way to construct a granary floor (1.19.1), he favours the word laterculus. He recommends the use of bipes (i.e. bipedales) or smaller laterculi. The context makes it clear that Palladius is speaking of two kinds (sizes) of fired bricks/tiles. The question is whether the word laterculi refers only to the smaller category of tiles, or both? Possibly the word tegula has been left out.

As already mentioned, the walls of Babylon appear to have constituted a popular topos in Greek and Roman literature. These walls, which were rebuilt and extended during the reign of Nebuchadnezzar in the 6th century BC, were truly remarkable. It is obvious that the great renown of the walls of Babylon to a large extent was founded on their enormous dimensions (thickness, height, and length), but the fact that the new outer circuit was constructed completely of fired bricks, a decision that must have added immensely to the building costs, probably also contributed to their universal fame.40 Thus, they are mentioned in different contexts, for example by Herodotos (1.179) and Aristophanes (Aves 552).41 The subject of the walls also appears with later authors: Diodorus Siculus (2.7; 17.115), Vitruvius (1.5.8; 8.3.8), Hyginus (Fab. 223), Strabon (15.3.2; 16.1.5), Ovidius (Met. 4.57–58), Martialis (9.75), Curtius (5.1.25), Lucanus (Bellum civile 6.49), Flavius Josephus (AJ 10.219), Justinus (Epit. 1.2.7), Orosius (Historiae adversus paganos 2.6.7–9), and Cassiodorus (Var. 7.15). All mention the walls of Babylon, stressing that they were made of fired brick. Only Plinius maior (HN 6.30.121; 35.51.182)

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40 van de Mieroop 2003, 265. Cf. the walls of Uruk, as described in the Epic of Gilgamesh (Tablet 1).
41 The Old Testament (Genesis 11.3) describes how the tower of Babel was built of fired bricks. The story may originally go back to the 2nd millennium BC, but the text was compiled in the 6th or 5th BC and therefore probably alludes to the immense brick production of Nebuchadnezzar and his restoration of the ziggurat in Babylon with fired bricks.
omits this fact in his treatment of the famous walls. The popularity of this topos is without doubt related to the fact that the walls of Babylon was considered one of the seven wonders of the world, although the topos seems to be older than any of the known lists of wonders.

Presentation of epigraphic material

In addition to the literary testimonia, 15 graffiti and three passages from monumental epigraphic texts were also collected. In at least 13 cases the graffiti can be associated with brick production, as they were written on bricks before or shortly after they were laid out to dry and before they were fired (Table 3).62 These scribbles were left by brick makers and the words they used, later (6), laterculus (5), laterculus capitularis (1), bipes (1), most likely denote the items they were currently producing. In some cases this seems to beyond doubt (cat. nos 134, 136, 142, 143, 145). The more humorous texts (cat. nos 133, 135, 137, 144) may possibly refer to brick making in general, rather than the exact objects on which they were found. A further complicating matter is the fact that the graffiti in question all derive from fired bricks, but could signify the unfired, “green” bricks rather than the finished product. Inscribed production numbers were probably meant to be read before firing. The newly moulded bricks were laid out to dry for several weeks before they went to the kiln. By then the daily records had most likely already been tallied. Whether this distinction would affect the choice of words, however, is impossible to determine. Mainly for this reason, this evidence will be left out of the analysis below.

Two occurrences of the word later on walls in Pompeii (cat. nos 146, 147) are inconclusive as to their exact meaning. A funerary inscription from the vicinity of Rome (cat. no. 148), which has been dated to AD 136, describes the sepulchral monument as testacius, i.e. made of testae, but reveals no further clues.

Finally, the Diocletian price edict merits some closer scrutiny (cat. nos 149, 150). This famous inscription includes regulations for the wages of various professions.63 Two paragraphs (7.15–16) concern brick makers. A possible translation would be:

(To the maker) of crude [i.e. unfired] bricks (which are) to become fired bricks, a daily remuneration (should be paid); for four bricks of two feet (in length), under the condition that he prepares (the clay) at his own expense, (and that he has been) supplied with food: two denarii.

In the same way (to the maker) of bricks of clay [i.e. mud bricks] a daily remuneration (should be paid); for eight bricks, under the condition that he prepares (the clay) at his own expense, (and that he has been) supplied with food: two denarii.

H. Blümner interpreted laterculus as synonymous with later coctus, which must be correct.64 However, he wanted to substitute praeest for praeperet and understood it to mean that the brick maker should supply various ingredients, such as tempering agents and straw, at his own expense. Rather it means that the preparation of the clay was included in the compensation.65 Thus, the brick maker had to pay an assistant from his own wage or prepare the clay himself. Brick makers normally work in pairs, with a senior worker (moulder) shaping the bricks and an assistant (temperer) mixing, treading, and handing over the clay.66 This means that the specified remunerations actually had to cover the work of two persons. According to common estimates an experienced brick maker (with an assistant) can shape up to 1,000 bricks in a day.67 This would have earned them about 250 denarii (or 125 denarii each) a day, according to the price edict. This seems far too much compared to other comparable trades, and probably reflects the significance of the size of the bricks. According to another Roman inscription (ILS 8675) a group of brick makers each made about 200 bricks a day.68 Assuming that they all had assistants and that the bricks in question were bipedales to be fired, it would result in a daily wage of about 50 denarii, which is perfectly consistent with other wages in the price edict. The remuneration is the same for making eight mud bricks (lateres) as for making four crude bricks, which are later to be fired.69 However, the latter are specified as bipedales (two by two feet and about six cm thick). The size of the mud bricks is not stated, but if we assume that they belong to the lydion category (one by one-and-a-half feet and about eight cm thick), eight of these would amount to the same volume as four bipedales. Thus, it appears that the wages were strictly related to the amount of clay that was processed.

42 In some cases the objects are fragmented or lost, and may therefore have been roof tiles. Similarly, it cannot always be verified that the letters were actually incised before firing, and not after.
43 For commented editions of the edict, see Mommsen & Blümner 1893; Lauffer 1971.
49 The use of later to designate “green bricks”, which are meant to be fired, can also be found in Hieronymus’ Vulgata (Genesis 11.3).
Table 2. Words used to signify bricks (including roof tiles used as bricks). In the fifth column, "Yes" and "No" indicate that the interpretation is considered certain or almost certain, whereas "Yes?" and "No?" designate a probable interpretation.

<table>
<thead>
<tr>
<th>Author</th>
<th>Reference</th>
<th>Date</th>
<th>Word</th>
<th>Fired</th>
<th>Size</th>
<th>Roof tile</th>
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<td>later</td>
<td>?</td>
<td>?</td>
<td></td>
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<td>later</td>
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<td>later</td>
<td>No?</td>
<td>?</td>
<td></td>
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<td>later</td>
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<td>c. 81–67 BC</td>
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<td>?</td>
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<td>?</td>
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<td>besalis</td>
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<td>c. AD 207–217</td>
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<td>7.15</td>
<td>AD 301</td>
<td>later</td>
<td>No</td>
<td>2'</td>
<td></td>
</tr>
<tr>
<td>Edictum de pretiis</td>
<td>7.16</td>
<td>AD 301</td>
<td>later coctilis</td>
<td>No &lt; 2'</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Edictum de pretiis</td>
<td>7.16</td>
<td>AD 301</td>
<td>later</td>
<td>No &lt; 2'</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Arnobius</td>
<td>Adv. nat. 4.6</td>
<td>c. AD 297–303</td>
<td>laterculus crudus</td>
<td>No</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Arnobius</td>
<td>Adv. nat. 4.6</td>
<td>c. AD 297–303</td>
<td>testa</td>
<td>Yes</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Ammianus Marcellinus</td>
<td>24.2.12</td>
<td>c. AD 380–390</td>
<td>laterculus coctilis</td>
<td>Yes</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Ammianus Marcellinus</td>
<td>24.4.19</td>
<td>c. AD 380–390</td>
<td>later coctilis</td>
<td>Yes</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Ambrosius</td>
<td>De virginibus 3.4.19</td>
<td>c. AD 374–397</td>
<td>later</td>
<td>No</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Ambrosius</td>
<td>De Cain et Abel 2.3.10</td>
<td>c. AD 374–397</td>
<td>later</td>
<td>No</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Ambrosius</td>
<td>De Abraham 2.9.65</td>
<td>c. AD 374–397</td>
<td>later</td>
<td>?</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Justinus</td>
<td>Epit. 1.2.7</td>
<td>c. AD 390?</td>
<td>later coctus</td>
<td>Yes</td>
<td>?</td>
<td></td>
</tr>
</tbody>
</table>
Analysis of word usages

Table 2 presents a summary of all passages, in which a single word or a combination of words has been used to signify the noun "brick" (or something equivalent). This résumé excludes the graffiti incised on green bricks, due to their inherent ambiguity. Adjectives like latericus and testaceus, as well as words for brickwork, brick walls etc., have also been left out. Although this selection reduces the available source material, it allows for a more straightforward comparison. The most common expression is later (40), followed by later crudus (8), later coctus/coctilis (7), laterculus (6), laterculus coctilis (4), testa (4), tegula (4), laterculus crudus (2), later testaceus (1), later ex luto (1), besalis (1), and coctilis (1). The two last adjectives should probably be supplemented with the headwords laterculus and later, which seem to have been left out.50 In this context tegula is actually used to indicate a (large) floor tile or revetment tile of terracotta, and therefore would not normally be translated as "a brick" in English. However, in reality there would be no difference between a large thin Roman brick and a floor tile. The use of the words tegula and bipes has not been systematically explored in this study and may therefore be underrepresented.

Not in a single case can later, used alone, be shown with any probability to indicate fired bricks. In 25 cases, however, distributed over all periods, the internal evidence convincingly demonstrates that later (definitely or most probably) was meant to indicate mud bricks. Conversely, there is no example where laterculus definitely refers to a mud brick. In at least three cases laterculus by itself seems to indicate fired bricks;51 the other three cases are inconclusive or uncertain. In one of these Curtius (7.3.8) clearly contrasts later with laterculus when he describes some domestic buildings in the East: the lower parts of the houses were built of the former kind of bricks, the upper parts of the latter. Also here the interpretation of laterculus as fired bricks seems likely, although far from certain.52 Furthermore, it is noteworthy that in two other passages, where laterculus does not signify a proper brick, the word still refers to something that has been baked in an oven (Plaut. Poen. 325; Cato, Agr. 109.1). Still, as with later and testa, the distinction between later and laterculus cannot be explained solely as a matter of unfired or fired clay, since it does not account for the occasional use of the epithets crudus and coctus/coctilis.

Testa, as a word for "brick" only occurs four times. In three cases we are definitely dealing with some kind of fired bricks, and in one of these it is obvious that they are made of roof tiles (Vitr. De arch. 2.8.19). The fourth passage is probably also indicating roof tiles reused as bricks (2.8.4). Even more interesting, though, is the frequent use of testa for fragmented or crushed tiles/potsherds (at least 18 passages). Thus, Lucanus (Bellum civile 6.49) is the earliest case where this word can be assumed, with some confidence, to have been used to signify ordinary fired bricks.

If we now turn to the use of the adjectives latericus and testaceus (14 and 15 occurrences respectively), the observed pattern is confirmed. In ten cases latericus is certainly or almost certainly used to indicate that something is made of mud bricks; the remaining four cases are inconclusive. Testaceus is more difficult to determine with absolute certainty, but in at least seven passages it refers to something which includes fragmented or crushed terracotta, often broken roof tiles, and the same interpretation can be applied in most of the others. Only one phrase stands out: later testaceus (Vitr. De arch. 8.3.8).53 The use of the noun latericium (brickwork, brick wall) must be regarded as inconclusive, but in three cases (out of a total of eight) it is definitely or most probably used to indicate a structure made of mud bricks. In none of the cases can it be positively shown that we are dealing with fired bricks.

As already mentioned above, the habit of using later to signify mud bricks seems to remain unchanged throughout the entire period that has been studied. Some other possible developments over time can be noticed, however. It is striking, for example, that the word laterculus, which clearly carries a diminutive implication in some of the earlier texts (Plaut. Poen. 325; Cato, Agr. 109.1), is combined with the adjective besalis by Vitruvius, with pedalis by Plinius maior and with bipedalis in the Diocletian price edict. This probably reflects a change in the meaning of the word. It should also be noted that both later and laterculus are used by brick makers to signify green bricks which are meant to be fired (Table 3). In two cases (cat. nos 134, 136), the word later can be firmly connected to the lydion size category. Laterculus, on the other hand, is at one time associated with a besalis (cat. no. 133) and at another with a bipedalis (cat. no. 143).

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50 Cf. the use of bipes in Palladius 1.19.1 and IL5 8673 (cat. no. 145). It should be noted that the word coctilis only appears in connection with bricks.
51 These can be supplemented by some later literary evidence (Palladius 1.19.1; Isid. Origines 19.10.14).
52 It would perhaps make more sense to use fired bricks at the base of a mud brick wall, as a substitute for the stone socle, but it could also serve as a protective crowning of the wall (cf. Vitr. De arch. 2.8.18).
53 For a possible interpretation of later testaceus, see above n. 36.
### Table 3. Words used to denote bricks in graffiti made by brick makers. The last two columns refer to the object carrying the text.

<table>
<thead>
<tr>
<th>Cat. no.</th>
<th>Reference</th>
<th>Date</th>
<th>Word</th>
<th>Size</th>
<th>Brick</th>
</tr>
</thead>
<tbody>
<tr>
<td>133</td>
<td>CIL 3.8277.3</td>
<td>Imperial</td>
<td>laterculus</td>
<td>c. 28 × 28 cm</td>
<td>Yes</td>
</tr>
<tr>
<td>134</td>
<td>CIL 3.11383</td>
<td>3rd cent. AD</td>
<td>lateres</td>
<td>44 × 31 × 5.5 cm</td>
<td>Yes</td>
</tr>
<tr>
<td>135</td>
<td>CIL 3.14336.3</td>
<td>Imperial</td>
<td>lateres</td>
<td>thickness 6.5 cm</td>
<td>Yes</td>
</tr>
<tr>
<td>136</td>
<td>IMS 2.227</td>
<td>Imperial</td>
<td>lateres</td>
<td>41 × 30 × 5 cm</td>
<td>Yes</td>
</tr>
<tr>
<td>137</td>
<td>CIL 5.8110.176</td>
<td>Imperial?</td>
<td>lateres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>138</td>
<td>de Alarcão &amp; Etienne 1976, no. 359</td>
<td>Imperial</td>
<td>lateres</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>139</td>
<td>de Alarcão &amp; Etienne 1976, no. 367</td>
<td>Imperial</td>
<td>lateres</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>140</td>
<td>Serrano Ramos &amp; Atencia Pérez 1981, no. 58</td>
<td>Imperial?</td>
<td>lateres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>141</td>
<td>Scholz 2012, no. 24</td>
<td>after c. AD 180</td>
<td>latericus</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>142</td>
<td>IDR 3.6310</td>
<td>AD 106–271</td>
<td>laterculus</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>143</td>
<td>Scholz 2012, no. 82</td>
<td>c. AD 130–230</td>
<td>latericus</td>
<td>c. 60 × 60 cm</td>
<td>Yes</td>
</tr>
<tr>
<td>144</td>
<td>Scholz 2012, no. 83</td>
<td>Imperial (Late Roman)</td>
<td>laterolos</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>145</td>
<td>ILS 8673</td>
<td>AD 228</td>
<td>bipedas</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

### An alternative interpretation

One particular passage in Vitruvius (2.3.3) offers an important clue to the meaning of the different words and their usage: "...fiunt autem laterum genera tria ..." Vitruvius continues by naming these types and defining them as bricks of different size and/or shape: tetradoron, pentadoron, and lydion. All three classes are still roughly of the same size, though: between one and one-and-a-half feet in length. In the preceding passage Vitruvius is clearly discussing mud bricks, but archaeological finds have shown that the classification would have applied also to Hellenistic fired bricks. When Vitruvius wants to describe smaller units (e.g. besales) he uses laterculus and for larger sizes he uses tegula. This allows us to formulate a comprehensive hypothesis:

Roman brick terminology was not primarily based on differences in material and fabric (i.e. fired vs. unfired clay), but rather on shape and dimensions. A large block (at least one foot long on either side and with a considerable thickness) would be a later; a smaller and/or thinner slab would be a laterculus; a large but relatively thin tile might be called a tegula, regardless of whether it had flanges or not. All three words may encompass entities made of different materials: lateres and laterculi could be blocks made of fired or unfired clay, as well as of gold, stone, paste, or salt; whereas tegulae could designate both terracotta and marble tiles. Since the vast majority of all lateres were mud bricks, also during the Roman Imperial period, usually no epithet was needed. However, in certain contexts it was deemed necessary or appropriate to be more specific, either for making distinctions or for the sake of clarity. It could also be a matter of convention, as for example in descriptions of the walls of Babylon, where the presence of fired bricks constituted a topos. Thus, it is not necessary to postulate a transformation of the general connotation of the word later. Laterculus, on the other hand, probably went through a significant shift in meaning, from denoting small blocks of any kind to predominantly representing the standardized fired bricks that were produced in the Imperial brick yards: the laterculi of Caesar might have been just small mud bricks, the laterculi of Vitruvius were small fired bricks, whereas the laterculi in the Diocletian price edict were fired but not particularly small (two by two feet). The latter development probably also corresponds to a shift in Imperial brick production from predominantly besales to sesquipedales and bipedales. All of them, however, could be broken up into smaller units.

The fired bricks that were being made in central Italy from the late Augustan period onwards were considerably thinner than the old Hellenistic bricks (the production of which continued into the Imperial period in other parts of Italy and also in some provinces). The thickness of these new bricks was probably influenced by the reuse of roof tiles, which was common both in Campania and Latium by the end of the 1st century.

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54 Gerding & Östborn forthcoming.
55 Cf. bricks stamps mentioning tegula sesquipedalis and tegula bipedalis (CIL 15,650–651). These are probably plain square tiles, rather than roof tiles.
56 See e.g. Livius 42.3.2.
century BC. By making them thinner than traditional Hellenistic bricks the firing process could be made more efficient and the risk of cracking was greatly reduced. The modest thickness also made them easier to break into neat triangular pieces when used as facing in concrete walls. Small reclining bricks, regardless of whether they were irregular fragments of roof tiles or triangular bats, bonded well with the concrete core. More importantly, though, they were small enough to be lifted with one hand by the mason while he held a trowel in the other. This allowed a much quicker working pace when compared to the Hellenistic bricks, which usually weighed well over 20 kg and could only be lifted with two hands. The advantages of speed and comfort obviously outweighed the fact that an increased number of bricks had to be laid to reach the same wall height.

The difference in size, and consequently also in cost, quality, handling, and usage, was significant and motivated a clear linguistic distinction between the Hellenistic (thick) *laterococcus* and the Imperial (thin) *laterococcitilis*. Since the employment of small mud bricks probably was very limited, the epithet could be dropped without the risk of any confusion. This means that *laterocculus*, from the early Imperial period onwards, can be assumed to be synonymous with *laterococcitilis*. One of the best examples of this is the Diocletian price edict. It is probably also the case in Vitruvius (5.10.2), Columella, and Palladius. As already mentioned, however, most of these *laterculi* were broken up into triangular pieces. After that they were probably not called *laterculi*, but *testae*. The word *testa* originally refers to some kind of fragment, usually a piece of a broken roof tile. However, the triangular brick bats of the Roman Imperial period were used in the same manner as the *testae* of Varro and Vitruvius, and they were also made in a similar way, that is by breaking up a terracotta tile/brick into smaller pieces. Thus, it would not be surprising if the word *testa* was transferred onto this new standardized building unit. Admittedly, the use of *testa* for triangular bricks (or any kind of brick for that matter) is not well testified in the literary sources, but can be deduced from expressions such as *opus testaceum*, found for example in the letters of Pliny minor.

The Roman brick makers do not demonstrate any attempts to distinguish between fired and unfired bricks in their graffiti, nor was there any need to. These short messages, directed to their immediate colleagues, were often hurried and abbreviated, but the context made the content fully clear. It would be more important for them to be able to specify brick dimension, since it was related to output, work effort, and earnings.

To sum up, the basic significance of *later* seems to be closer to the concept of “a block” than “a brick”, although in practice the word was used predominantly to denote mud bricks. *Laterculus* clearly lost its diminutive connotation with time, but was retained to indicate the standardized (relatively thin) Imperial bricks, thus distinguishing them from the more block-like *later*. The principal connotation of *testa* (in this context), on the other hand, reverts to the act of breaking up something that is hard or crustaceous, and the outcome of this act (broken pieces or fragments). It should be emphasized that the connotation of *later* as “a block” has been recognized before, as is evident from the entry in *Oxford Latin Dictionary*. It has generally been regarded as a secondary or parallel meaning, though. By bringing this implication of the word to the fore it is possible to reach a better understanding of the nuances in Latin brick terminology and how the different words relate to various distinctions such as those between fired and unfired bricks, Hellenistic and Imperial bricks, custom made and recycled bricks.

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57 The habit of breaking up bricks into triangular pieces and use them as facing on concrete walls was occasionally taken up in areas where large Hellenistic bricks continued to dominate, as can be seen e.g. in the theatre and odeum in Tauromenion (both probably from the period of Hadrian). However, the remains clearly show that the thickness of these bricks made it difficult to break them into regular pieces, even if they had been scored diagonally before firing.

58 See e.g. Blake 1947, 303; Bukowiecki 2010, 145.

59 Since the triangular bricks only functioned as lost shuttering and facing, the concrete core being the load-bearing element, these bricks did not need full width throughout their entire length.

60 The difference in weight between a fired *lydion* and a *besalis* is substantial: c. 2.1 kg compared to c. 2.4 kg.


62 Roman Imperial bricks were usually notched along the diagonals before firing, in order to make this procedure easier (see e.g. Blake 1947, 302.)


64 Cf. the Greek equivalent πλίνθος.
Testimonia

Plautus (fl. c. 204–184 BC; Truculentus c. 190 BC)
1. Plaut. Truculentus 305 (Lindsay) – later
AS. nihil mirum (uetus est maceria) lateres si ueteres ruont.
[Inconclusive: lateres = bricks of unknown type]

2. Plaut. Poen. 325 (Lindsay) – laterculus
AG. opscero hercle, ut mulsa loquitur? MI. nil nisi laterculos, sesumam papauremque, triticum et frictas nuces.
[Laterculi probably signifies cakes shaped like small bricks.]

Terentius (c. 190–159 BC; Phormio 161 BC)
3. Ter. Phorm. 186 – later
GE. quod quom audierit, quod eiu’ remedium inveniam iracundiae?
loquarne? incendam; taceam? instigem; purgem me? laterem lavem.
[Later] most probably signifies a mud brick (a metaphor for wasted/counterproductive effort – a mud brick becomes grimmer, the more it is washed; cf. Ambrosius, De virginibus 3.4.19.)

Cato (234–149 BC; De agricu]la c. 160–150 BC)
Villa lapide calce; fundamenta supra terram pede, ceteros pareties ex latere, iugumenta et antepagmenta quae opus erunt indito.
[In view of the use of a stone socle, later (collect.) most probably signifies mud bricks.]

5. Cato, Agr. 18.7 – testa
… eo calcem cribro subcretam indito alte digitos duo, ibi de testa arida pavimentum struito; ubi structum erit, pavito fricatoque, uti pavimentum bonum siet.
[Testa (collect.) probably signifies potsherds or pieces of broken roof tiles.]

6. Cato, Agr. 38.3 – later
Si parum altam fornacem habelis ubi facias, lateres summam statuito aut caementis cum luto summam extrinsecus oblimito.
[Later (collect.) probably indicates mud bricks, considering the suggested use of latum (the bricks would eventually be baked by the heat from the kiln anyway).]

7. Cato, Agr. 39.2 – laterculus
Ubi saseris, qui colorem eundem facias, creta crudae partes duas, calcis tertiam conmisceto; inde laterculos facito, coquito in fornace, cum conterito idque inducito.
[laterculi = (small?) blocks (of chalk and lime)]

8. Cato, Agr. 109.1 – laterculus
De ervo farinam facito libras IIII et vini cyathos IIII conspar gito sapa. Postea facito laterculus. Sinito conhibitant noctem et diem. Postea conniscetuo cum eo vino in dolio et oblimito post dies LX.
[laterculi = small blocks (of paste)]

9. Cato, Agr. 110.1 – testa
Odoem deteriorem demere vino. Testam de tegula crassam puram calfacito in igni bene. Ubi calebit, eam picato, resticula alienato, testam demittito in dolium inimium leniter, sinito biduum oblitum dolium.
[testa = fragment of a roof tile]

10. Cato, Agr. 113.1 – testa
Ut odoratum bene sit, sic facito. Sumito testam picatam, eo prunam lenem indito, suffito serta et schoeno et palma, quam habent unguentarii, ponito in dolio et operito, ne odor exeat, antequam vinum indas.
[Testa most probably indicates a fragment of a roof tile (cf. De agricultura 110.1).]

Lucilius (fl. c. 132–117 BC; d. 103/2 BC)
11. Lucil. frag. 324 (Marx) – later
<et> laterem qui ducit, habet nihil amplius na<tu>m quam commune lutum a paleis cenoque aceratum.
[later = mud brick (only mud bricks are mixed with straw)]

12. Lucil. frag. 681 (Marx) – later
cribrum, incerniculum, lucernam, in laterem, in telam licium.
[Inconclusive: The meaning of later is unclear (among the possessions of a frugal wife).]

Sisenna (c. 120–67 BC; Historiae c. 80–70 BC)
13. Sisenna, Historiae frag. 11 (Peter) – testa
… dissipatis imbricum fragminibus ac testis regularum ...
[testa = fragment of a roof tile]

Cicero (106–43 BC; De domo sua 57 BC; Ad Atticum 5.12 51 BC; De divinatione 44 BC)
Neque porro illa manus copiaeque Catilinae caementis ac testis tectorum meorum se famem suam expleturas putaverunt ...
[Testae probably indicate the broken roof tiles of Cicero’s ruined house, corresponding to the caementa of the walls.]

15. Cic. Att. 5.12.3 – later
Cui rei fugerat me rescribere, de strue laterum, plane rogo, de aqua si quid poterit fieri, eo sis animo quo soles esse ...
[Inconclusive: lateres = bricks of unknown type]
Fac in puerò referre ex qua adfectione caeli primum spiritum duxerit; num hoc in latere aut in caemento, ex quibus urbs effecta est, potuit valere?
[Inconclusive: later (collect.) = bricks of unknown type]

Caesar (100–44 BC; De bello civile 49–48 BC)

17. Caes. BCiv. 2.8.1 – later
Est animadversum ab legionibus, qui dextrae partem operis administrabant, ex crebris hostium eruptionibus magno sibi esse praecidio posse, si ibi pro castello ac receptaculo turrim ex laterè sub muro fecissent.
[Later (collect.) most probably signifies mud bricks (refers to the same building as 2.10.6).]

18. Caes. BCiv. 2.9.2 – laterculus
Hanc super contagitationem, quantum tectum plutei ac vinearum passum est, later(i)culo adstruxerunt ...
[Inconclusive: laterculi = (small?) bricks of unknown type]

19. Caes. BCiv. 2.9.4 – later; latericium
... eamque contabulationem summan lateribus lutoque constraverunt, ne quid ignis hostium nocere posset, centonesque insuper inicérerunt, ne aut tela tormentis immissa tabulationem perfringerent, aut saxa ex catapultis insuper inietserunt, ne aut tela tormentis immissa tabula straverunt, ne quid ignis hostium nocere posset; centonesque eamque contabulationem summam diluverunt.

20. Caes. BCiv. 2.10.1 – latericium
... quem a turri latericia ad hostium turrim murumque perducérunt ...
[Latericia most probably means ”(made) of mud bricks” (refers to the same building as 2.10.6).]

21. Caes. BCiv. 2.10.4–6 – later
Ad extremum musculi tectum trabes que extremas quadratas regulas IIII patenis digitos deígunt quae lateres qui super musculo struantur conteínant. Ita fastigato atque ordinatim structo ut trabes erant in capreolis conlocatae [in] lateribus luto musculus ut ab igni qui ex muro inacerréter tutus esset contegitur. Super lateres coria inducuntur, ne canalis aqua immissa lateres diluere posset.
[lateres = mud bricks (they are vulnerable to water)]

22. Caes. BCiv. 2.14.4 – latericium
illi sub murum se recipiunt ibi que musculum turrim que latericiam libere incendunt.
[Latericium most probably means ”(made) of mud bricks” (refers to the same building as 2.10.6).]

23. Caes. BCiv. 2.15.6 – latericum
... aggerem novi generis atque inauditum ex latericiis duobus muris senum pedum crassitudine atque eorum murorum contagiatione facere instituerunt aqua fere altitudine, atque ille congesticus ex materia fuerat agger.
[Laticia probably signifies brickwork of mud bricks, considering the speed of the work (cf. 2.16.1).]

Sallustius (86–35 BC; Historiae c. 40 BC)

24. Sall. Hist. frag. 4.79 – later
... clausi lateribus altis pedem ...
[Inconclusive: lateres = bricks of unknown type]

Varro (116–27 BC; Saturae Menippeae c. 81–67 BC; De re rustica 37 BC)

25. Varro, Sat. Men. frag. 96 (Astbury) – later
Ludon fluens sub Sardibus flumen tulit aurum, later quod conquadravit regius [later = block (of gold)]

hic ut quadrato later stirpatae strues
[Inconclusive: later (collect.) = bricks of unknown type]

27. Varro, Sat. Men. frag. 530 (Astbury) – latericium
antiqui nostri in domibus latericiis paululum modo lapidibus suffundatis, ut umorem ecfugerent, habitabant [laterica = walls of mud bricks (need protection from moisture)]

28. Varro, Sat. Men. frag. 474 (Astbury) – later
ubi dicuntur barbari innumerabiles lateres aureos habuisse [lateres = blocks (of gold)]

29. Varro, Rust. 1.14.4 – lateroclit; later crudus
Quartum fabrile saepimentum est novissimum, maceria. Huius fere species quattuor, quod fiant e lapide, ut in agro Tusculano, quod e lateribus coclitibus, ut in agro Gallico, quod e lateribus crudis, ut in agro Sabino, quod ex terra et lapillis compositis in formis, ut in Hispania et agro Tarentino.
[lateres coclitiles = fired bricks]
[lateres crudus = unfired bricks (mud bricks)]

30. Varro, Rust. 2.3.6 – testa
Id, ut plerque, lapide aut testa subserini oportet, caprile quo minus sit uliginosum ac luteulentum.
[Testa (collect.) probably signifies pieces of reused or broken roof tiles.]

31. Varro, Rust. 3.11.2 – testaceus
Circum totum parietem intrinsecus crepidio lata, in qua secundum parietem sint tecta cubilia, ante ea vestibulum earum exaequatum tectorio operic testaceo.
[Opus testaceum signifies some kind of wall structure involving testa, probably masonry of broken roof tiles.]

32. Varro, R. 3.16.27 – testa
... in qua aqua iaceant testae aut lapilli, ita ut exstent paulum, ubi adsidere et bibere possint.
[testa = fragments (of broken roof tiles?)]

Vitrivius (De architectura c. 35–25 BC)

33. Vitr. De arch. 1.5.8 (Granger) – lateroctus; later crudus
Sed ubi sunt saxa quadrata sive silex seu caementum aut coctus later sive crudus, his erit utendum. Non enim, uti Babylonae abundantes liquid bitumine pro calce et harena ex cocto later e faciam habent murum ...
[lateroctus = fired brick]
[later crudus = unfired brick (mud brick)]
[later octus (collect.) = fired bricks (the walls of Babylon)]

34. Vitr. De arch. 2.1.7 (Granger) – latericius
... non casas sed etiam domos fundat aus latericiis parietibus aut e lapide structas materiaque et tegula tecta perficere coeperunt ...
[Inconclusive: latericius = made of bricks of unknown kind]

35. Vitr. De arch. 2.3.1 (Granger) – later
Itaque primum de lateribus, qua de terra duci eos oporeteat, dicam.
[lateres = mud bricks (mixed with straw and vulnerable to rain)]

36. Vitr. De arch. 2.3.2 (Granger) – later
... igitur tectoria ab structura seuinceta propter tuitatem per se stare non possunt, sed franguntur, ipsique parietes fortuito sidentes vitiantur. Ideo etiam Uitcenses laterem, si sit aridis et ante quinquennium ductus, cum arbitrio magistratus fuerit ita probatus, tunc utuntur in parietum structuris.
[later = mud brick (only mud brick would continue to dry in a wall)]

37. Vitr. De arch. 2.3.3 (Granger) – later
Fuint autem laterum genera tria ... [Lateres most probably signify mud bricks (cf. 2.3.1–2).]

38. Vitr. De arch. 2.3.4 (Granger) – later; semilaterium; semilater
Fuint autem cum his lateribus semilateria. Quae cum struuntur, una parte lateribus ordines, altera semilatereis ponuntur. Ergo ex utraque parte ad lineam cum struuntur, alternis coriis parietes alligantur et mediis lateres supra coagmenta conlocati et firmitatem et speciem faciant uraure parte non inveniunt.
[Lateres most probably signify mud bricks (cf. 2.3.1–2).]

[Semilateria most probably signifies lateres divided in half.]
[semilatere = late re divided in half (necessary to break joints in the described bond)]

39. Vitr. De arch. 2.3.4 (Granger) – later
Est autem in Hispania ... ubi lateres cum sunt ducti et arefacti, proiecti natant in aqua.
[lateres = mud bricks (only dried; cf. Pliniius HN 35.49.171)]

40. Vitr. De arch. 2.5.1 (Granger) – testa
Etiam in fluviatrica aut marina si qui testam tunsam et succe- tam ex tertia parte adiecercet, efficiet materiae temperaturam ad usum mieriorem.
[testa (collect.) = fragments of terracotta]

41. Vitr. De arch. 2.8.4 (Granger) – testa
... ex rubro sando quadrato aut ex testa aut ex silicibus ordinarius struat bipedes parietes ...
[Testa (collect.) probably signifies pieces of broken roof tiles (used as bricks).]

42. Vitr. De arch. 2.8.5 (Granger) – latericium
... et uti latericia struentes alligant eorum alternis coriis co- agmenta ...
[Inconclusive: latericia = brick walls of unknown kind]

43. Vitr. De arch. 2.8.9 (Granger) – latericium; later; latericius
De latericius vero, dummodo ad perpendicularum sint stantes, nihil deducitur ... I旬ae nonnullis civitatis et publica opera et privatas domos etiam regias a lateri structas licet videre: et primum Athenis murum ... item Patris in aede Lovis et Hercu- lis latericias cellas ... in Italia Arretio vetustum egregie factum murum.
[Latericia most probably signifies walls of mud brick (cf. 2.8.16).]
[Later (collect.) most probably signifies mud bricks (cf. 2.8.16).]
[Latericius most probably means “(made) of mud bricks” (cf. 2.8.16).]

44. Vitr. De arch. 2.8.10 (Granger) – later
... regis Mauioli domus ... parietes habet late re structos ...
[Later (collect.) most probably signifies mud bricks (described as an inexpensive building material; cf. 2.8.16).]

45. Vitr. De arch. 2.8.16 (Granger) – latericius
Cum ergo tam magna potentia reges non contemperint lat- ericiorum parietum structuras ... non puto oportere inprobare quae sunt e latericia structura facta aedificia, dummodo recte sint tecta.
[Latericius most probably means “(made) of mud bricks}.]
[structura latericia = brickwork made of mud bricks (only mud brick would have to be covered)]
46. Vitr. De arch. 2.8.17 (Granger) – latericius Latericii vero, nisi diplinthii aut triplinthii fuerint, sesquipedali crassitudinem non possunt plus unam sustinere contignationem.

47. Vitr. De arch. 2.8.17 (Granger) – testaceus

Itaque pilis lapideis structuris testaceis, parietibus caementicis altitudines extructae ...

[Structurae testaceae signifies some kind of structures involving testa (= masonry of broken roof tiles?).]

48. Vitr. De arch. 2.8.18 (Granger) – latericius; testaceus; later Quoniam ergo explicata ratio est, quid qua in urbe propter necessitatem angustiarum non patiuntur esse latericios parietes, cum extra urbem opus erit his uti, sine vitis ad vetustatem, sic erit faciendum. Summis parietibus structura testacea sub tegula subiciatur altitudine circiter sesquipedali habeant proi ... tate in tecto cum est conlocata, tunc, si est firma, probatur; statim nemo potest iudicare, quod in tempestatibus et aedificare ...

49. Vitr. De arch. 2.8.19 (Granger) – testa De ipsa autem testa, si sit optima seu vitiosa ad structuram, statim nemo potest iudicare, quod in tempestatibus et aestate in tecto cum est conlocata, tunc, si est firma, probatur; namque quae non fuerit ex creta bona aut parum erit coca, ibi se ostendit esse viosisam gelidiiis et pruina tacta. Ergo quae non in tectis poterit pati laborem, ea non potest in structura oneri ferendo esse firma. Quare maxime ex veteribus tegulis tecta structa; parietibus firmitate poterunt habere. [testa = fragment of roof tiles (used as a brick)]

50. Vitr. De arch. 2.8.20 (Granger) – testaceus

Itaque satius esse videtur inspessa testacea in sumptu, quam compendio craticiorum esse in periculo. [parietes] testacei = (walls/brickwork) made of fragments of roof tiles (cf. 2.8.18–19)]

51. Vitr. De arch. 5.10.2 (Granger) – tegula ...

ut primum sesquipedalibus tegulis solum sternatur inclinationum ad hypocaustum ...

[tegulae sesquipedales = terracotta tiles/bricks (1½ foot sq.)]

52. Vitr. De arch. 5.10.2 (Granger) – laterculus; tegula Supraque laterculis besalibus pilae structurit ita dispositae, uti bipeidas tegulae possint supra esse conlocatae ...

[Laterculi besales most probably signifies fired bricks (⅔ foot square), considering their use in a hypocaust.]

[tegulae bipeidas = terracotta tiles/bricks (2 feet square)]

53. Vitr. De arch. 5.10.2 (Granger) – tegula ...

... supraque conlocentur tegulae bipeidas quae sustinent pavimentum.

[tegulae bipeidas = terracotta tiles/bricks (2 feet square)]

54. Vitr. De arch. 5.10.3 (Granger) – tegula ... caeque regulae sive arcus ita disponentur, uti tegulae sine marginibus sedere in dubius invehiique possint ...

[tegulae sine marginibus = flat tiles or roof tiles with flanges removed]

55. Vitr. De arch. 5.10.3 (Granger) – testa ...

inferior autem pars ... primum testam calce trullizetur, deinde opere albario sive tectorio poliatur. [testa (collect.) = crushed pieces of roof tiles or potsherds]

56. Vitr. De arch. 6.8.9 (Granger) – latericium ...

praeterea in domini est potestate, utrum latericio an caementicio an saxo quadrato velit aedificare ...

[Inconclusive: latericium = brickwork of unknown type]

57. Vitr. De arch. 7.1.3 (Granger) – testa

Insuper ex testa nucleus indicatur mixtionem habens ad tres partes unam calcis ...

[testa (collect.) = crushed pieces of roof tiles or potsherds]

58. Vitr. De arch. 7.1.4 (Granger) – testaceus Item testacea spicata tiburtina sunt diligenter exigenda, ut ne habeant lacunas nec extantes tumulos, sed extenta et ad regulam perfricata.

[Testaceus probably means ”(made) of tile fragments”.]

59. Vitr. De arch. 7.1.7 (Granger) – tegula ...

tegulae bipeidas inter se coagentatae supra rudus substrata materia conlocentur ...

[tegulae bipeidas = terracotta tiles/bricks (2 feet square)]

60. Vitr. De arch. 7.1.7 (Granger) – testaceus

Supra autem sive ex tesserae grandis sive ex spica testacea structurit fastigiis ...

[Testaceus probably means ”(made) of tile fragments”.]

61. Vitr. De arch. 7.4.1 (Granger) – testa ...

... in imo pavimento alte circiter pedibus tribus pro harenato testa trullissetur et dirigatur ...

[testa (collect.) = crushed or powdered pieces of roof tiles or potsherds (used in mortar instead of sand)]
Later, laterculus, and testa: New Perspectives on Latin Brick Terminology • Henrik Gerdin • 25

Vitr. De arch. 7.4.1 (Granger) – testa
His perfectis paries testa trullissetur et dirigatur et tunc tecto muris coctilibus.
[Inconclusive: later (collect.) = bricks of unknown type (in Heraclea in Aetolia)]

62. Vitr. De arch. 7.4.2 (Granger) – tegula; besalis
Sin autem locus non patietur structuram fieri, canales fiant et
nares exant ad locum patentem. Deinde tegulae bipedales ex
una parte supra marginem canalis inponantur, ex altera parte
besalis pilae substruantur, in quibus duarum tegularum anguli sedere possint, et ita a parietae eae distent, ut ne plus pate
ant palnum. Deinde insuper erectae hamatae tegulae ab imo
ad summum ad parietem figantur ...

63. Vitr. De arch. 7.4.3 (Granger) – testaceus
... uti trullissationem testaceam non respuant ...
[testaceus = of terracotta fragments]

64. Vitr. De arch. 7.4.3 (Granger) – testa
Trullissatione inducta pro harenato testa dirigatur ...
[testa (collect.) = crushed or powdered pieces of roof tiles or
potsherds (cf. 7.4.1 above)]

65. Vitr. De arch. 7.4.5 (Granger) – testaceus
... et solo festucato inducitur aut rudus aut testaceus pavimentum ...
[testaceus = of terracotta fragments]

66. Vitr. De arch. 8.3.8 (Granger) – later testaceus
... quo bitumine et later testaceo structum murum Samaramis circumedit Babylonem.
[later testaceus (collect.) = later coctus (cf. 1.5.8: the walls of
Babylon)]

Hyginus (fl. c. 28 BC–AD 17)

67. Hyg. Fab. 223 (Marshall) – later coctus
murus in Babylonia, quem fecit Semiramis Dercetis filia later
coctus et sulphure ferro unictum, latum pedes XXV altum pe
des LX in circitu stadiorum CCC.
[later coctus (collect.) = fired bricks (the walls of Babylon)]

Livius (59 BC–AD 17)

68. Livius, 36.22.11 – later
... deserta quae in vestibulo urbis erat tecta in varos usus non
tigna modo et tabulas sed laterem quoque et caementa et saxa
variae magnitudinis praebent.

[Inconclusive: later (collect.) = bricks of unknown type (in Cassand-
reia)]
76. Curt. 5.1.29 – laterculus coctilis
Coctili laterculi structi sunt, totum opus bitumine adstringitur. [laterculus coctilis (collect.) = fired bricks (public works in Babylon; cf. Herodotos 1.179–186)]

77. Curt. 7.3.8 – later; laterculus
Tuguria later ab imo structa et, quia sterilis est terra materia in nudo etiam montis dorso, ad summum aedificiorum fastigium eodem laterculo utuntur. [Inconclusive: later (collect.) = bricks of unknown type]

78. Curt. 8.10.25 – later crudus
XXXV stadium murus urbem conplectitur, cuius ima saxo, superiore crudum latere sunt structa. Lateri vinculum lapides sunt, quos interposuere, ut duriori materiae fragilis incumbe ret, simulque terra humore diluta. [later crudus (collect.) = mud brick (city walls of Massaga)]

Lucanus (AD 39–65; Bellum civile AD 62–65)
79. Luc. Bellum civile 6.49 – testa
Nunc vetus Iliacos attollat fabula muros adscribatque deis; fragili circumdata moenia mirentur refugi Babylonia Parthi [testa (collect.) = fired bricks (the walls of Babylon)]

Columella (De re rustica AD 60–65)
80. Columella, Rust. 1.6.13 – testaceus
Tum deinde cum exaruit, simili modo pavimenta testacea, quae pro aqua receperint amurcum mixtam calci et harenae, super-sternuntur et magna vi paviculis inculcantur atque expoliuntur; omnesque parietum et soli iuncturae super-sternuntur et magna vi paviculis inculcantur atque ex quae pro aqua receperint amurcam mixtam calci et harenae, [testaceus (made) of terracotta fragments]

81. Columella, Rust. 6.14.6 – laticium
Itaque cum id accidit, veteri latericio trito, prius quam diun gantur, collara conspargi oportet et deinde, cum adsiccerint, subinde oleo inbui. [Inconclusive: laticium = bricks (brickwork) of unknown type]

82. Columella, Rust. 6.15.1 – testa
... si forte surculum calcaverit, aut acuta testa vel lapide ungulam pertuderit [testa = fragment (of a tile or brick?)]

83. Columella, Rust. 7.5.8 – testa
... quae tamen prius aspera testa defricta vel pumice reducaturat. [Testa is probably a piece of tile or brick.]

84. Columella, Rust. 8.14.1 – laticulus
Sub porticus deinde quadratae harae caementis vel etiam lat erculis extruuntur ... [Inconclusive: laticuli = bricks of unknown type (building for geese, cf. Varro, Rust. 3.11: opus testaceum).]

85. Columella, Rust. 9.1.2 – later crudus
Modus silvae pro cuiusque facultatibus occupatur, ac si lapidis et operae vilitas suadet, haut dubie caementis et calce formatum circumdatur murus, sin aliter crudo laterac ac luto constructus. [later crudus (collect.) = mud bricks]

86. Columella, Rust. 9.6.4 – laticium
Nam quod maxime movet Celsum, ne sint stabula vel igni vel furibus obnoxia, potest vitari latericio circumstructis alvis, ... [Inconclusive: laticium = wall made of bricks of unknown type]

87. Columella, Rust. 9.7.2 – later; laticulus
Superponuntur deinde sive, ut Celso placer, lateribus facta domicilia, sive, ut nobis, alvaria praeterquam tergo et frontibus circumstructa; seu, quod paene omnium in usu est qui modo diligenter ista curant, per ordinem vasa disposita ligantur vel laterculis vel caementis, ita ut singula binis parietibus angustis conterminantur, liberaeque frontes utrimque sint. [Inconclusive: lateres = bricks of unknown type (the contra position of laticuli may suggest that unfired bricks are indicated).]

[Laticuli probably signify fired bricks, otherwise the walls would be damaged by rain (cf. 11.3.2).]

88. Columella, Rust. 11.3.2 – later
Democritus in eo libro, quem Georgicon appellavit, parum prudenter censet eos facere, qui hortis exstruant munimenta, quod neque lateres fabricata maceres perennare possit pluviis ac tempestatibus plerumque infestata neque lapides supra rei dignitatem poscat inspensa; [later = mud brick]

Plinius maior (AD 23/24–79; Naturalis historia c. AD 73–77)
89. Plin. HN 2.61.147 – later coctus
Eodem causam dicente lateribus coctis pluisses in acta eius anni relatum est. [lateres cocti = fired bricks]

90. Plin. HN 2.84.197 – later
Tutissimi sunt aedificiorum fornes, anguli quoque paretium postesque, alterno pulsu renitente. et later terreno facti parietes minore noxa quatiuntur. [Inconclusive: later (collect.) = bricks of unknown type (fired bricks would probably withstand earthquakes better than mud brick).]
91. Plin. HN 7.56.193 – *laterculus coctilis*
E diverso Epigenes apud Babyloniens DCCXX annorum observavere siderum coctilis *laterculus* inscriptas docet, gravis auctor in primis;

[*laterculi coctiles* = fired clay tablets]

92. Plin. HN 7.56.194 – *lateraria*
Laterariae ac domus constituerunt primi Euryalus et Hierubius fratres Athenis; antea specus erant pro domibus.

[*laterariae* = brickworks (this is described as the first building material adopted by man, which implies mud bricks; cf. Martin 1965, 47 n. 1)]

93. Plin. HN 17.21.98 – *later*
Sabina herba propagine seritur et avolsione; tradunt facere vini aut e parietibus *lates* tuo mire ali.

[*Later* (collect.) most probably signifies mud bricks.]

94. Plin. HN 18.23.98 – *later crudus*
Lentem torreri prius, dein cum furfuribus leviter pisi aut ad dito in sextarios XX *lateris crudi* frusto et harene semudio.

[*later crudus* = mud brick]

95. Plin. HN 18.73.301 – *latericius*
Horrea opore tripedali crassitudine latericius exaeedificari iubent aliqui, praeteraque superne impleri nec adflatus ad intritam ipsam eorum, priusquam fingatur, macerari oportet.

[*latericius* = made of bricks of unknown type]

96. Plin. HN 19.45.156 – *laterarius*
Odit hiemem et umorem ac fimum, apricis gaudet ac siccis terraque quam maxime *lateraria*, cinere vult nutriri.

[*laterarius* = used for making bricks (of unknown type)]

Quidam et aquam diluto *latercrudo* inimicam his putant.

[*later crudus* = mud brick (remedy against ants)]

98. Plin. HN 30.20.63 – *laterculus crudus*
... alter sacrificio quodam facto crudis laterculis ad formam camini atque, ut sacrum peractum est, obstructo sacello.

[*laterculi crudis* = (small?) unfired bricks]

99. Plin. HN 31.20.29 – *later*
In Colossis flumen est, quo *lateres* coniciet lapidei extrahuntur.

[*Inconclusive: lateres = bricks of unknown type (the marvel of the transformation indicates mud brick)]

100. Plin. HN 31.41.84 – *laterculus*
E Cappadocia qui in *laterulus* adfertur, cutis nitiorem dicitur facere.

[*laterculi = moulded blocks (of salt)]

101. Plin. HN 35.46.159 – *laterculus coctilis*
... vel adsiduitate satiant figurinarum opera, dolis ad vina ex cogitatis, ad aquas tubulis, ad balineas mammatis, ad tecta imbriciibus, coctilibus *laterculus* fundamentisque aut quae rota fiunt, propter quae Numa rex septimum collegium figurorum instituit.

[*laterculi coctiles* = fired bricks]

102. Plin. HN 35.48.169 – *later crudus*
Inlini quidem crates parietum luto et *lateribus crudis* exstrui quis ignorat?

[*lateres crudis* = mud bricks (cf. Vitr. De arch. 2.3.2)]

103. Plin. HN 35.49.170 – *later*
Lateres non sunt ex sabuloso neque harenoso multoque minus calculoso ducendi solo, sed e cretoso et albicante aut ex rubrica vel etiam e sabulo, masculo certe. Finguntur optime vere, nam solstitio rimosi fiunt. Aedificii non nisi bimos probant, quia et intritam ipsam eorum, priusquam fingantur, macerari oportet.

[*lateres* = mud bricks (cf. Vitr. De arch. 2.3.4)]

105. Plin. HN 35.49.172 – *latericius*
Gracii, praeterquam ubi e silice fieri poterat structura, latericii parietes praetulere.

[*Latericius* most probably means “(made) of mud bricks” (cf. Vitr. De arch. 2.8.9).]

106. Plin. HN 35.49.173 – *latericius*
Lacedaemon quidem *latericii* parietibus excisum opus tectorium propter excellendiam picturae ligneis formis inclusum Romam deportavere ...

[*latericius* = (made) of mud brick]

107. Plin. HN 35.49.173 – *latericius*
In Italia quoque *latericii* murus Arreti et Mevaniae est.

[*Latericius* most probably means “(made) of mud bricks” (cf. Vitr. De arch. 2.8.9).]

108. Plin. HN 36.6.47 – *latericus*
Antiquissima, quod equidem inveniam, Halicarnasi domus Mausoli Proconnesio marmore exculta est.

[*Latericus* most probably means “(made) of mud bricks” (cf. Vitr. De arch. 2.8.10).]

... navesque duas in latitudinem patulas pedalibus ex codem lapide ad rationem geminati per duplicem mensuram ponder-
is oneratās ita, ut subirent obeliscum pendentem extremitātibus suis in ripis utrimque; postea egestis laterculus adlevatās naves excepisse onus:

\[ \text{laterculus} = \text{pedales (ex lapide)} = \text{(one foot) blocks (of stone)} \]

110. Plin. *HN* 36.17.81 – later
alii lateribus e luto factis extrectos pontes, peracto opere lateribus in privatas domos distribuēs ... [Lateres most probably signify mud bricks (used by the Egyptians).]

111. Plin. *HN* 36.51.171 – latericium
Gracci e lapide duro aut silice aequato struunt veluti latericium parietes.

\[ \text{Inconclusive: latericium = (made) of bricks of unknown type (probably indicate large bricks laid in regular courses)} \]

112. Plin. *HN* 36.54.175 – testa
Harenæ tria genera: [...] Si et testae tueæ tertia pars addatur, melior materia erit.

\[ \text{testa (collect.) = terracotta fragments (cf. 36.62.186)} \]

Uliginosa et ubi salsum vīriet testaceo sublīni utilius.

\[ \text{testaceus = of terracotta fragments (cf. Vitr. De arch. 7.1.4)} \]

Similiter fiunt spicata testaceae.

\[ \text{Testaceus probably means “(made) of tile fragments” (cf. Vitr. De arch. 7.1.4)} \]

115. Plin. *HN* 36.63.188 – testaceus
... testaceum pavimentum ...

\[ \text{testaceus = (made) of terracotta fragments (cf. Columella, Rust. 1.6.13)} \]

**Martialis (c. AD 38–104)**

116. Martialis 9.75 – later coctus
Non silice duro structilive caemento, nec later cocto, quo Samiramis longam Babylona cinxit, Tucca balneum fecit:

\[ \text{later coctus (collect.) = fired bricks (the walls of Babylon)} \]

**Frontinus (c. AD 30–104; De aquae ductu urbis Romae c. AD 98)**

117. Frontin. *Ag.* 2.125 – testa
... ex agris privatorum terra, limus, lapides, testa, harena, ligna ceteraque quibus ad eam rem opus esset ...

\[ \text{Testa probably signifies crushed terracotta intended for water-resistant mortar/plaster. (The text quotes a senatorial decree from 11 BC on the repair of aqueducts.)} \]

**Plinius minor (c. AD 61–112; Epistulae ad Traianum c. AD 111)**

Manent adhuc paucissimi arcus: possunt et erigi quidam lapide quadrato, qui ex superiore opere detractus est; aliquis pars, ut mihi videtur, testaceo opere agenda erit, id enim et facilius et vilius.

\[ \text{[Inconclusive: opus testaceum = brickwork of fired bricks or reused tiles]} \]

... quia sint caemento medii farti nec testaceo opere praecincti.

\[ \text{[Inconclusive: opus testaceum = brickwork of fired bricks or reused tiles]} \]

**Tacitus (c. AD 56–120; Annales c. AD 115)**

120. Tac. *Ann.* 16.1 – later
... quo magna vis auri contineretur, non in formam pecuniae sed rudi et antiquo pondere. lateres quippe praegravis iacere, adstantibus parte alia columnis ...

\[ \text{[lateres = blocks (of gold)]} \]

**Suetonius (c. AD 69–125; Vita divi Augusti c. AD 115–125)**

Urbem neque pro maiestate imperii ornatam et inundationibus incendiisque obnoxīt aedem adaeque, neque pro maiestate imperii ornatam et inundationibus incendiisque obnoxīt. [Latericus = brickwork of fired bricks or reused tiles]

**Celsius (fl. AD 106–129)**

122. Celsus, *Digesta* 19.1.38.2 – latericus
Firmus a Proculo quaequit, si de plumbeo castello fistulae sub terram missae aquam ducerent in aenom...

\[ \text{[Inconclusive: lateres = bricks of unknown type]} \]

**Tertullianus (c. AD 160–240; De resurrectione mortuorum after AD 207)**

123. Tert. *De resurrectione mortuorum* 35 – later
Sic et parietis corpus non aliud admittam quem caementa, quam saxa, quam lateres.

\[ \text{[Inconclusive: lateres = bricks of unknown type]} \]

**Arnobius maius (d. c. AD 330; Adversus nationes c. AD 297–303)**

124. Arn. *Adv. nat.* 4.6 – laterculus crudus; testa
Lateranus, ut dicitis, deus est focorum et genius adiectus quantum hoc nomine, quod ex laterculis ab hominibus crudus caminorum istud exaedificetur genus. Quid ergo? si testa aut materia fuerint quacumque alia fabricati, foci genios non habebunt,
et ab officio tutelae quisquis iste est Lateranus abscedet, quod regni sui possessio non luteis constructa est formis? [laterculi crudi = (small?) unfired bricks (cf. Plin. HN 30.20.63)]

[Inconclusive: testa (collect.) = fired bricks or reused roof tiles]

125. Arn. Adv. nat. 6.16 – testa coctilis ... coctilibus testis succumbitis ...
[Inconclusive: testae coctiles = terracotta objects (bricks?)]

Ammianus Marcellinus (c.AD 330–395)

127. Amm. Marc. 24.2.12 – laterculus coctilis
... in Euphratis fluenta projectae cautes eminentius tuebantur, in qua excellabant minae murorum bitumine et coctilibus laterculi fabricatae, quo adificiis genere nihil esse tuitius constat. [laterculi coctiles = fired bricks (the citadel of Pirisabora)]

128. Amm. Marc. 24.4.19 – later coctilis
cum enim ut saepe discursarum partes leuius concertarent, abusue incusso ariete, qui paulo ante erat adinmotus, sternitur residuis omnibus altior turris later coctili firmissime structa, cuius ruina muri contiguum latere cum immane fragore prostravit.
[later coctilis (collect.) = fired brick (the city of Maiozamalcha)]

Ambrosius (c.AD 340–397; De virginibus after AD 374)

129. Ambrosi, De virginibus 3.4.19 – later
Sed ille, sicut is qui laterem lauat, saecularia saecularibus frustra cupiebat abolere; magis enim se oblinebat luto qui remedium a uluptate quaerebat.
[later = mud brick (cf. Terentius, Phormio 186)]

130. Ambrosi, De Cain et Abel 2.3.10 – later
Ideo et dominus in euangelo inanim populum gentilium miseratus laborem, qui lateres construuerunt lutulentae superstitionis et uluptati corporis dediti, solidum fidei murum aedificare non possent, ...
[later = mud brick]

131. Ambrosi, De Abraham 2.9.65 – later
Ita ergo et nos in hac terra adlectionis fugiamus lateres formare, ...
[Inconclusive: lateres = bricks of unknown type]

Justinus (Epitome historiarum Philippicarum Pompei Trogi c. AD 390?)

132. Just. Epit. 1.2.7 – later coctus
Haec Babyloniam condidit murum que urbi cocto lateres circumdedit, arenae vice bitumine interstrato, quae materia in illis locis passim inventur e terra exaestuata.
[later coctus (collect.) = fired bricks (the walls of Babylon)]

Epigraphic material

133. CIL 3.8277.3; Scholz 2012, no. 54 (Golubinje, Moesia superior) – laterculus
[Fac] laterc(u)lus [CC(?)] [F]uriane | [m]ale dor[mie]s si nun fe]ceris
[Laterculi most probably signify green bricks to be fired (inscribed on brick before firing; c. 28 × 28 cm)]

134. CIL 3.11383; Matijašić 1986; Scholz 2012, no. 23 (Scicla, Pannonia superior) – later
V Kal(endas) Aug(ustas) | Severus et | Fortunat[u]s | later(es) CCCXXXX
[Lateres = green bricks to be fired (inscribed on brick before firing; 44 × 31 × 5.5 cm)]

135. CIL 3.14336.3; p. 2328,179 (Novi, Dalmatia) – laterculus?
Vivas f[elix] | qui later[cula] | qui facie(s)
[Laterculi probably signify green bricks to be fired (inscribed on brick before firing; fragment 28+ × 25+ × 6.5 cm)]

136. IMS 2.227; Scholz 2012, no. 67 (Viminacium, Moesia superior) – later
Gesubalu(s) | Bitus q(uis?) | exib(u)it | later(es) | numeru(s) / CCCII
[Lateres = green bricks to be fired (inscribed on brick before firing; 41 × 30 × 5 cm)]

137. CIL 5.8110.176; ILS 8674; Scholz 2012, no. 84 (Aquileia) – later
Cave malum si non | rarser| lateres DC | si raser is minus malum formidabis
[Lateres probably signify green bricks to be fired (inscribed on large brick or tile before firing)]
138. de Alarcão & Etienne 1976, no. 359 (Conimbriga, Lusitania) – *later*
(A)gilio | CI *lateres*
[*Lateres probably signify green bricks to be fired (inscribed on brick before firing?)*]

139. de Alarcão & Etienne 1976, no. 367 (Conimbriga, Lusitania) – *later?*
Titus f(ecit) VI *lat(eres)*
[*Lateres probably signify green bricks to be fired (inscribed on brick before firing?)*]

140. Serrano Ramos & Atencia Páez 1981, no. 58 (Baetica) – *later*
Natalis feci *lat|eres* decu(rioni) mun(icipii) | kau(s)tas num ero V | (e)c t XXX
[*Lateres probably signify green bricks to be fired (inscribed on brick before firing?)*]

141. Scholz 2012, no. 24; Peacock 1982, 143 (Holdcurn, Germania inferior) – *laterculus*
Kal(endis) Iuni(i}s | Quartus | *laterc(u)los* | n(umero) CCXIII
[*Laterculi probably signify green bricks to be fired (inscribed on brick or roof tile before firing)*]

142. IDR 3.6.310; Scholz 2012, no. 80 (Apulum, Dacia) – *laterculus*
F(ecit) MI | *laterculos* | CCLXXXXIII
leg(io) XIII G(emin)a
[*Laterculi = green bricks to be fired (inscribed on brick before firing)*]

143. Scholz 2012, no. 82; Peacock 1982, 143 (Haselburg, Germania superior) – *laterculus capitularis*
Stratura tertia | *laterc(u)li* capi(t(u)lares | n(umero) CCCLXXV
[*Laterculi capitulares = green bricks to be fired (inscribed on brick before firing; square brick used in *suspensura*, probably *bipedalis*)]

144. Scholz 2012, no. 83; Gudea 1988 (Sacidava, Moesia inferior) – *laterculus*
[---] latercolos ira[cunditer … fecit … ?] | [---] milia eos [---]
[*Laterculi probably signify green bricks to be fired (inscribed on brick before firing)*]

145. *ILS* 8673; Scholz 2012, no. 25 (Casilinium AD 228) – *bipes*
N.D.E.T.C | idibus Iul(i)s Celer inget | *bipedas* VXXXI | Actum Casilino | Modesto II et Probo co(n)s(ulibus)
[*Bipes = green bricks to be fired (2 feet square; inscribed on large brick or tile before firing)*]

146. *CIL* 4.2325 (Pompeii) – *later*
Logadi *lateres* XXXIX
[Inconclusive: *lateres = bricks of unknown type (inscribed on a wall)*]

147. *CIL* 4.4273 (Pompeii) – *laterculus*
Lateris LX | Mag(i) va[le]
[Inconclusive: *lateres = bricks of unknown type (inscribed on a wall)*]

148. *CIL* 6.10242.10 (Rome AD 136) – *testacius*
… A MONIMENTO TEST[ACIO]…
[Inconclusive: *testacius = (made) of fired bricks or reused roof tiles*]

149. [Diocletianus], *Edictum de pretiis rerum venalium* 7.15 [AD 301] – *later crudus; laterculus; later*
Lateris crud[i] ad laterculos diurnam mercedem, in lateribus quattuor pedum vinum, ita ut ipse sibi inspensam praep[a]ret, pasto π duos
[*Later crudus (collect.) most probably signifies green bricks which are meant to be fired (2 feet square).]*
[*Laterculi most probably signifies fired bricks (2 feet square).]*
[*Lateres = lateres crud(i) (2 feet square)*]

150. [Diocletianus], *Edictum de pretiis rerum venalium* 7.16 [AD 301] – *later*
Item *lateris ex luto* diurnam mercedem, in lateribus no. octo, ita ut ipse sibi inspensam praeparet, pasto π duos
[*Later ex luto (collect.) = mud bricks]*
[*Lateres = lateres ex luto*]

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