



LUND UNIVERSITY

Later, laterculus and testa

new perspectives on Latin brick terminology

Gerding, Henrik

Published in:

Opuscula: Annual of the Swedish Institutes At Athens and Rome

DOI:

[10.30549/opathrom-09-02](https://doi.org/10.30549/opathrom-09-02)

2016

Document Version:

Publisher's PDF, also known as Version of record

[Link to publication](#)

Citation for published version (APA):

Gerding, H. (2016). *Later, laterculus and testa: new perspectives on Latin brick terminology. Opuscula: Annual of the Swedish Institutes At Athens and Rome*, 9(1), 7-31. <https://doi.org/10.30549/opathrom-09-02>

Total number of authors:

1

Creative Commons License:

CC BY-NC-ND

General rights

Unless other specific re-use rights are stated the following general rights apply:

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

Read more about Creative commons licenses: <https://creativecommons.org/licenses/>

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

LUND UNIVERSITY

PO Box 117
221 00 Lund
+46 46-222 00 00

SVENSKA INSTITUTEN I ATHEN OCH ROM
INSTITUTUM ATHENIENSE ATQUE INSTITUTUM ROMANUM REGNI SUECIAE

Opuscula

Annual of the Swedish Institutes at Athens and Rome

9
2016

STOCKHOLM

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*.¹ 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

* 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 agree-

later -eris, m.

1 A brick; -eres *ducere*, to make bricks. **b** (sg.) brickwork, bricks. **c** (prov. after Gk. πλινθον πλύνειν) -erem *lauare*, to waste one’s labour.

2 A block, bar, ingot (of metal).

laterāria -ae, f. A brickworks, brick-kiln.

laterārius -a -um, a. (of earth) Used for brickmaking.

laterculus -ī, m.

1 A small brick, tile; (also sg.) brickwork.

2 A brick-shaped mass, block; a hard cake or biscuit.

3 (surv.) A square piece of land, parcel.

latericium -(i)ī, n. Brickwork; (pl.) brick walls.

latericius -a -um, a. Made or constructed of brickwork, brick.

testa -ae, f.

1 An object made of burnt clay: **a** an earthenware jar or other vessel. **b** a brick or tile. **c** (collect.) pulverized tile or earthenware (as material for pavements; also as colouring). **d** (transf.) a dark red eruption on the skin. **e** a method of clapping, perh. with the flat of the hand.

2 A fragment of earthenware, shard, crock. **b** (in general) a fragment, splinter (esp. of broken bone or tooth); (app. also of a bone in its natural state).

3 The hard outer covering of a crustacean, snail, etc., shell.

b (applied to a sheet of ice; also app. of glass or sim.).

testāceus (-i)ī, a. -um, a.

1 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.

2 (of animals) Having a hard outer covering or shell; (also of the covering).

testārius -(i)ī, m.

1 A maker or seller of bricks or pottery of burnt clay.

ment. In this paper only those connotations that are related to bricks will be discussed.

2 (in mining, perh.) One who gleans through the fragments of ore.

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.³ 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.⁴ 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.⁵ 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.⁶ For some curious reason roof tiles seem to differ from bricks in this regard, as we occasionally find the word *tegula* 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-

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*.⁷

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.⁸ 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.⁹ It did not appear in the Graeco-Roman world until the second half of the 4th century BC.¹⁰ 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*.¹¹

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 as the use of proper bricks, and was particularly rife in southern Italy.¹² 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 they were then divided into smaller pieces. These *ersatz* 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,¹³ where an exterior brick casing provided both lost shuttering and protective surface for the concrete core.¹⁴ 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,¹⁵ 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.¹⁶ 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.¹⁷ 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* ($\frac{2}{3}$ of a Roman foot on either side), but they all retained the relative thinness of roof

⁷ The fact that dimensions are specified (*tegula scipipedalis*, *tegula bipedalis*) 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.

⁸ Scholz 2012. According to Matijašić (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.

⁹ For mud bricks and the Near Eastern brick tradition, see Sauvage 1998; Wright 2005, 75–108.

¹⁰ Gerding 2006; Östborn & Gerding 2015. For a full account of the development, see Gerding & Östborn forthcoming.

¹¹ Vitr. *De arch.* 2.3.3.

¹² A well-documented early example can also be found in Fregellae in central Italy (Coarelli 2000).

¹³ Roman concrete may be more correctly described as “strongly mortared rubble construction” (DeLaine 2001, 230).

¹⁴ 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.

¹⁵ Aquileia: Righini 1999, 138f., 147.

¹⁶ Gerding 2008. *Contra* Coarelli 2000.

¹⁷ Östborn & Gerding 2015; Gerding & Östborn forthcoming.

tiles (generally about 4.5 cm).¹⁸ Before they were actually used as wall facing, they were broken up into neat triangular pieces. Most scholars adhere to the view that the purpose of the triangular shape was to augment the bond between wall facing and concrete core, just as with the pyramid-shaped stones used in *opus reticulatum*.¹⁹

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 (*sesquipedalis* 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,²⁰ 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.²¹ 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.²² 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.²³

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.²⁴ Thus, during this period *later* and *testa* would have been interchangeable.²⁵

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”,²⁶ a statement which he himself later contradicts.²⁷ 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”.²⁸ 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.²⁹

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 *latericius*.

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).

¹⁸ Lugli 1957, 583–621; Blake 1959, 161–164.

¹⁹ Bukowiecki 2010.

²⁰ Choisy 1899, I 520; Blake 1947, 276f.; Helen 1975, 16: *Later* always means sun-dried brick. Cf. also Adam 1994, 341 n. 58.

²¹ Rivoira 1921, 2; Van Aken 1952, 141, 144; Coarelli 2000, 88–89.

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.³⁰ 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.³¹ The passages from Cato’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,³² 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 *latericius* 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.

Vitruvius 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

³⁰ Riley 1880–1881, vol. 2, 366 n. 2.

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.* 2.99 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 (39.61.1–2), who describes the destructive effect of the flood in 54 BC on the houses in Rome, as they were made of πλίνθοι (i.e. mud bricks).

Table 1. *List of authors.*

<i>Author</i>	<i>Date</i>	<i>Birthplace</i>	<i>Residency</i>	<i>Genre</i>
Plautus	<i>fl.</i> c. 204–184 BC	Sarsina	Rome?	Comedy
Terentius	c. 190–159 BC	(North Africa)	Rome	Comedy
Cato	234–149 BC	Tusculum	Rome	Agricultural treatise
Lucilius	<i>fl.</i> c. 132–117 BC	Suessa Aurunca	Rome	Satire
Sisenna	c. 120–67 BC	? (Italy)	Rome	History
Cicero	106–43 BC	Arpinum	Rome	Oration; letters; philosophy
Caesar	100–44 BC	Rome	Rome	History
Sallustius	86–35 BC	Amiternum	Rome	History
Varro	116–27 BC	Reate?	Rome	Satire; agricultural treatise
Vitruvius	<i>fl.</i> c. 35–25 BC	? (Italy)	Rome	Architectural treatise
Hyginus	<i>fl.</i> c. 28 BC	Spain?	Rome	Mythography
Livius	59 BC–AD 17	Patavium	Rome	History
Ovidius	43 BC–AD 17	Sulmo	Rome	Epic poetry
Seneca (rhetor)	c. 50 BC–AD 40	Corduba	Rome/Corduba	Rhetorical treatise
Seneca (philosophus)	c. 4 BC–AD 65	Corduba	Rome	Natural science
Curtius	<i>fl.</i> mid-1st cent. AD	?	Rome?	History
Lucanus	AD 39–65	Corduba	Rome	Epic poetry
Columella	<i>fl.</i> c. AD 60–65	Gades	? (Italia)	Agricultural treatise
Plinius maior	AD 23/24–79	Comum	Rome?	Natural science
Martialis	c. AD 38–104	Bilbilis (Spain)	Rome	Epigrams
Frontinus	c. AD 30–104	?	Rome	Treatise on aqueducts
Plinius minor	c. AD 61–112	Comum	Rome	Letters
Tacitus	c. AD 56–120	? (Gallia)	Rome	History
Suetonius	c. AD 69–125	?	Rome	Biography
Celsus	<i>fl.</i> AD 106–129	?	Rome	Law
Tertullianus	c. AD 160–240	Carthage	Carthage	Exegesis
Arnobius maior	d. c. AD 330	?	Sicca Veneria (Numidia)	Apologetic treatise
Ausonius	c. AD 310–394	Burdigala	Trier	Poetry
Ammianus Marcellinus	c. AD 330–395	Antiochia?	Rome	History
Ambrosius	c. AD 340–397	Augusta Treverorum	Rome/Mediolanum	Exegesis
Justinus	<i>fl.</i> c. AD 390?	?	?	History

ancient walls of Babylon in the following sentence,³³ 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.

crudus here as well.³⁴ In three cases (2.1.7; 2.8.5; 6.8.9) the internal evidence points neither way.

In at least one case (2.8.19) *testa* quite obviously signifies pieces of broken roof tiles; in another one (7.13.3) it is used to denote a fragment of a shell (not included in the catalogue). In several passages (2.5.1; 5.10.3; 7.1.3; 7.4.1 *bis*; 7.4.3) *testa* is mentioned as an important ingredient in mortar or plaster. This could be either broken roof tiles or potsherds, and it is also difficult to say whether they were crushed into a fine-grained powder (as a substitute for sand) or merely broken in very small pieces before mixing (Italian *cocciopesto*). Similarly, the word *testaceus* is used to describe pavements or wall coatings that include terracotta fragments of various sorts (7.4.3; 7.4.5). In some instances, however, Vitruvius' use of *testa* (2.8.4; 2.8.19) and *structura testacea* (2.8.17; 2.8.18; cf. 2.8.20) clearly indicates that large chunks of roof tiles were used for the construction of walls, probably both as facing and as aggregate in the concrete core, perhaps even in solid brick masonry.³⁵ It is reasonable to assume that *spicata tiburtina testacea* (7.1.4; cf. 7.1.7) is a pavement consisting of rectangular pieces of roof tiles laid in a herring-bone pattern. *Later testaceus* (8.3.8) is a unique combination of words, but it appears that it is meant to be synonymous with *later coctus*, as the term is used to describe the ancient walls of Babylon.³⁶

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 be roof tiles, reworked and reused as floor tiles, but the specified 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 *pilae* 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.³⁷

The older Seneca (rhetor) repeats the proverb of Plautus (*laterem lavare*) whereas the younger one (philosophus) reiterates 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.).³⁸ 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.³⁹ 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,

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 *testaceus* 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 corbelling 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 Gerding 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 *laterculis* is implied, or if the epithet *coctilibus* refers directly to *muris*. 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. Vit. *De arch.* 7.1.4), but the most likely reading may be a plastered floor, including small pieces of potsherds (*cocciopesto*). 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 auri*). 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 (*latericius*) 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 (*Adv. nat.* 4.6) uses *laterculi crudi* 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 (*laterem 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 artis architectonicae* by Cetus 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 Herodotus (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 adversum 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)

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).⁴² 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 be 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.⁴³ 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.⁴⁴ However, he wanted to substitute *praestet* for *praeparet* 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.⁴⁵ 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.⁴⁶ 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.⁴⁷ 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.⁴⁸ 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.⁴⁹ 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.

⁴⁴ Mommsen & Blümner 1893, 108. Similarly, Lauffer 1971, 235.

⁴⁵ Cf. Lauffer 1971, 235.

⁴⁶ See e.g. Hampe & Winter 1965, 27, 49, 108, 209.

⁴⁷ Wright 2005, 99. Cf. DeLaine 2001, 261–262.

⁴⁸ Cf. Matijašić 1986 and Catalogue no. 141.

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).

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.

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.

<i>Author</i>	<i>Reference</i>	<i>Date</i>	<i>Word</i>	<i>Fired</i>	<i>Size</i>	<i>Roof tile</i>
Plautus	<i>Truculentus</i> 305	c. 190 BC	<i>later</i>	?	?	
Terentius	<i>Phorm.</i> 186	161 BC	<i>later</i>	No	?	
Cato	<i>Agr.</i> 14.4	c. 160 BC	<i>later</i>	No	?	
Cato	<i>Agr.</i> 38.3	c. 160 BC	<i>later</i>	No?	?	
Lucilius	frag. 324	c. 125 BC	<i>later</i>	No	?	
Varro	<i>Sat. Men.</i> 248	c. 81–67 BC	<i>later</i>	?	?	
Cicero	<i>Att.</i> 5.12.3	51 BC	<i>later</i>	?	?	
Caesar	<i>BCiv.</i> 2.8.1	49 BC	<i>later</i>	No	?	
Caesar	<i>BCiv.</i> 2.9.2	49 BC	<i>laterculus</i>	?	?	
Caesar	<i>BCiv.</i> 2.9.4	49 BC	<i>later</i>	No	?	
Caesar	<i>BCiv.</i> 2.10.4–6	49 BC	<i>later</i>	No	?	
Cicero	<i>Div.</i> 2.99	44 BC	<i>later</i>	?	?	
Sallustius	<i>Hist. frag.</i> 4.79	c. 40 BC	<i>later</i>	?	?	
Varro	<i>Rust.</i> 1.14.4	37 BC	<i>later coctilis</i>	Yes	?	
Varro	<i>Rust.</i> 1.14.4	37 BC	<i>later crudus</i>	No	?	
Vitruvius	1.5.8	c. 30 BC	<i>later coctus</i>	Yes	?	
Vitruvius	1.5.8	c. 30 BC	<i>later crudus</i>	No	?	
Vitruvius	2.3.1	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.3.2	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.3.3	c. 30 BC	<i>later</i>	No	1–1 ½ ’	
Vitruvius	2.3.4	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.3.4	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.8.4	c. 30 BC	<i>testa</i>	Yes?	?	Yes?
Vitruvius	2.8.9	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.8.10	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.8.18	c. 30 BC	<i>later</i>	No	?	
Vitruvius	2.8.19	c. 30 BC	<i>testa</i>	Yes	?	Yes
Vitruvius	5.10.2	c. 30 BC	<i>tegula</i>	Yes	1 ½ ’	
Vitruvius	5.10.2	c. 30 BC	<i>laterculus</i>	Yes?	⅔ ’	
Vitruvius	5.10.2	c. 30 BC	<i>tegula</i>	Yes	2 ’	
Vitruvius	7.1.7	c. 30 BC	<i>tegula</i>	Yes	2 ’	
Vitruvius	7.4.2	c. 30 BC	<i>tegula</i>	Yes	2 ’	
Vitruvius	7.4.2	c. 30 BC	<i>besalis</i>	Yes?	⅔ ’	
Vitruvius	8.3.8	c. 30 BC	<i>later testaceus</i>	Yes	?	
Hyginus	<i>Fab.</i> 223	c. 28 BC	<i>later coctus</i>	Yes	?	
Livius	36.22.11	c. 15 BC	<i>later</i>	?	?	
Livius	44.11.5	c. 15 BC	<i>later</i>	?	?	
Ovidius	<i>Met.</i> 4.58	c. AD 8	<i>coctilis</i>	Yes	?	
Seneca (rhetor)	<i>Controv.</i> 10 praef. 11	c. AD 35	<i>later</i>	No	?	
Curtius	5.1.25	c. AD 50	<i>laterculus coctilis</i>	Yes	?	

Curtius	5.1.29	c. AD 50	<i>laterculus coctilis</i>	Yes	?	
Curtius	7.3.8	c. AD 50	<i>later</i>	?	?	
Curtius	7.3.8	c. AD 50	<i>laterculus</i>	?	?	
Curtius	8.10.25	c. AD 50	<i>later crudus</i>	No	?	
Seneca (philosophus)	<i>Q Nat.</i> 3.25.5	c. AD 65	<i>later</i>	?	?	
Lucanus	6.49	c. AD 65	<i>testa</i>	Yes	?	
Columella	8.14.1	c. AD 65	<i>laterculus</i>	?	?	
Columella	9.1.2	c. AD 65	<i>later crudus</i>	No	?	
Columella	9.7.2	c. AD 65	<i>later</i>	?	?	
Columella	9.7.2	c. AD 65	<i>laterculus</i>	Yes?	?	
Columella	11.3.2	c. AD 65	<i>later</i>	No	?	
Plinius	<i>HN</i> 2.61.147	c. AD 75	<i>later coctus</i>	Yes	?	
Plinius	<i>HN</i> 2.84.197	c. AD 75	<i>later</i>	?	?	
Plinius	<i>HN</i> 17.21.98	c. AD 75	<i>later</i>	No	?	
Plinius	<i>HN</i> 18.23.98	c. AD 75	<i>later crudus</i>	No	?	
Plinius	<i>HN</i> 19.58.178	c. AD 75	<i>later crudus</i>	No	?	
Plinius	<i>HN</i> 30.20.63	c. AD 75	<i>laterculus crudus</i>	No	?	
Plinius	<i>HN</i> 31.20.29	c. AD 75	<i>later</i>	?	?	
Plinius	<i>HN</i> 35.46.159	c. AD 75	<i>laterculus coctilis</i>	Yes	?	
Plinius	<i>HN</i> 35.48.169	c. AD 75	<i>later crudus</i>	No	?	
Plinius	<i>HN</i> 35.49.170	c. AD 75	<i>later</i>	No	?	
Plinius	<i>HN</i> 35.49.171	c. AD 75	<i>later</i>	No	?	
Plinius	<i>HN</i> 36.17.81	c. AD 75	<i>later</i>	No	?	
Martialis	9.75	c. AD 95	<i>later coctus</i>	Yes	?	
Celsus	<i>Dig.</i> 19.1.38.2	c. AD 120	<i>later</i>	?	?	
Tertullianus	<i>De resurrect. mortuorum</i> 35	c. AD 207–217	<i>later</i>	?	?	
<i>Edictum de pretiis</i>	7.15	AD 301	<i>later crudus</i>	No	2'	
<i>Edictum de pretiis</i>	7.15	AD 301	<i>laterculus</i>	Yes	2'	
<i>Edictum de pretiis</i>	7.15	AD 301	<i>later</i>	No	2'	
<i>Edictum de pretiis</i>	7.16	AD 301	<i>later ex luto</i>	No	< 2'?	
<i>Edictum de pretiis</i>	7.16	AD 301	<i>later</i>	No	< 2'?	
Arnobius	<i>Adv. nat.</i> 4.6	c. AD 297–303	<i>laterculus crudus</i>	No	?	
Arnobius	<i>Adv. nat.</i> 4.6	c. AD 297–303	<i>testa</i>	Yes	?	
Ammianus Marcellinus	24.2.12	c. AD 380–390	<i>laterculus coctilis</i>	Yes	?	
Ammianus Marcellinus	24.4.19	c. AD 380–390	<i>later coctilis</i>	Yes	?	
Ambrosius	<i>De virginibus</i> 3.4.19	c. AD 374–397	<i>later</i>	No	?	
Ambrosius	<i>De Cain et Abel</i> 2.3.10	c. AD 374–397	<i>later</i>	No	?	
Ambrosius	<i>De Abraham</i> 2.9.65	c. AD 374–397	<i>later</i>	?	?	
Justinus	<i>Epit.</i> 1.2.7	c. AD 390?	<i>later coctus</i>	Yes	?	

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 *latericius* 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/bipedalis* 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 *latericius* and *testaceus* (14 and 15 occurrences respectively), the observed pattern is confirmed. In ten cases *latericius* 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).

⁵⁰ Cf. the use of *bipes* in Palladius 1.19.1 and *ILS* 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.

Cat. no.	Reference	Date	Word	Size	Brick
133	CIL 3.8277.3	Imperial	<i>laterc(u)lus</i>	c. 28 × 28 cm	Yes
134	CIL 3.11383	3rd cent. AD	<i>later(es)</i>	44 × 31 × 5.5 cm	Yes
135	CIL 3.14336.3	Imperial	<i>later[---</i>	thickness 6.5 cm	Yes
136	IMS 2.227	Imperial	<i>latere(s)</i>	41 × 30 × 5 cm	Yes
137	CIL 5.8110.176	Imperial?	<i>lateres</i>		Yes?
138	de Alarcão & Etienne 1976, no. 359	Imperial?	<i>lateres</i>		Yes?
139	de Alarcão & Etienne 1976, no. 367	Imperial?	<i>lat(eres)</i>		Yes?
140	Serrano Ramos & Atencia Páez 1981, no. 58	Imperial?	<i>lateres</i>		Yes?
141	Scholz 2012, no. 24	after c. AD 180	<i>laterc(u)los</i>		Yes?
142	IDR 3.6.310	AD 106–271	<i>laterculus</i>		Yes
143	Scholz 2012, no. 82	c. AD 130–230	<i>laterc(u)li capit(u)lares</i>	c. 60 × 60 cm	Yes
144	Scholz 2012, no. 83	Imperial (Late Roman)	<i>latercolos</i>		Yes?
145	ILS 8673	AD 228	<i>bipedas</i>		Yes?

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.⁵⁴ When Vitruvius wants to describe smaller units (e.g. *besales*) he uses *laterculus* and for larger sizes he uses *tegula*.⁵⁵ 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.⁵⁶ 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

⁵⁴ Gerding & Östborn forthcoming.

⁵⁵ Cf. bricks stamps mentioning *tegula scipederalis* and *tegula bipederalis* (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.⁵⁷ Small receding bricks, regardless of whether they were irregular fragments of roof tiles or triangular bats, bonded well with the concrete core.⁵⁸ More importantly, though, they were small enough to be lifted with one hand by the mason while he held a trowel in the other.⁵⁹ 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) *later coccatus* and the Imperial (thin) *laterculus coctilis*.⁶⁰ 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 *laterculus*, from the early Imperial period onwards, can be assumed to be synonymous with *laterculus coctilis*.⁶¹ 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.⁶² 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 Plinius minor.⁶³

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.⁶⁴ *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.

HENRIK GERDING
Department of Archaeology and Ancient History
Lund University
Box 192
SE-221 00 Lund
henrik.gerding@klass.lu.se

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. 21 kg compared to c. 2.4 kg.

⁶¹ Cf. Chabat 1881, 25: “Les briques cuites étaient désignées sous le nom de *lateres cocti* ou *laterculi* et affectaient la forme carrée ...”

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.)

⁶³ Cf. Luc. *Bellum civile* 6.49; cat. no. 148.

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. opsecro hercle, ut mulsa loquitur! MI. nil nisi laterculos,
sesumam papaueremque, 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 inueniam 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 agricultura* c. 160–150 BC)

4. Cato, *Agr.* 14.4 – *later*

Villa lapide calce; fundamenta supra terram pede, ceteros parietes 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 pavementum struito; ubi structum erit, pavito fricatoque, uti pavementum bonum siet.
[*Testa* (collect.) probably signifies potsherds or pieces of broken roof tiles.]

6. Cato, *Agr.* 38.3 – *later*

Si parum altam fornacem habebis ubi facias, latere summam statuito aut caementis cum luto summam extrinsecus oblinito.
[*Later* (collect.) probably indicates mud bricks, considering the suggested use of *lutum* (the bricks would eventually be baked by the heat from the kiln anyway).]

7. Cato, *Agr.* 39.2 – *laterculus*

Ubi sarseris, qui colorem eundem facias, cretae crudae partes duas, calcis tertiam conmisceto; inde laterculos facito, coquito in fornace, eum 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 consparigito sapa. Postea facito laterculos. Sinito conbibant noctem et diem. Postea conmisceto cum eo vino in dolio et oblinito post dies LX.
[*laterculi* = small blocks (of paste)]

9. Cato, *Agr.* 110.1 – *testa*

Odorem deteriore demere vino. Testam de tegula crassam puram calfacito in igni bene. Ubi calebit, eam picato, resticula alligato, testam demittito in dolium infimum leniter, sinito biduum oblinitum 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 certa 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 tegularum ...
[*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)

14. Cic. *Dom.* 61 – *testa*

Neque porro illa manus copiaque 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]

16. Cic. *Div.* 2.99 – *later*

Fac in puero 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 dextram partem operis administrabant, ex crebris hostium eruptionibus magno sibi esse praesidio posse, si ibi pro castello ac receptaculo turrim ex latere 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 contignationem, 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 summam lateribus lutoque constraverunt, ne quid ignis hostium nocere posset, centonesque insuper iniecerunt, ne aut tela tormentis immissa tabulationem perfringerent, aut saxa ex catapultis latericium discuterent.

[*Lateres* most probably signifies mud bricks (refers to the same building as 2.10.6).]

[*Latericium* most probably signifies brickwork of mud bricks (refers to the same building as 2.10.6).]

20. Caes. *BCiv.* 2.10.1 – *latericius*

... quem a turri latericia ad hostium turrim murumque perducerent ...

[*Latericius* 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 patentis digitos defigunt quae lateres qui super musculo struantur contineant. Ita fastigato atque ordinatim structo ut trabes erant in capreolis conlocatae [in] lateribus luto musculus ut ab igni qui ex muro iaceretur tutus esset contegitur. Super lateres coria inducuntur, ne canalibus aqua immissa lateres diluere posset.

[*lateres* = mud bricks (they are vulnerable to water)]

22. Caes. *BCiv.* 2.14.4 – *latericius*

illi sub murum se recipiunt ibi que musculum turrim que latericiam libere incendunt.

[*Latericius* most probably means “(made) of mud bricks” (refers to the same building as 2.10.6).]

23. Caes. *BCiv.* 2.15.6 – *latericium*

... aggerem novi generis atque inauditum ex latericiis duobus muris senum pedum crassitudine atque eorum murorum contignatione facere instituerunt aequa fere altitudine, atque ille congesticius ex materia fuerat agger.

[*Latericia* 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)]

26. Varro, *Sat. Men.* frag. 248 (Astbury) – *later*

hic ut quadrato latere stipatae 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

[*latericia* = 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 – *later coctilis*; *later crudus*

Quantum fabrilis saepimentum est novissimum, maceria. Huius fere species quattuor, quod fiunt e lapide, ut in agro Tusculano, quod e lateribus coctilibus, 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 coctiles* = fired bricks]

[*lateres crudi* = unfired bricks (mud bricks)]

30. Varro, *Rust.* 2.3.6 – *testa*

Id, ut pleraque, lapide aut testa substerni oportet, caprile quo minus sit uliginosum ac lutulentum.

[*Testa* (collect.) probably signifies pieces of reused or broken roof tiles.]

31. Varro, *Rust.* 3.11.2 – *testaceus*

Circum totum parietem intrinsecus crepido lata, in qua secundum parietem sint tecta cubilia, ante ea vestibulum earum exaequatum tectorio opere testaceo.

[*Opus testaceum* signifies some kind of wall structure involving *testa*, probably masonry of broken roof tiles.]

32. Varro, *Rust.* 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?)]

Vitruvius (*De architectura* c. 35–25 BC)

33. Vitr. *De arch.* 1.5.8 (Granger) – *later coctus*; *later crudus*

Sed ubi sunt saxa quadrata sive silex seu caementum aut *coctus later* sive *crudus*, his erit utendum. Non enim, uti Babylone abundantes liquid bitumine pro calce et harena ex *cocto latere* factum habent murum ...

[*later coctus* = fired brick]

[*later crudus* = unfired brick (mud brick)]

[*later coctus* (collect.) = fired bricks (the walls of Babylon)]

34. Vitr. *De arch.* 2.1.7 (Granger) – *latericius*

... non casas sed etiam domos fundatas et *latericiis* parietibus aut e lapide structas materiaque et tegula tecta perficere coeperunt ...

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

35. Vitr. *De arch.* 2.3.1 (Granger) – *later*

Itaque primum de *lateribus*, qua de terra duci eos oporteat, dicam.

[*lateres* = mud bricks (mixed with straw and vulnerable to rain)]

36. Vitr. *De arch.* 2.3.2 (Granger) – *later*

... igitur tectoria ab structura seiuncta propter tenuitatem per se stare non possunt, sed franguntur, ipsique parietes fortuito sidentes vitiantur. Ideo etiam Uticenses *laterem*, si sit aridus 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*

Fiunt 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*

Fiunt autem cum his *lateribus semilateria*. Quae cum struuntur, una parte *lateribus* ordines, altera *semilateres* ponuntur. Ergo ex utraque parte ad lineam cum struuntur, alternis coriis parietes alligantur et medii *lateres* supra coagmenta conlocati et firmitatem et speciem faciunt utraque parte non invenustam.

[*Lateres* most probably signify mud bricks (cf. 2.3.1–2).]

[*Semilateria* most probably signifies *lateres* divided in half.]

[*semilateres* = *lateres* 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. Plinius *HN* 35.49.171)]

40. Vitr. *De arch.* 2.5.1 (Granger) – *testa*

Etiam in fluviatica aut marina si qui *testam* tunsam et succretam ex tertia parte adiecerit, efficiet materiae temperaturam ad usum meliorem.

[*testa* (collect.) = fragments of terracotta]

41. Vitr. *De arch.* 2.8.4 (Granger) – *testa*

... ex rubro saxo quadrato aut ex *testa* aut ex silicibus ordinariis struat bipedales parietes ...

[*Testa* (collect.) probably signifies pieces of broken roof tiles (used as bricks).]

42. Vitr. *De arch.* 2.8.5 (Granger) – *latericium*

... et ita uti *latericia* struentes alligant eorum alternis coriis coagmenta ...

[Inconclusive: *latericia* = brick walls of unknown kind]

43. Vitr. *De arch.* 2.8.9 (Granger) – *latericium*; *later*; *latericius*
De *latericiis* vero, dummodo ad perpendicularum sint stantes, nihil deducitur ... Itaque nonnullis civitatibus et publica opera et privatas domus etiam regias a *latere* structas licet videre: et primum Athenis murum ... item Patris in aede Iovis et Herculis *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 Mausoli domus ... parietes habet *latere* 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 contempserint *latericiorum* parietum structuram ... 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. Vitruvius. *De arch.* 2.8.17 (Granger) – *latericius*

Latericii vero, nisi diplinthii aut triplinthii fuerint, sesquipedali crassitudinem non possunt plus unam sustinere contiguationem.

[*(parietes?) latericii* = (walls) of mud brick]

47. Vitruvius. *De arch.* 2.8.17 (Granger) – *testaceus*

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

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

48. Vitruvius. *De arch.* 2.8.18 (Granger) – *latericius; testaceus; later*

Quoniam ergo explicata ratio est, quid ita in urbe propter necessitatem angustiarum non patiuntur esse latericios parietes, cum extra urbem opus erit his uti, sine vitiis ad vetustatem, sic erit faciendum. Summis parietibus structura testacea sub tegula subiciatur altitudine circiter sesquipedali habeatque proiecturas coronarum. Ita vitari poterunt quae solent in his fieri vitia; cum enim in tecto tegulae fuerint fractae aut a ventis deiectae, qua possint ex imbris aqua perpluere, non patietur lorica testacea laedi laterem, sed proiectura coronarum reiciet extra perpendiculum stillas et ea ratione servaverit integras parietum latericiorum structuram.

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

[*structura testacea* = masonry made of fragments of roof tiles (cf. 2.8.19)]

[*testaceus* = (made) of fragments of roof tiles]

[*later* (collect.) = mud bricks (can be damaged by water)]

[*latericius* = (made) of mud brick (can be damaged by water)]

49. Vitruvius. *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 composita est conlocata, tunc, si est firma, probatur; namque quae non fuerit ex creta bona aut parum erit cocta, ibi se ostendit esse vitiosam gelicidiis 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; parietes firmitatem poterunt habere.

[*testa* = fragment of roof tiles (used as a brick)]

50. Vitruvius. *De arch.* 2.8.20 (Granger) – *testaceus*

Itaque satius esse videtur impensa testaceorum in sumptu, quam compendio craticiorum esse in periculo.

[*(parietes) testacei* = (walls/brickwork) made of fragments of roof tiles (cf. 2.8.18–19)]

51. Vitruvius. *De arch.* 5.10.2 (Granger) – *tegula*

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

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

52. Vitruvius. *De arch.* 5.10.2 (Granger) – *laterculus; tegula*

Supraque laterculis besalibus pilae struantur ita dispositae, uti bipedales tegulae possint supra esse conlocatae ...

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

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

53. Vitruvius. *De arch.* 5.10.2 (Granger) – *tegula*

... supraque conlocentur tegulae bipedales quae sustineant pavimentum.

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

54. Vitruvius. *De arch.* 5.10.3 (Granger) – *tegula*

... caeque regulae sive arcus ita disponantur, uti tegulae sine marginibus sedere in duabus invehique possint ...

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

55. Vitruvius. *De arch.* 5.10.3 (Granger) – *testa*

... inferior autem pars ... primum testa cum calce trullizetur, deinde opere albario sive tectorio poliatur.

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

56. Vitruvius. *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. Vitruvius. *De arch.* 7.1.3 (Granger) – *testa*

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

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

58. Vitruvius. *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. Vitruvius. *De arch.* 7.1.7 (Granger) – *tegula*

... tegulae bipedales inter se coagmentatae supra rudus substrata materia conlocentur ...

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

60. Vitruvius. *De arch.* 7.1.7 (Granger) – *testaceus*

Supra autem sive ex tessera grandi sive ex spica testacea struantur fastigiis ...

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

61. Vitruvius. *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)]

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

His perfectis paries testa trullissetur et dirigatur et tunc tectorio poliatur.

[*testa* (collect.) = crushed or powdered pieces of roof tiles or potsherds (cf. 7.4.1 above)]

62. Vitr. *De arch.* 7.4.2 (Granger) – *tegula; besalis*

Sin autem locus non patietur structuram fieri, canales fiant et nares exeant ad locum patentem. Deinde tegulae bipedales ex una parte supra marginem canalis inponantur, ex altera parte besalibus pilae substruantur, in quibus duarum regularum anguli sedere possint, et ita a pariete eae distent, ut ne plus pateant palmum. Deinde insuper erectae hamatae tegulae ab imo ad summum ad parietem figantur ...

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

[(*Laterculi?*) *besales* probably signifies fired bricks ($\frac{2}{3}$ foot square; cf. 5.10.2).]

[*tegulae hamatae* = terracotta tiles with knobs or hooks (protection against moisture)]

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*

Trullissione inducta pro harenato testa dirigatur ...

[*testa* (collect.) = crushed or powdered pieces of roof tiles or potsherds (cf. 7.4.1)]

65. Vitr. *De arch.* 7.4.5 (Granger) – *testaceus*

... et solo festucato inducitur aut rudus aut testaceus pavimentum ...

[*testaceus* = (made) of terracotta fragments]

66. Vitr. *De arch.* 8.3.8 (Granger) – *later testaceus*

... quo bitumine et latere testaceo structum murum Sameramis circumdedit 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 latere cocto et sulphure ferro uinctum, latum pedes XXV altum pedes LX in circuitu 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 erant tecta in varos usus non tigna modo et tabulas sed laterem quoque et caementa et saxa variae magnitudinis praebebant.

[Inconclusive: *later* (collect.) = bricks of unknown type (in Heraclea in Aetolia)]

69. Livius, 44.11.5 – *later*

... non ad eandem crassitudinem, qua veterem murum, sed simplici laterum ordine structos esse.

[Inconclusive: *lateres* = bricks of unknown type (in Cassandrea)]

Ovidius (43 BC–AD 17; *Metamorphoses* c. AD 2–8)

70. Ov. *Met.* 4.57–58 – *coctilis*

contiguas tenuere domos, ubi dicitur altam

coctilibus muris cinxisse Semiramis urbem.

[(*lateres/laterculi?*) *coctiles* = fired bricks (the walls of Babylon)]

71. Ov. *Met.* 8.660–663 – *testa*

adcubuere dei. mensam succincta tremensque

ponit anus, mensae sed erat pes tertius inpar:

testa parem fecit; quae postquam subdita clivum

sustulit, aequatam mentae tersere virentes.

[Inconclusive: *testa* could be a brick or a terracotta fragment of any kind]

72. Ov. *Fast.* 2.537, 540 – *testa*

tegula porrectis satis est velata coronis

et sparsae fruges parca que mica salis,

in que mero mollita Ceres violae que solutae:

haec habeat media testa relicta via.

[Inconclusive: *testa* = brick, tile, or large fragment thereof (used as a plate for offerings)]

Seneca (rhetor) (c. 50 BC–AD 40; *Controversiae* after AD 34)

73. Sen. *Controv.* 10 *praef.* 11 – *later*

ille Passieno prima eius syllaba in Graecum mutata obscenum nomen imposuit; ille Sparso dixit scholam communem cum rhetore quodam, <declamatore subtili sed arido,> habenti: tu potes controversiam intellegere, qui non intellegis te laterem lavare?

[*Later* most probably signifies a mud brick (cf. Ter. *Phorm.* 186).]

Seneca (philosophus) (c. 4 BC–AD 65; *Quaestiones naturales* AD 62–65)

74. Sen. *QNat.* 3.25.5 – *later*

erat in Sicilia, est adhuc in Syria stagnum in quo natant lateres et mergi proiecta non possunt, licet grauia sint.

[Inconclusive: *lateres* = bricks of unknown type]

Curtius (fl. mid 1st century AD)

75. Curt. 5.1.25 – *laterculus coctilis*

Murus instructus laterculo coctili, bitumine interlitus ...

[*laterculus coctilis* (collect.) = fired bricks (the walls of Babylon)]

76. Curt. 5.1.29 – *laterculus coctilis*

Coctili laterculo 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 latere ab imo struunt 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]
[Inconclusive: *laterculus* (collect.) = bricks of unknown type (different from *later*?)]

78. Curt. 8.10.25 – *later crudus*

XXXV stadium murus urbem complectitur, cuius ima saxo, superiora crudo latere sunt structa. Lateri vinculum lapides sunt, quos interposuere, ut duriori materiae fragilis incumbere, 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 testa
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 amurcam mixtam calci et harenae, super-sternuntur et magna vi paviculis inculcantur atque expoliuntur; omnesque parietum et soli iuncturae testaceis pulvinis fibulantur
[*testaceus* = (made) of terracotta fragments]

81. Columella, *Rust.* 6.14.6 – *latericium*

Itaque cum id accidit, veteri latericio trito, prius quam diiungantur, colla conspargi oportet et deinde, cum adsiccuierint, subinde oleo inbui.
[Inconclusive: *latericium* = 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 defricata vel pumice redulceratur.
[*Testa* is probably a piece of tile or brick.]

84. Columella, *Rust.* 8.14.1 – *laterculus*

Sub porticibus deinde quadratae harae caementis vel etiam laterculis exstruuntur ...
[Inconclusive: *laterculi* = 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 formatus circumdatur murus, sin aliter crudo latere ac luto constructus.
[*later crudus* (collect.) = mud bricks]

86. Columella, *Rust.* 9.6.4 – *latericium*

Nam quod maxime movet Celsum, ne sint stabula vel igni vel furibus obnoxia, potest vitari latericio circumstructis alvis, ...
[Inconclusive: *latericium* = wall made of bricks of unknown type]

87. Columella, *Rust.* 9.7.2 – *later*; *laterculus*

Superponuntur deinde sive, ut Celso placet, 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 contineantur, liberaeque frontes utrumque sint.
[Inconclusive: *lateres* = bricks of unknown type (the contraposition of *laterculi* may suggest that unfired bricks are indicated).]
[*Laterculi* 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 latere fabricata maceries perennare possit pluviis ac tempestatibus plerumque infestata neque lapides supra rei dignitatem poscat inpensa;
[*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 pluisse in acta eius anni relatum est.
[*lateres cocti* = fired bricks]

90. Plin. *HN* 2.84.197 – *later*

Tutissimi sunt aedificiorum fornices, anguli quoque parietum postesque, alterno pulsu renitente. et latere 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 Babylonios DCCXX annorum observationes siderum coctilibus laterculis inscriptas docet, gravis auctor in primis;

[*laterculi coctiles* = fired clay tablets]

92. Plin. *HN* 7.56.194 – *lateraria*

Laterarias ac domus constituerunt primi Euryalus et Hyperbius 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 faece vini aut e parietibus later tuso mire ali.

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

94. Plin. *HN* 18.23.98 – *later crudus*

Lentem torreris prius, dein cum furfuribus leviter pisi aut addito in sextarios XX lateris crudi frusto et harenae semodio.

[*later crudus* = mud brick]

95. Plin. *HN* 18.73.301 – *latericius*

Horrea operose tripedali crassitudine parietis laterici exaedificari iubent aliqui, praeterea superne impleri nec adflatus admittere aut fenestras habere ullas;

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

96. Plin. *HN* 19.45.156 – *laterarius*

Odit hiemem et umorem ac fimum, apricis gaudet ac siccis teraque quam maxime lateraria, cinere vult nutriri.

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

97. Plin. *HN* 19.58.178 – *later crudus*

Quidam et aquam diluto latere crudo 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 crudi* = (small?) unfired bricks]

99. Plin. *HN* 31.20.29 – *later*

In Colossis flumen est, quo lateres coniecti 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 laterculis adfertur, cutis nitioem dicitur facere.

[*laterculi* = moulded blocks (of salt)]

101. Plin. *HN* 35.46.159 – *laterculus coctilis*

... vel adsiduitate satiant figlinarum opera, doliis ad vina excogitatis, ad aquas tubulis, ad balneas mammatis, ad tecta imbricibus, coctilibus laterculis fundamentisque aut quae rota fiunt, propter quae Numa rex septimum collegium figulorum 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 crudi* = mud bricks]

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. Aedificiis non nisi bimos probant, quia et intritam ipsam eorum, priusquam fingantur, macerari oportet.

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

104. Plin. *HN* 35.49.171 – *later*

Pitanae in Asia et in ulteriore Hispania civitatibus Maxilua et Callet fiunt lateres, qui siccati non erguntur in aqua. Sunt enim e terra pumicosa, cum subigi potest, utilissima.

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

105. Plin. *HN* 35.49.172 – *latericius*

Graeci, praeterquam ubi e silice fieri poterat structura, latericiis parietes praetulerunt.

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

106. Plin. *HN* 35.49.173 – *latericius*

Lacedaemone quidem latericiis parietibus excisum opus tectorium propter excellentiam picturae ligneis formis inclusum Romam deportavere ...

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

107. Plin. *HN* 35.49.173 – *latericius*

In Italia quoque latericius murus Arreti et Mevaniae est.

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

108. Plin. *HN* 36.6.47 – *latericius*

Antiquissima, quod equidem inveniam, Halicarnasi domus Mausoli Proconnesio marmore exulta est latericiis parietibus.

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

109. Plin. *HN* 36.14.68 – *laterculus*

navesque duas in latitudinem patulas pedalibus ex eodem lapide ad rationem geminati per duplicem mensuram ponder-

is oneratas ita, ut subirent obeliscum pendentem extremitatibus suis in ripis utrimque; postea egestis laterculis adlevatas naves excepisse onus;
[*laterculi* = *pedales* (ex lapide) = (one foot) blocks (of stone)]

110. Plin. *HN* 36.17.81 – *later*

alii lateribus e luto factis exstructos pontes, peracto opere lateribus in privatas domos distributis ...
[*Lateres* most probably signify mud bricks (used by the Egyptians).]

111. Plin. *HN* 36.51.171 – *latericius*

Graeci e lapide duro aut silice aequato struunt veluti latericios parietes.
[Inconclusive: *latericius* = (made) of bricks of unknown type (probably indicate large bricks laid in regular courses)]

112. Plin. *HN* 36.54.175 – *testa*

Harenae tria genera: [...] Si et testae tusae tertia pars addatur, melior materia erit.
[*testa* (collect.) = terracotta fragments (cf. 36.62.186)]

113. Plin. *HN* 36.55.176 – *testaceus*

Uliginosa et ubi salsugo vitiet testaceo sublini utilis.
[*testaceus* = of terracotta fragments (cf. *testa* Vit. *De arch.* 7.4.1)]

114. Plin. *HN* 36.62.187 – *testaceus*

Similiter fiunt spicata testacea.
[*Testaceus* probably means “(made) of tile fragments” (cf. Vit. *De arch.* 7.1.4).]

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

... testaceum pavimentum ...
[*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 latere cocto, quo Samiramis longam
Babylona cinxit, Tucca balneum fecit:
[*later coctus* (collect.) = fired bricks (the walls of Babylon)]

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

117. Frontin. *Aq.* 2.125 – *testa*

... ex agris privatorum terra, limus, lapides, testa, harena, ligna ceteraque quibus ad eam rem opus esset ...
[*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)

118. Plin. *Tra.* 10.37(46).2 – *testaceus*

Manent adhuc paucissimi arcus: possunt et erigi quidam lapide quadrato, qui ex superiore opere detractus est; aliqui pars, ut mihi videtur, testaceo opere agenda erit, id enim et facilius et vilius.
[Inconclusive: *opus testaceum* = brickwork of fired bricks or reused tiles]

119. Plin. *Tra.* 10.39(48).4 – *testaceus*

... quia sint caemento medii farti nec testaceo opere praecincti.
[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 ...
[*lateres* = blocks (of gold)]

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

121. Suet. *Aug.* 28.3 – *latericius*

Urbem neque pro maiestate imperii ornatam et inundationibus incendiisque obnoxiam excoluit adeo, ut iure sit gloriatus marmoream se relinquere, quam latericiam accepisset.
[Inconclusive: *latericius* = (made) of bricks of unknown type]

Celsus (fl. AD 106–129)

122. Celsus, *Digesta* 19.1.38.2 – *later*

Firmus a Proculo quaesivit, si de plumbeo castello fistulae sub terram missae aquam ducerent in aenum lateribus circumstructum, an hae aedium essent an ut ruta caesa vineta fixae quae aedium non essent.
[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 quam caementa, quam saxa, quam lateres.
[Inconclusive: *lateres* = bricks of unknown type]

Arnobius maior (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 que hoc nomine, quod ex laterculis ab hominibus crudis 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?)]

Ausonius (c.AD 310–394; *Parentalia* after AD 379)

126. Auson. *Parentalia* 11 – *testa*

occidis emissae percussus pondere *testae*,

abiecit tecto quam manus artificis.

non fuit artificis manus haec: manus illa cruenti

certa fuit fati suppositura reum.

heu, quae uota mihi, quae rumpis gaudia, Pastor!

illa meum petiit tegula missa caput.

[*testa* = *tegula* (probably broken since it was thrown away)]

Ammianus Marcellinus (c.AD 330–395)

127. Amm. Marc. 24.2.12 – *laterculus coctilis*

... in Euphratis fluentia proietae cautes eminentius tuebantur, in qua excellabant minae murorum bitumine et *coctilibus laterculis* fabricatae, quo aedificii genere nihil esse tutius constat.
[*laterculi coctiles* = fired bricks (the citadel of Pirisabora)]

128. Amm. Marc. 24.4.19 – *later coctilis*

cum enim ut saepe discessurae partes leuius concertarent, abusiue incusso ariete, qui paulo ante erat admotus, sternitur residuis omnibus altior turris *latere coctili* firmissime structa, cuius ruina muri contiguum latus se cum immani fragore prostravit.

[*later coctilis* (collect.) = fired brick (the city of Maiozamalcha)]

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

129. Ambrosius, *De virginibus* 3.4.19 – *later*

Sed ille, sicut is qui *laterem* lauatur, saecularia saecularibus frustra cupiebat abolere; magis enim se oblinebat luto qui remedium a uoluptate quaerebat.

[*later* = mud brick (cf. Terentius, *Phormio* 186)]

130. Ambrosius, *De Cain et Abel* 2.3.10 – *later*

Ideo et dominus in euangelio inanem populorum gentilium miseratus laborem, qui *lateres* construerent lutulentae superstitioni et uoluptati corporis dediti, solidum fidei murum aedificare non possent, ...

[*later* = mud brick]

131. Ambrosius, *De Abraham* 2.9.65 – *later*

Ita ergo et nos in hac terra afflictionis 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 latere* circumdedit, arenae vice bitumine interstrato, quae materia in illis locis passim invenitur 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 (Siscia, Pannonia superior) – *later*

V Kal(endas) Aug(ustas) | Severus et | Fortunat[us] | *later(es)* CCCCXXXX

[*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(ui?) | exhib(u)it | *latere(s)* | 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 (Aquila) – *later*

Cave malum si non | raseris *lateres* DC | si raseris 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(er)es
[*Lateres* probably signify green bricks to be fired (inscribed on brick before firing?)]

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

141. Scholz 2012, no. 24; Peacock 1982, 143 (Holdeurn, 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 | later(c)ulos | CCLXXXIII
leg(io) XIII G(emina)
[*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 capit(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 (Casilinum AD 228) – *bipes*
N.D.ET.C | idibus Iul(i)is Celer inget | bipedas VXXXI | Acutum Casilino | Modesto II et Probo co(n)s(ulibus)
[*Bipedes* = green bricks to be fired (2 feet square; inscribed on large brick or tile before firing)]

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

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

148. CIL 6.10242.10 (Rome AD 136) – *testacius*
... A MONIMENTO TES|TACIO ...
[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 crudi ad laterculos diurnam mercedem, in lateribus quattuor pedum vinum, ita ut ipse sibi inpensam praep[a]ret, pasto
x 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 crudi* (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 inpensam praeparet, pasto
x duos
[*later ex luto* (collect.) = mud bricks]
[*lateres* = *lateres ex luto*]

Bibliography

- Adam, J.-P. 1994. *Roman building: Materials and techniques*, transl. A. Mathews, Bloomington (Paris 1984).
- Blake, M.E. 1947. *Ancient Roman construction in Italy from the prehistoric period to Augustus*, Washington, D.C.
- Blake, M.E. 1959. *Roman construction in Italy from Tiberius through the Flavians*, Washington, D.C.
- Bukowiecki, E. 2010. 'La taille des briques de parament dans l'opus testaceum à Rome', in *Arqueología de la construcción 2. Los procesos constructivos en el mundo romano*, eds. S. Camporeale, H. Dessales & A. Pizzo, Mérida, 143–152.

- Chabat, P. 1881. *La brique et la terre cuite*, Paris.
- Choisy, A. 1899. *Histoire de l'architecture*, 2 vols, Paris.
- Coarelli, F. 2000. 'L'inizio dell'*opus testaceum* a Roma e nell'Italia romana', in *La brique antique et médiévale: Production et commercialisation d'un matériau*, eds. P. Boucheron, H. Broise & Y. Thébert, Roma, 77–85.
- de Alarcão, J. & R. Etienne 1976. *Fouilles de Conimbriga 2. Épigraphie et sculpture*, Paris.
- DeLaine, J. 2001. 'Bricks and mortar: Exploring the economics of building techniques at Rome and Ostia', in *Economies beyond agriculture in the classical world*, eds. D.J. Mattingly & J. Salmon, London, 230–268.
- Gerding, H. 2006. 'Early use of fired brick in Hellenistic and Roman architecture', in *Common ground: Archaeology, art, science and humanities: The Proceedings of the 16th International Congress of Classical Archaeology, Boston 2003*, eds. C. Mattusch, A. Donohue & A. Brauer, Oxford, 355–358.
- Gerding, H. 2008. 'Reconsidering the tomb of Aulus Hirtilius', *OpAthRom* 1, 145–154.
- Gerding, G. & P. Östborn forthcoming. *The diffusion of fired bricks in Hellenistic Europe*.
- Hampe, R. & A. Winter 1965. *Bei Töpfern und Ziegeln in Südtalien, Sizilien und Griechenland*, Mainz.
- Helen, T. 1975. *Organization of Roman brick production in the first and second centuries A.D.*, Helsinki.
- Langslow, D. 1989. 'Latin technical language: Synonyms and Greek words in Latin medical terminology', *Transactions of the Philological Society* 87:1, 33–53.
- Lauffer, S. 1971. *Diocletians Preisedikt*, Berlin.
- Lugli, G. 1957. *La tecnica edilizia romana*, 2 vols, Roma.
- Manzelli, V. 2001. 'Le mura di Ravenna repubblicana', in *Fortificazioni antiche in Italia: Età repubblicana*, eds. L. Quilici & S. Quilici Gigli, Roma, 7–24.
- Martin, R. 1965. *Manuel d'architecture grecque 1. Matériaux et techniques*, Paris.
- Matijašić, R. 1986. 'Lateres siscienses', *Journal of the Zagreb Archaeological Museum (VAMZ)* 3rd ser., 19, 203–215.
- Mommsen, T. & H. Blümner 1893. *Der Maximaltarif des Diocletian*, Berlin.
- Östborn, P. & H. Gerding 2015. 'The diffusion of fired bricks in Hellenistic Europe: A similarity network analysis', *Journal of Archaeological Method and Theory* 22:1, 306–344.
- Otto, A. 1890. *Die Sprichwörter und sprichwörtlichen Redensarten der Römer*, Leipzig.
- Peacock, D. 1982. *Pottery in the Roman world: An ethnoarchaeological approach*, London.
- Pernier, L. 1920. 'Arezzo – Ricerche per la scoperta delle antiche mura urbane laterizie nei terreni di "Fonte Pozzolo" e "Catona"', *NSc* ser. 5, 17, 167–217.
- Righini, V. 1999. 'La diffusione del mattone cotto nella Gallia Cisalpina e l'architettura in mattoni di Ravenna', in *El ladrillo y sus derivados en la época roman*, eds. C. Rico, L.R. Gómez & M.B. Galán, Madrid, 125–157.
- Riley, H.T. 1880–1881. *The comedies of Plautus*, 2 vols., London.
- Riley, H.T. 1887. *The comedies of Terence*, New York.
- Rivoira, G.T. 1921. *Architettura romana: Costruzione e statica nell'età imperiale*, Milano.
- Sauvage, M. 1998. *La brique et sa mise en œuvre en Mésopotamie des origines à l'époque achéménide*, Paris.
- Scholz, M. 2012. "'Ziegelrechnungen' – Aspekte der Organisation römischer Ziegeleien', in *Inscriptions mineures: Nouveautés et réflexions*, eds. M.E. Fuchs, R. Sylvestre & C. Schmidt Heidenreich, Bern, 339–357.
- Serrano Ramos, E. & R. Atencia Pérez 1981. *Inscripciones latinas del Museo de Málaga*, Madrid.
- Steinby, M. 1978. 'Ziegelstempel von Rom und Umgebung', *RE* Suppl. 15, 1489–1531.
- Van Aken A.R.A. 1952. 'Lateres and latericium', *Mnemosyne*, ser. 4, 5:2, 139–148.
- van de Mierop, M. 2003. 'Reading Babylon', *AJA* 107, 257–275.
- Wilson, A. 2006. 'The economic impact of technological advances in the Roman construction industry', in *Innovazione tecnica e progresso economico nel mondo romano*, ed. E. Lo Cascio, Bari, 225–236.
- Wright, G.R.H. 2005. *Ancient building technology 2. Materials*, Leiden.