

The Singing Loom: The Importance of Textile Production in the Roman Domestic Soundscape

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ABSTRACT: This paper traces Roman acoustic experience of domestic soundscapes, particularly the soundscape of textile production (especially weaving) through a combination of philological analysis of Latin poetry and experimental archaeology. Based on a comprehensive survey of textile sound-mimicking in Latin poetry, the paper highlights consistent features of Roman domestic soundscapes rather than the soundscape of any one specific setting, site, or period. Spectrographic analysis of audio recordings of weaving experiments conducted at the Centre for Textile Research in Copenhagen provides the experimental archaeological basis for the literary analysis. Passages from Tibullus' *Elegies* 2.1 and the *Ciris* provide representative examples of literary sound-mimicking of craft processes.

Scholarly interest in Roman urban environments (and the interplay of people with them) has soared in the last decade^{1,2} contributing to an increase of work on related Roman soundscapes. The range of methodologies for investigation of sound in Roman contexts is rapidly expanding. Increasingly, scholars use sound experiments, architectural and acoustic data collected from unusually well-preserved sites or objects in comparison with lexical and literary analysis to discuss the soundscapes of ancient sites.³ This is a welcome expansion of the hitherto dominant analysis of explicit comments about sounds and noises of the ancient environment in extant literary sources.⁴

Yet in tracing generic Roman soundscapes, the increased use of acoustic modelling can and should be complemented by other tools, as also suggested by Vincent in his 2017 paper on the sounds of the *tuba*. This goes particularly for domestic soundscapes, where we have a high degree of variation depending on a home's wealth, class, location and region in the Roman world. For most domestic settings, the archaeological record does not yet provide sufficient material for acoustic modelling. Scholars of later periods have drawn on literary sources commenting on domestic sounds together with other types of documentary evidence to assess the composition of their soundscapes.⁵

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² E.g. Edwards 1996; Weaver 1997; Laurence and Newsome 2011; Hemelrijk and Woolf 2013; Bjørnebye, Malmberg, and Östenberg 2015; Hartnett 2016.

³ Vincent 2017; Veitch 2017. Two recent volumes on the soundscapes of Graeco-Roman antiquity demonstrate the importance of ancient sound studies, cf. Emerit, Perrot, and Vincent 2015 and Courtil and Courtray 2015.

⁴ Betts 2011; Grand-Clémant 2015; Francois 2015; Hartnett 2016; Laurence 2017. Cf. Gurd 2016. Vincent 2017, 149-151 highlights the methodological challenges inherent in such literary material.

⁵ Corbin 1998, cf. also Picker 2003; Fritz 2015.

In this paper, however, I will show that ancient literary sources may throw light on features of domestic soundscapes even when they do not make explicit comments about experiences of sound. When combined with an experimental archaeological approach, literary sources may, in fact, reveal additional features of common Roman domestic soundscapes.

My interest lies with literary texts that mimic the sounds of the environments they describe. Roman authors often develop sound mimetic effects to contribute to the artistic, overall impression of literary settings: Vergil's hedges buzz with bees in the *Eclogues*, cut-off repetition of phrases and syllables distinguish Ovid's description of echo in the *Metamorphoses* (3.359-401), to mention but two examples.⁶ Less heavily signposted versions of such literary mimesis of sound throws additional light on the soundscapes associated with both places and activities in the Roman world and the way that they were perceived by those members of the elite by and for whom Latin poetry was primarily produced.

Here, I will explore how sound-mimicking features in Roman poetry on weaving underscore the importance of textile production and its sounds as a part of the Roman domestic soundscape from the Republic and into Late Antiquity. Using experimental reconstructions of craft working processes, I will show that poetic authors describing weaving in progress often transpose the working rhythm and the sounds arising

from weaving into the new medium of the text, by means of different types of sound play.

The assumption that writers of Roman poetry and their audiences were interested in or aware of the soundscape of textile production is based on explicit comments on such sounds in their texts. Several passages in Greek and Roman literature mention the sounds created by the loom and by the weaver's tools, and distinguish a few different weaving sounds.⁷ Latin poets throughout antiquity mention the sounds arising as a weaver works: they note both the sound of clattering clay loom weights and refer to the sounds of the pinbeater used to settle the weft.⁸ The assumption is readily made that authors also use sound play to imitate such textile making sounds in passages about weaving, incorporating the making of textiles into the making of poetry.

Tibullus' comments about the song of clay loom weights (*tela latere sonat* in Tibullus 2.1.66-67) or the resounding heddle rods of Lucretius (*scapique sonantes* in *De rerum natura* 5.1353) unfortunately give no details on what these sounds were like.⁹ Therefore, I rely extensively on experimental archaeology to assess how the sounds of weaving are mimicked in poetic texts. I draw on video- and audio recordings, as well as observation, of weaving experiments conducted at the Centre for Historical-Archaeological Research and Communication at Lejre and the Centre for Textile Research (CTR) in Denmark.¹⁰ As this

⁶ On resonance in Vergil's *Eclogues*, e.g. Fitzgerald 2016.

⁷ Literary reflection on sounds generated by weaving has received more attention in relation to Greek literature, cf. Restani 1995; Tuck 2006; Tuck 2009; Nosch 2014; Heath 2011. For discussion of passages in Latin literature, cf. Restani 1995; Kissel 1980.

⁸ Noises generated by heddle rods, Lucr. 5.1353; loom weights, Tib. 2.1.65-66; pin beaters, Verg. *Georg.* 1.294;

Aen. 7.14; Macrobian 5.12.7.5; *Cod. Iust.* 11.9.4, weaving pins: Symphos. 17.2; Claud. *Carm. Min. App.* 5.48.

⁹ For *scapus* as 'heddle rod', Johncock 2016, 254 with further bibliography.

¹⁰ Such experiments are conducted in line with the methodological principles of documentation, craft experience, and close replication of ancient tools based on archaeological finds set out by CTR (Mårtensson, et al., 2009: 379-380).

project is concerned with the generic sound of weaving rather than any one specific setting, I have compared features from several different experiments, all of which used period-appropriate materials and reconstructions and saw the work carried out by experienced weavers.

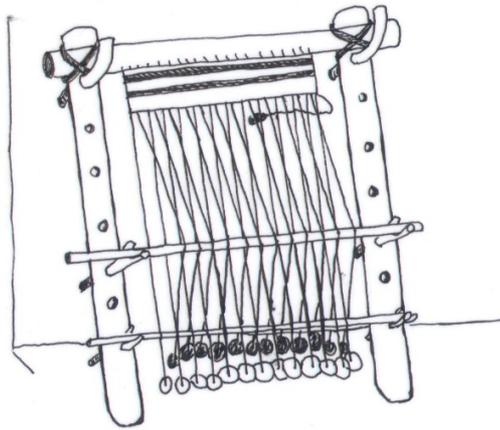


FIG. 1. Overview of a warp-weighted loom with a tabby weave. The heddle rod is resting on its supports to keep the desired shed open while weft is inserted.

Documentation has been collected from weaving on both warp-weighted and two-beam looms, capturing sounds generated by different types of weaves.

In set-ups on the warp-weighted loom, the shape and weight of the loom weights have also been varied. The analysis in this paper is based on the experiments on the warp-

weighted loom, as this loom type is most relevant to the periods from which my two literary examples derive.

The following sound events characterize weaving in a warp-weighted loom:

Beating: The sound of the weaving sword beating in newly inserted weft is dull and regular. The width and density of the weave influence the number of repetitions and pauses. After beating, faint scratching sounds are sometimes audible as the weaver moves the pin beater through the warp to fit the next weft thread.

Shed change: When the weaver moves the heddle rods to change the shed, distinctive sounds arise from wooden parts of the loom moving against each other.

Warp noises: Noises arise from the warp as the weaver unsnags threads and clears the new shed opening with their hands. This may also generate chiming from the weights as the movement of the warp causes them to move against each other.

These sounds recur cyclically as the weaver continues their work. A basic acoustic spectrogram (Fig. 2) illustrates the strong rhythmic qualities of the soundscape of weaving on a warp-weighted loom, as well as its key sound marks, shed change and beating.

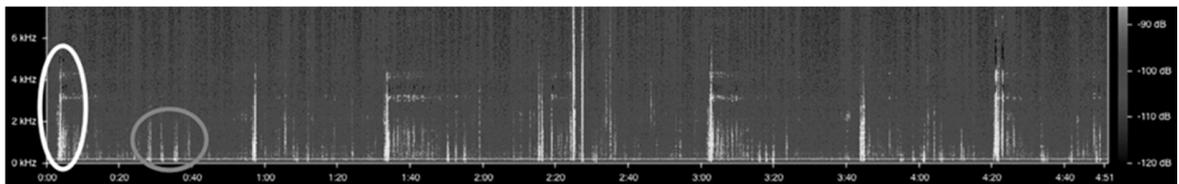


FIG 2. Acoustic spectrogram generated using Spec (version 0.8.2) of experimental weaving of a tabby weave in wool, using 26 loom weights. Sound frequency (kHz) is indicated on the vertical axis, whereas sound intensity (dB) is expressed through colour, with bright green and bright turquoise indicating sounds of 70 dB and 80 dB respectively. Time is indicated on the horizontal axis.

This spectrogram is based on a recording from an experiment at Lejre reconstructing the functional parameters of heavy, pyramidal loom weights.¹ The sounds of shed change appear as regular, tall turquoise spikes (00.05 – circled in yellow, etc.). After each shed change, higher-frequency sounds generated by the loom weights are notable as weaver clears the shed by hand, joggling the warp (e.g. 00.05-00.15).

The sounds of beating appear as short series of finer spikes, clustered together after each shed change (00.29-00.38 – circled in red, etc.). After beating, there tends to be a short interval of comparative silence as the weaver fits the weft (e.g. 00.40-00.55): other set-ups exhibit thin sound spikes, corresponding to the low scratching of the pin beater used to fit the weft before changing the shed, but these sounds are noticeable only at a very close range.

Modern sound studies remind us that “[s]ound has a strongly tactile aspect, particularly with lower frequencies, which we feel as much in the warp with one’s hand are distinct but only audible immediately next to the loom, as we hear”.² A weaver will be acutely aware of this: the sounds of parting fibres and the experience of them blend with the feel of the threads against one’s hand. A text that mimics sound is uniquely placed to merge their sonic-linguistic representation, so that sound play renders both sound *and* tactile experience. This is prominent in many poetic descriptions of weaving.

Systematic tracing of one specific activity (in this case, weaving) allows us to identify

commonalities in its sonic-literary representations in Latin poetry. Consistent with their prominence in recordings of experimental weaving, beating of the weft and sounds arising from loose, wooden parts of the loom moving against each other are the features of the soundscape of weaving to which Latin poets allude most frequently. Clanking noises from the loom frame and/or beating are frequently mimicked through clusters of voiceless plosive consonants (p, t, and k-sounds). In isolated, more elaborate passages, a distinction is also made between the clanking of wood and the noise from beating. In these cases, voiced plosives (d, b) are used in combination with open vowels to mark the duller sound of the weaving sword hitting the weft.³ Warp noises, from parting the shed and unsnagging threads, are often represented in poetic texts by means of rhotic and sibilant sounds (r, s).

Of course, some words likely to occur in the context of weaving have inherent, onomatopoeic qualities (e.g. *texo* ‘weave’), but how such words are deployed in context is far more important for the effectiveness of poetic sound mimesis: for example, do they appear as part of a cluster of certain sounds, or are they placed in an position which is emphasised through syntax or metre?⁴ Rhythm is a vital component in poetic sound-mimicking of textile work. Roman poetry depends on rhythmical sequences: details can be adjusted and varied only within the framework of metrical rules. Audiences are trained to listen keenly for how poets engage with set sequences, and for

¹ This experiment was designed for Dr Anna-Rosa Tricomi (Padua) in collaboration with Ida Demant (Lejre) and Eva Andersson Strand (CTR), who generously allowed me to record their work. On the loom weights and their context, Tricomi 2012.

² Czink 2010

³ Ov. *Fast.* 3.820: *erudit et rarum pectine denset opus* (‘she teaches [them to run the weft through the warp] and she presses together the remarkable weave with a pin beater’) and Claud. *Carm. Min. App.* 5.47: *densetur pectine texta* (‘the weave is packed with a pin beater’).

⁴ Cf. Lateiner 1990, 204-206.

how they satisfy or defy audience expectations of the chosen rhythm to underline the content of the poem.

The Pseudo-Vergilian *Ciris* exemplifies some of these features.⁵ References to spinning and weaving illustrate how the character Scylla has abandoned all her regular pastimes due to her lovesickness. The allusions to the soundscape of weaving contribute to an image of female industriousness in the reader's mind, a counterpoint to Scylla's own inactivity:

an Libyco molles plauduntur pectine telae 179

...nor is the soft weave beaten with ivory pin.

In his influential commentary on the *Ciris*, Lyne uses this passage to illustrate the density of literary allusion, highlighting the prominent play with Vergil: the three lines on music and weaving in the *Ciris* bring together Vergil's description of a weaver noisily running a pin beater through the warp⁶ with his description of Orpheus striking the strings on the lyre with an ivory plectrum in *Aeneid* 6.647.⁷ These literary parallels underline that music and wool-work go together, a connection which encourages us to listen for the music of weaving itself.

The single most noticeable sound-mimicking feature of the line is the centrally placed verb *plauduntur* ('is beaten'). While it has inherent onomatopoeic qualities, the *Ciris* poet has integrated it into a larger, sound-mimicking context and thus amplified its effect. Sensitised to the presence of weaving sounds through the emphasis on *plauduntur*

and the intertextual presence of texts connecting music and textile work, one may associate the line's opening plosives (b and c in *Libyco*) with the clanking sounds of wooden loom parts moving against each other during a shed change. Lyne attributes the poet's unusual choice of *Libyco* for 'ivory' to a desire for variety in line with the literary aesthetics espoused by the *Ciris* as a whole,⁸ but it also supports the allusion to the soundscape of weaving better than the alternatives, especially the poetically traditional *eburno* (with the same meaning), which lacks appropriate 'clanking sounds'.⁹ Next, the adjective *molles* ('soft', describing the weave) with its liquids and final s recalls the sound and feel of threads moving smoothly against the weaver's hand as they clear the shed before beating in the new weft. The brief silence arising when the weaver picks up the weaving sword is mirrored by the penthemimeral *caesura*, a regularly expected pause occurring in the middle of the third metrical foot. Through its dark vowels and a slow, spondaic rhythm, alluding to the dull resonance of the growing weave, *plauduntur* captures the beating of the newly inserted weft.

Then, a new weft thread is inserted and positioned with the pin beater. This lighter work element, and its brief, scratching sounds, is represented through the combination of plosives and close vowels in *pectine*. *Telae* as the subject of *plauduntur* grammatically signifies the growing weave, but it also evokes the loom frame itself: elsewhere, the word is used for the whole of the loom or its frame.¹⁰ In this way, the plosive

⁵ For a survey of the discussion of the dating of the *Ciris*, Kayachev 2016, 1-7.

⁶ Verg. *Georg.* 1.204: *arguto coniunx percurrit pectine telas* ('the wife runs through the weave with a chattering pin beater'; Aen. 7.14: *arguto tenuis percurrens pectine* ('she runs the fine weave through with a pin beater').

⁷ Lyne 1978, 37-39.

⁸ Lyne 1978, 38. Prevosti 2013 offers several typical examples of bone pin beaters from the Roman period.

⁹ Cf. Mart. 14.150 *Niliaco pectine* ('with a pin beater from the Nile') for another location adjective (equally rare), which also contributes to a clustering of plosive consonants mirroring the sounds of beating the weft.

¹⁰ *telae* referring to the loom (frame), e.g. Lucr. 5.1351; Verg. *Georg.* 1.286; Tib. 1.6.79. Cf. Öhrman 2017.

t in *telae* points forward to the movement and sounds of heddle bars moving against the loom during shed change. Thus the *Ciris* traces the sounds arising from one working sequence, from shed change (*Libyco*) to shed change (*telae*), in a single line.



FIG. 3 A pin beater is used to position the weft. Detail of experimental weave at CTR, using white weft for illustration purposes.

One of Tibullus' elegies about the ideal life in the countryside provides our second example (Tib. 2.1.63-66). This passage includes both a direct reference to the sound of loom weights and an indirect representation of the soundscape of weaving.

hinc et femineus labor est, hinc pensa colusque, 63
fusus et adposito pollice uersat opus: 64
atque aliqua adsiduae tatrix operata mineruae 65
cantat, et a pulso tela sonat latere. 66

...from here comes also the woman's work, the daily allotment of wool and the distaff, from here also the weaver singing as she busies herself with constant craft, and the loom resounds with struck clay loom weights.

Tibullus explicitly mentions that the loom itself creates noise (*tela sonat* 'the loom resounds'). He also highlights the part of the loom from which the sound derives (*pulso latere* 'with struck clay weights'). There are

no other mentions in Latin poetry of sound arising from loom weights, and until recently, the term *later* in this sense was only securely attested in this passage.¹¹ The find of an inscribed loom weight in excavations of Caesar Augusta near Zaragoza, bearing the legend *ama lateres* [...] ('Love [your] loom weights!') now provides evidence of the term's usage in Tibullus' period.¹² Maltby argues that Tibullus' use of this and other technological terms expresses his Hellenistic preference for displaying specialist knowledge,¹³ but this knowledge is also clearly rooted in the practice and vocabulary of those engaged in textile production.

It is fitting, therefore, that Tibullus' text also replicates the sounds of weaving with considerable detail in an indirect way. The two lines on weaving open with a half-line characterized by alliteration, stressing the unity of the three initial words, and plosives emphasized through their position at the beginning of each metrical foot (*atque aliqua adsiduae*). The clanking impression of this half-line corresponds well to the sound of shed change, where wooden parts of the loom clank against each other. The persistent elision of ending vowels in *atque aliqua adsiduae* blurs the boundaries between words, mirroring how the clanking of heddle rods drowns out other sounds. The sibilant in *adsiduae* expresses the swishing of the warp pulled back or forth by the heddles.

Next, a shift in perception of where the weaving sounds come from is created by syntax and the audience expectation of a prominent pause in the middle of the line: when the word *tatrix* ('weaver') stands emphasized after the mid-line pause and as the

¹¹ Murgatroyd 1980, 55-56; Maltby 1999, 246; Maltby 2002, 378. Maltby notes that Lucil. 681M also uses *later* in the context of looms, but the meaning is unclear.

¹² Beltrán Lloris and Beltrán Lloris 2012, also noting that *later* occurs in *Inscr. Aquil.* 3444, from roughly the same period.

¹³ Maltby 1999.

subject of the sentence, the focus shifts from the noise of the loom itself (i.e. its heddle rods, as we just saw) to the *textrix*, the weaver herself, who generates sound by moving her hands through the warp. The repeated rhotic sounds in *textrix*, *operata*, and *minervae* bring the low-frequency crackling sound of unsnagging warp threads to mind. The combination of close vowels and plosives in *textrix* may also allude to the light chiming of loom weights that accompanies this work element, developed fully in the next line. Thus, the sound play of the line beginning *atque aliqua adsiduae* generates a sonic zoom-in from sounds audible across the room (the clanking of heddle rods) to sounds perceptible to the weaver only (warp and weight noises).

The final line is initially about the weaver's song, opening with *cantat* ('she sings'), but later shifts to how the loom resonates with the sound of loom weights striking against each other during beating. Plosives (c, t, p, and t) and open vowels (a, u, o) merge with the sense of the verb *pulsere* ('beat' or 'strike') to recall the sound of regular beating of the weft along with the explicitly mentioned chiming of loom weights. A pronounced rhythmical pause (*diarexis*) falls after the word *pulso* ('struck'). Although sound is explicitly mentioned here through *sonat* ('resounds'), it is the light, falling rhythm¹⁴ that best captures the sound of loom weights settling into place after the louder noise of beating has ceased: the sequencing of *tela sonat latere* ('the loom resounds with ... clay') draws the reader's attention gradually away from loom sounds in general to those arising from the clay loom weights. The word *latere* ('clay') opens with two light syllables, suggesting that the

clatter of loom weights is barely audible, and then fades on a heavy, emphasized e, just as the light sound of loom weights peters out as the movement in the warp gradually stops.

Based on this work-mimicking sound play, Tibullus' couplet on weaving encapsulates one repetition of the weaver's work sequence (shed change, weft insertion, and beating with accompanying chiming of loom weights). Through its syntax and sequencing, the passage also highlights how sounds of different quality and origin are perceived, making a distinction between loud noises and noises perceptible only at close range and noises strongly supplemented by tactile experience.

These are but two examples of weaving sound play in Latin poetry: there are at least twenty passages that exhibit sound-mimicking features in their descriptions of weaving.¹⁵ They are evenly divided from the late Republic into Late Antiquity and occur in authors from different parts of the Empire. They vary in level of detail and length, and their level of engagement with the sounds and rhythms of textile work differs, but features such as those I have discussed here are typical. Even though experiments show that many sounds arising from weaving would be easily obscured by other sounds and do not carry beyond the space immediately around the loom, clearly these sounds were distinctive and meaningful even to those not directly involved in weaving themselves. Thus, the sounds of textile production emerges as an intrinsic part of elite domestic soundscapes from the Republic into Late Antiquity.

¹⁴ Morgan 2010, 352-359.

¹⁵ Cf. esp. Verg. *Georg.* 1.285-286; Tib. 1.6.79 (on which Öhrman 2017); Ov. *Met.* 4.275; 6.576-577; Ov. *Fast.* 3.819-820; Luc. 10.142-143; Sil. It. 14.656-660; Juv.

9.30; Aus. *Epist.* 22.14-16; *Epigr.* 28.1-2; Prud. *Ham.* 291-292; Claud. *Rapt.* 1.276-275; Claud. 1. 224-225; 8.594-595; *Carm. Min. App.* 5.44-48; *Symph.* 17.2; Paul. Petric. 320-321; Sidon. *Ap.* 15.154-161.

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